APPLICATION FOR LOW VOLTAGE DIRECTIVE

On Behalf Of

Company Limited Liability « Faraday Electronics »

Switching Mode Power Adaptor

Model: 19W/14.4V/EU(18V/1.0A), 19W/14.4V/EU(12V/1.5A)

Prepared For : Company Limited Liability « Faraday Electronics »
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TEST REPORT

EN 60065

Audio, Video and Similar Electronic Apparatus: Safety Requirements

Report Reference No. ..... :	PSZ1204026S
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Testing Laboratory ..... :	SHENZHEN PTSI TESTING CO., LTD.
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Address ..... :	Flat 37, House 4, UL Kirovogradskaya, Kiev, Ukraine
Manufacturer's name ..... :	Faraday Electronics (Hong Kong) Co., Ltd.
Address ..... :	#A1102, Tian He Lian Meng Building, Xin Sha Road, Sha Jing Town, Bao'an District, Shenzhen, China
First Factory's name ..... :	Faraday Electronics (Hong Kong) Co., Ltd.
Address ..... :	#A1102, Tian He Lian Meng Building, Xin Sha Road, Sha Jing Town, Bao'an District, Shenzhen, China
Second Factory's name ..... :	N/A
Address ..... :	N/A
Third Factory's name ..... :	N/A
Address ..... :	N/A
Test specification:	
Standard ..... :	EN 60065: 2002+A1: 2006+ A11: 2008 + A2: 2010
Test procedure ..... :	CE
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	IEC60065_I
Master TRF ..... :	2008-05

Test item description..... :	Switching Mode Power Adaptor
Trade Mark .....:	FARADAY ELECTRONICS
Manufacturer .....:	Same as applicant
Model/Type reference.....:	19W/14.4V/EU(18V/1.0A), 19W/14.4V/EU(12V/1.5A)
Ratings .....:	Input: 100-240 V~, 50/60Hz, 0.45A Output: 18V⎓, 1.0A for model 19W/14.4V/EU(18V/1.0A); 12V⎓, 1.5A for model 19W/14.4V/EU(12V/1.5A)

Copy of marking plate

Summary of testing:

1) The Maximum ambient temperature: 35°C.

2) Following tests performed during evaluation.

Clause(s)	Test(s)
5	Durability of Marking Test
5.1	Input Current Test
7.1	Heating under Normal Operations
7.2	Softening Test for insulation material
9.1.1.1	Touch current
9.1.6	Discharge Test of Mains Plug
9.1.7	Resistance to external Forces (50N)
10.1	Surge Test
10.2	Humidity Test
10.3	Insulation Resistance and Electric Strength
11.1	Touch current under Fault Conditions
11.2	Heating under Fault Conditions
12.1.2	Vibration test
12.1.3	Impact Test
12.1.4	Drop Test
12.1.5	Stress Relieve Test
13.2	Working Voltages
15.4.1	Torque on the socket-outlet test

Test item particulars.....:	Movable equipment
Classification of installation and use .....:	Class II
Supply connection .....:	±10%
Possible test case verdicts:	
- test case does not apply to the test object .....:	N/A
- test object does meet the requirement .....:	Pass (P)
- test object does not meet the requirement .....:	Fail (F)
Testing:	
Date of receipt of test items..... :	April 05, 2012
Date(s) of performance of tests.....:	April 05, 2012 to April 11, 2012

General remarks:

The test results presented in this report relate only to the object tested.

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"(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 (coma) is used as the decimal separator.

List of test equipment must be kept on file and available for review.

General product information:

The EUT covered by this report is a desk-top switching mode power adaptor with model: 19W/14.4V/EU(18V/1.0A) & 19W/14.4V/EU (12V/ 1.5A), used with audio, video and similar electronics apparatus. The two models are identical, only except the output rating, see below for details:

Input: 100-240 V~, 50/60Hz, 0.45A

Output: 18V⎓, 1.0A for model 19W/14.4V/EU(18V/1.0A); 12V⎓, 1.5A for model 19W/14.4V/EU (12V/ 1.5A).

Model 19W/14.4V/EU (12V/ 1.5A) has larger output current, selected as the Representative model.

The switching power supply’s bottom enclosure is secured to top enclosure by ultrasonic-wave welding.

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Clause	Requirement – Test	Result - Remark	Verdict
3	**General requirements**		**P**
	Safety class of the apparatus .....:	Class II equipment	**P**
4	**General test conditions**		**P**
4.1.4	Ventilation instructions require the use of the test box	Not used	**N/A**
5	**Marking and instructions**		**P**
	Comprehensible and easily discernible	The rating label is easily discernible.	**P**
	Permanent durability against water and petroleum spirit	Compliance was checked by rubbing the marking by hand for 15 s with cloth soaked with water and cloth soaked with petroleum spirit, it was not possible to remove marking plate and no curling observed after the test.	**P**
5.1	a) Identification, maker ……..:	(see copy of marking plate on page 2)	**P**
	b) Model number or type reference ……..:	(see copy of marking plate on page 2)	**P**
	c) Class II symbol if applicable ……..:	Class II symbol on the rating label	**P**
	d) Nature of supply …….....:	(see copy of marking plate on page 2)	**P**
	e) Rated supply voltage and symbol ……:	(see copy of marking plate on page 2)	**P**
	f) Mains frequency if safety dependant ……..…….:	(see copy of marking plate on page 2)	**P**
	g) Rated current or power consumption for apparatus supplied by supply apparatus for general use ……:	(see copy of marking plate on page 2, see also appended table 7.1)	**P**
	Measured current or power consumption ……...:		**P**
	Deviation % (max 10%) ……....:		**P**
	h) Power consumption marking for apparatus other than single phase ……..…….:		**P**
	i) Rated current or power consumption for apparatus intended for connection to an a.c. mains supply ……:		**P**
	Measured current or power consumption …..…….....:		**P**
	Deviation % (max 10%) ……....:		**P**

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Clause	Requirement – Test	Result - Remark	Verdict
5.2	Earth terminal	Class II equipment	**N/A**
	Hazardous live terminals	No such terminals	**N/A**
	Supply output terminals (other than mains)	No such terminals	**N/A**
5.3	Use of triangle with exclamation mark	Marked in circuit diagram	**P**
5.4	Instructions for use	English and German (Version in other language will be provided when submitted for national approval)	**P**
5.4.1	a) Mains powered equipment not exposed to dripping or splashing. Warning concerning objects filled with liquid, etc. ……..:	Mentioned in user manual	**P**
	b) Hazardous live terminals, instructions for wiring ...:	No such terminals	**N/A**
	c) Instructions for replacing lithium battery ……..:	No lithium battery used	**N/A**
	d) Class I earth connection warning ……..:	Class II equipment	**N/A**
	e) Instructions for multimedia system connection …..:	No such system	**N/A**
	f) Special stability warning for attachment of the apparatus to the flor/wall ……:	Not this type apparatus	**N/A**
	g) Warning: battery exposure to heat ……...:		**N/A**
	h) Warning: protective film on CRT face …….:	No such devices	**N/A**
5.4.2	Disconnect device: plug/coupler or all-pole mains switch location, accessibility and markings	Power plug provided	**P**
	Instructions for permanently connected equipment	No such equipment	**N/A**
	Marking, signal lamps or similar for completely disconnection from the mains ……...…:		**N/A**
6	**Hazardous radiation**		**P**
6.1	Ionizing radiation < 36 pA/kg (0,5 mR/h) ……..:	No ionizing radiation	**N/A**
	Ionizing radiation under fault condition ……..:		**N/A**
6.2	Laser radiation, emission limits to IEC 60825-1 ……..:	No laser radiation	**N/A**
	Emission limits under fault conditions ……..:		**N/A**
7	**Heating under normal operating conditions**		**P**
7.1	Temperature rises not exceeding specified values, no operation of fuse links	(see appended table 7.1)	**P**
7.1.1	Temperature rise of accessible parts	(see appended table 7.1)	**P**
7.1.2	Temperature rise of parts providing electrical insulation	(see appended table 7.1)	**P**

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Clause	Requirement – Test	Result - Remark	Verdict
7.1.3	Temperature rise of parts acting as a support or as a mechanical barrier	(see appended table 7.1)	**P**
7.1.4	Temperature rise of windings	(see appended table 7.1)	**P**
7.1.5	Parts not subject to a limit under 7.1.1 to 7.1.4		**N/A**
7.2	Softening temperature of insulating material supporting parts conductively connected to the mains carrying a current > 0,2 A at least 150 °C	Bobbin (Phenolic) of T1 and L1 are considered to be sufficient in regard to the temperature characteristic (150 °C). No other parts to be tested.	**P**
8	**Constructional requirements with regard to the protection against electric shock**		**P**
8.1	Conductive parts covered by lacquer, paper, untreated textile oxide films and beads etc. considered to be bare	Not used	**P**
8.2	No shock hazard when changing voltage setting device, fuse-links or handling drawers etc.	No voltage setting device. It is not possible for user to access fuse-links. No indicators and drawers used.	**N/A**
8.3	Insulation of hazardous live parts not provided by hygroscopic material	Not used	**N/A**
8.4	No risk of electric shock from accessible parts or from parts rendered accessible following the removal of a cover which can be removed by hand ……..:	No such a cover which can be removed by hand.	**N/A**
8.5	Class I equipment	Class II equipment	**N/A**
	Basic insulation between hazardous live parts and earthed accessible parts		**N/A**
	Resistors bridging basic insulation complying with 14.1 a)		**N/A**
	Capacitors bridging basic insulation complying with 14.2.1 a) ……..:		**N/A**
	Protective earthing terminal ……..:		**N/A**
8.6	Class II equipment and Class II constructions within Class I equipment	Class II equipment	**P**
	Reinforced or double insulation between hazardous live parts and accessible parts	Reinforced or double insulation used between hazardous live parts and accessible parts	**P**

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Clause	Requirement – Test	Result - Remark	Verdict
	Components bridging reinforced or double insulation complying with 14.1 a) or 14.3	Switching isolating transformer complying with 14.3	**P**
	Basic insulation bridged by components complying with 14.3.4.3. ……...:	No such components	**N/A**
	Basic and supplementary insulation each being bridged by a capacitor complying with 14.2.1 a) ……:	No such capacitors	**N/A**
	Double or reinforced insulation being bridged with 2 capacitors in series complying with 14.2.1 a) …….:	No such capacitors	**N/A**
	Double or reinforced insulation being bridged with a single capacitor complying with 14.2.1 b) …….:	Approved Y1 capacitor (CY1) bridged between primary and secondary	**P**
8.7	This clause is void		**--**
8.8	Basic or supplementary insulation > 0,4 mm (mm) :		**N/A**
	Reinforced insulation > 0,4 mm (mm) .....:	Thickness of enclosure: 2.0mm, for optocoupler see clause 14.11.	**P**
	Thin sheet insulation (excluding non-separable thin sheet insulation. See 8.22)		**N/A**
	Basic or supplementary insulation, at least two layers, each meeting 10.3		**N/A**
	Basic or supplementary insulation, three layers any two of which meet 10.3		**N/A**
	Reinforced insulation, two layers each of which meet 10.3	2 layers insulation tape wrapped around external of transformer T1. 2 layers insulation tape wrapped on primary and secondary heat sink. One of two layers passes dielectric strength test specified in 10.3 for reinforced insulation.	**P**
	Reinforced insulation, three layers any two which meet 10.3		**N/A**
8.9	Adequate insulation between internal hazardous live conductors and accessible parts	Double/reinforced insulation between primary live parts and accessible parts.	**P**
	Adequate insulation between internal hazardous live parts and conductors connected to accessible parts	No secondary wires can touch primary parts.	**P**
8.10	Double insulation between conductors connected to the mains and accessible parts. Double insulation between internal hazardous live parts and conductors connected to accessible parts.	See clause 8.9	**P**

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Clause	Requirement – Test	Result - Remark	Verdict
8.11	Detaching of wires		**P**
	No undue reduction of creepages or clearance distances if wires become detached	Secondary internal wires connected to PCB by soldering and fixed by glue.	**P**
	Vibration test carried out .....:		**P**
8.12	This clause is void		**--**
8.13	Adequate fastening of windows, lenses, lamp covers etc. (pull test 20 N for 10 s)	No such devices	**N/A**
8.14	Adequate fastening of covers (push/pull test 50 N for 10 s)	Enclosure only	**P**
8.15	No risk of damage to the insulation of internal wiring due to hot parts or sharp edges	Internal wires can't touch hot parts or sharp edges which can damage its insulation	**P**
8.16	Only special supply equipment can be used		**N/A**
8.17	Insulated winding wire without additional interleaved insulation	VDE approved triple insulated wire used in T1, see appendix 1 for transformer construction.	**P**
8.18	Endurance test as required by 8.17		**N/A**
8.19	Disconnection from the mains		**P**
8.19.1	Disconnect device	Appliance inlet used for disconnect device	**P**
	All-pole switch or circuit breaker with > 3 mm contact separation	See above	**N/A**
8.19.2	Mains switch ON indication	No mains switch used	**N/A**
8.20	Switch not fitted in the mains cord		**P**
8.21	Bridging components comply with clause 14	No mains switch used	**N/A**
8.22	Non-separable thin sheet material	No such material	**N/A**

9	**Electric shock hazard under normal operating conditions**		**P**
9.1	Testing on the outside		**P**
9.1.1	For voltages >1000 V ac or >1500 V dc complies with clause 13.3.1 for basic insulation	No such high voltage	**N/A**
9.1.1.1	a) Open circuit voltages	Measured max. open circuit voltage for output terminal not exceeding 60Vd.c.	**P**
	b) Touch current measured from terminal devices using the network in annex D .....:	(see appended table 9.1.1.1)	**P**

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Clause	Requirement – Test	Result - Remark	Verdict
	c) Discharge not exceeding 45 µC	Discharge not exceeding 45 µC	**N/A**
	d) Energy of discharge not exceeding 350 mJ	Open circuit voltage <15 KV	**N/A**
9.1.1.2	Test with test finger and test probe		**P**
9.1.2	No hazardous live shafts of knobs, handles or levers	No hazards, compliance was checked according to clause 9.1.1.	**P**
9.1.3	Ventilation holes and other holes tested by means of 4 mm x 100 mm test pin	No ventilation openings	**N/A**
9.1.4	Terminal devices tested with 1 mm x 20 mm test pin (10 N); test probe D of IEC 61032	No such terminal devices	**N/A**
	Terminal devices tested with 1 mm x 100 mm straight wire (1 N); test probe D of IEC 61032		**N/A**
9.1.5	Pre-set controls tested with 2.5 mm x 100 mm test pin (10 N); test probe C of IEC 61032	No pre-set controls used	**N/A**
9.1.6	No shock hazard due to stored charge on withdrawal of the mains plug; voltage (V) after 2 s .....:	4V measured	**P**
	If C is not greater than 0,1 uF no test needed	CX1=0.22uF	**P**
9.1.7	Enclosure sufficiently resistant to external force		**P**
	a)Test probe 11 of IEC 61032 for 10 s (50 N)		**P**
	b) Test hook of fig. 4 for 10 s (20 N)		**P**
	c) 30 mm diameter test tool for 5 s (100 or 250 N) :	Plastic enclosure used.	**N/A**
9.2	No hazard after removing a cover by hand	No cover can be removed by hand	**N/A**

10	**Insulation requirements**		**P**
10.1	Insulation resistance (MΩ) at least 2 MΩ min. after surge test for basic and 4 MΩ min. for reinforced insulation .....:	Tested between primary and accessible parts, after tested, EUT complied with the requirements of 10.3	**P**
10.2	Humidity treatment 48 h or 120 h .....:	93% R.H., 30ºC, 48h	**P**
10.3	Insulation resistance and dielectric strength between mains terminals	(see appended table 10.3)	**P**
	Insulation Resistance and dielectric strength across BASIC or SUPPLEMENTARY insulation (Class 1)	Class II equipment	**N/A**
	Insulation resistance and dielectric strength across REINFORCED insulation (Class II)		**P**

11	**Fault conditions**	**P**

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Clause	Requirement – Test	Result - Remark	Verdict
11.1	No shock hazard under fault condition	(see appended table 11.1)	**P**
11.2	Heating under fault condition		**P**
	No hazard from softening solder	No solder soften during the test.	**P**
	Flames extinguish within 10 seconds	No flames occurred	**N/A**
	Soldered terminations not used as protective mechanism		**P**
11.2.1	Measurement of temperature rises	(see appended table 11.2)	**P**
11.2.2	Temperature rise of accessible parts	(see appended table 11.2)	**P**
11.2.3	Temperature rise of parts, other than windings, providing electrical insulation		**P**
	Temperature rise of printed circuit boards (PCB) exceeding the limits of table 3 by max. 100 K for max. 5 min	None exceeding limits	**N/A**
	a) Temperature rise of printed circuit boards (PCB) to 20.1.3, exceeding the limits of table 3 by not more than 100 K for an area not greater than 2 cm²		**N/A**
	b) Temperature rise of printed circuit boards (PCB) to 20.1.3 up to 300 K for an area not greater than 2 cm² for a maximum of 5 min		**N/A**
	Meets all the special conditions if conductors on printed circuit boards are interrupted		**N/A**
	Class I protective earthing maintained	Class II equipment	**N/A**
11.2.4	Temperature rise of parts acting as a support or mechanical barrier	(see appended table 11.2)	**P**
11.2.5	Temperature rise of windings	(see appended table 11.2)	**P**
11.2.6	Temperature rise of parts not subject to the limits of 11.2.1 to 11.2.5		**N/A**

12	**Mechanical strength**		**P**
12.1.1	Bump test where mass >7 kg	Measured mass: 80g	**N/A**
12.1.2	Vibration test		**P**
12.1.3	Impact hammer test	0.5J, 3 times (After test, no damage and EUT can withstand the dielectric strength test as specified in 10.3)	**P**

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Clause	Requirement – Test	Result - Remark	Verdict
	Steel ball test	2J, 1 time (After test, no damage and EUT can withstand the dielectric strength test as specified in 10.3)	**P**
12.1.4	Drop test for portable apparatus where mass < 7 kg	3 times, 1000mm (After test, no damage and EUT can withstand the dielectric strength test as specified in 10.3)	**P**
12.1.5	Thermoplastic enclosures stress relief test	Test conditions: 104°C, 7h for enclosure (After test , no shrinkage or distortion for enclosure)	**P**
12.2	Fixing of knobs, push buttons, keys and levers	No such elements	**N/A**
12.3	Remote controls with hazardous live parts	No remote controls	**N/A**
12.4	Drawers (pull test 50 N, 10 s)	No drawers	**N/A**
12.5	Antenna coaxial sockets providing isolation	No antenna coaxial sockets	**N/A**
12.6	Telescoping or rod antennas construction	No such devices	**N/A**
12.6.1	Telescoping or rod antennas securement	No such devices	**N/A**

13	**Clearances and creepage distances**		**P**
13.1	Clearances in accordance with 13.3	(see appended table 13.3 & 13.4)	**P**
	Creepage distances in accordance with 13.4	(see appended table 13.3 & 13.4)	**P**
13.2	Determination of operating voltage	(see appended table 13.2)	**P**
13.3	Clearances	(see appended table 13.3 & 13.4)	**P**
13.3.1	General		**P**
13.3.2	Circuits conductively connected to the mains comply with table 8 and, where applicable, table 9		**P**
13.3.3	Circuits not conductively connected to the mains comply with table 10	No hazard when short circuited according to clause 11.	**P**
13.3.4	Measurement of transient voltages		**N/A**
13.4	Creepage distances	(see appended table 13.3 & 13.4)	**P**
	Creepage distances greater than table 11 minimum values		**P**

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Clause	Requirement – Test	Result - Remark	Verdict
13.5	Printed boards	No such printed boards	**N/A**
13.5.1	Clearances and creepage distances between conductors on printed circuit boards, one of which may be conductively connected to the mains, as in fig. 10		**N/A**
13.5.2	Type B coated printed circuit boards complying with IEC 60664-3 (basic insulation only)		**N/A**
13.6	Conductive parts along uncemented joints clearances and creepage distances comply with 13.3 and 13.4	No such parts	**N/A**
	Conductive parts along reliably cemented joints comply with 8.8		**N/A**
	Temperature cycle test and dielectric strength test		**N/A**
13.7	Enclosed, enveloped or hermetically sealed parts: not conductively connected to the mains: clearances and creepage distances as in table 12		**N/A**
13.8	Parts filled with insulating compound, meeting the requirements of 8.8	Approved opto-coupler with insulation thickness min. 0.4mm.	**P**
14	**Components**		**P**
14.1	Resistors		**P**
	a) Resistors between hazardous live parts and accessible metal parts	No such resistors	**N/A**
	b) Resistors, other than between hazardous live parts and accessible parts		**N/A**
	Resistors separately approved .....:		**N/A**
14.2	Capacitors and RC units		**P**
	Capacitors separately approved	See below	**P**
14.2.1	Y capacitors tested to IEC 60384-14, 2nd edition ...:	Approved Y1-Cap (CY1) used	**P**
14.2.2	X capacitors tested to IEC 60384-14, 2nd edition ...:	Approved X2-cap (CX1) used	**P**
14.2.3	Capacitors operating at mains frequency but not connected to the mains: tests for X2 .....:	No such capacitors	**N/A**
14.2.5	Capacitors with volume exceeding 1750 mm³, where short-circuit current exceeds 0,2 A: compliance with IEC60384-1, 4.38 category B or better .....:	See below	**N/A**
	Capacitors with volume exceeding 1750 mm³, mounted closer to a potential ignition source than table 5 permits: compliance with IEC 60 384-1, 4.38 category B or better .....:		**N/A**

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Clause	Requirement – Test	Result - Remark	Verdict
	Shielded by a barrier acc. To 20.1.4/ table 21 or metal .....:	Metal-cased capacitors used	**P**
14.3	Inductors and windings		**P**
	Comply with IEC 61558-1, IEC 61558-2 (as relevant) and clause 20.1.4	Tested with appliance	**N/A**
14.3.1	Transformers and inductors marked with manufacturer's name and type .....:	See table 14 for details	**P**
	Transformers and inductors separately approved .:	Tested with appliance	**N/A**
14.3.2	General		**P**
	Insulation material complies with clause 20.1.4		**P**
14.3.3	Constructional requirements	Class II construction	**P**
14.3.3.1	Clearances and creepage distances comply with clause 13	Clearance and creepage distance comply with the requirements of clause 13.	**P**
14.3.3.2	Transformers meet the constructional requirements		**P**
14.3.4	Separation between windings		**P**
14.3.4.1	Class II transformers have adequate separation between hazardous live parts and accessible parts (double or reinforced insulation)	Double or reinforced insulation used between hazardous live parts and accessible parts	**P**
	Coil formers and partition walls > 0,4 mm	0.8mm	**P**
14.3.4.2	Class I transformers, with basic insulation and protective screening only if all 7 conditions of 14.3.4.2 are met	Class II transformer	**N/A**
14.3.4.3	Separating transformers with at least basic insulation		**N/A**
14.3.5	Insulation between HAZARDOUS LIVE parts and ACCESSIBLE parts		**P**
14.3.5.1	Class II transformers have adequate insulation between hazardous live parts and accessible parts (double or reinforced insulation)	(see clause 14.3.4.1)	**P**
	Coil formers and partition walls > 0,4 mm	0.8mm	**P**
14.3.5.2	Class I transformers have adequate insulation between hazardous live parts and accessible conductive parts or those conductive parts or protective screens connected to a protective earth terminal	Class II transformer	**N/A**
	Winding wires connected to protective earth have adequate current-carrying capacity		**N/A**
14.4	High voltage components	No such components	**N/A**

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Clause	Requirement – Test	Result - Remark	Verdict
	High-voltage components and assemblies: U > 4 Kv (peak) separately approved		**N/A**
	Component meets category V-1 of IEC 60707		**N/A**
14.4.1	High voltage transformers and multipliers tested as part of the submission		**N/A**
14.4.2	High voltage assemblies and other parts tested as part of the submission		**N/A**
14.5	Protective devices		**P**
	Protective devices used within their ratings		**P**
	External clearances and creepage distances meet requirement of clause 13 for the voltage across the device when opened	(see appended table 13.1)	**P**
14.5.1.1	a) Thermal cut-outs separately approved	No thermal cut-outs used	**N/A**
	b) Thermal cut-outs tested as part of the submission		**N/A**
14.5.1.2	a) Thermal links separately approved	No thermal links used	**N/A**
	b) Thermal links tested as part of the submission		**N/A**
14.5.1.3	Thermal devices re-settable by soldering	No such devices	**N/A**
14.5.2.1	Fuse-links in the mains circuit according to IEC 60127	Approved fuse according to IEC 60127 standard used, also see table 14	**P**
14.5.2.2	Correct marking of fuse-links adjacent to holder ....:	Approved fuse rating marked close to fuse on PCB.	**P**
14.5.2.3	Not possible to connect fuses in parallel .....:	No fuse holder used	**N/A**
14.5.2.4	Not possible to touch hazardous live parts when replacing fuse-links without the use of a tool .....:	Fuse is not accessible by operator	**N/A**
14.5.3	PTC-S thermistors comply with IEC 60730-1	No such components	**N/A**
	PTC-S devices (15 W) category V-1 or better		**N/A**
14.5.4	Circuit protectors have adequate breaking capacity and their position is correctly marked		**N/A**
14.6	Switches	No switches used.	**N/A**
14.6.1 a)	Separate testing to IEC 61058 including: - 10 000 operations - Normal pollution suitability - Resistance to heat and fire level 3 - Make and break speed independent of speed of actuation V-0 compliance with annex G, G.1.1 ……...:		**P**
14.6.1 b)	Tested in the apparatus:		**N/A**

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Clause	Requirement – Test	Result - Remark	Verdict
	Switch controlling > 0.2A with open contact voltage > 35 V (peak)/24 V dc complying with 14.6.3, 14.6.4 and V-0 in annex G, G.1.1		**N/A**
	Switch controlling > 0.2A with open contact voltage < 35 V (peak)/24 V dc complying with 14.6.3 and V-0 in annex G, G.1.1		**N/A**
	Switch controlling < 0.2A with open contact voltage > 35 V (peak)/24 V dc complying with 14.6.4 and V-0 in annex G, G.1.1		**N/A**
14.6.2	Switch tested to 14.6.1 b) constructed to IEC 61058-1 subclause 13.1 and has making/breaking action independent of speed of actuation		**N/A**
14.6.3	Switch tested to 14.6.1 b) compliant with IEC 61058-1 subclause 16.2.2 d) and m) not attaining excessive temperatures in use		**N/A**
14.6.4	Switch tested to 14.6.1 b) has adequate dielectric strength		**N/A**
14.6.5	Mains switch controlling mains socket outlets additional tests to IEC 60058-1		**N/A**
	Socket outlet current marking correct		**N/A**
14.7	Safety interlocks	No safety interlocks used	**N/A**
	Safety interlocks to 2.8 of IEC 60950		**N/A**
14.8	Voltage setting devices and the like		**N/A**
	Voltage setting device not likely to be changed accidentally		**N/A**
14.9	Motors	No motors used	**N/A**
14.9.1	Endurance test on motors		**N/A**
	Motor start test		**N/A**
	Dielectric strength test		**N/A**
14.9.2	Not adversely affected by oil or grease etc.		**N/A**
14.9.3	Protection against moving parts		**N/A**
14.9.4	Motors with phase-shifting capacitors, three-phase motors and series motors meet clause. B.8, B.9 and B.10 of IEC 60950, Annex B		**N/A**
14.10	Batteries	No batteries used	**N/A**
14.10.1	Batteries mounted with no risk of accumulation of flammable gases		**N/A**
14.10.2	No possibility of recharging non-rechargeable batteries		**N/A**

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Clause	Requirement – Test	Result - Remark	Verdict
14.10.3	Recharging currents and times within manufacturers limits		**N/A**
	Lithium batteries discharge and reverse currents within the manufacturers limits		**N/A**
14.10.4	Battery mould stress relief		**N/A**
14.10.5	Battery drop test		**N/A**
14.11	Optocouplers	Approved optocoupler(U2) used	**P**
	Optocouplers comply with Cl. 8	Verified dti ≥ 0.4mm	**P**
	Internal and external dimensions to 13.1. or alternatively 13.6 (jointed insulation)	See appended table 13.3 & 13.4	**P**
14.12	Surge suppression varistors	No such component used	**N/A**
	Comply with IEC 61051-2		**N/A**
	Not connected between mains and accessible parts except for earthed parts of permanently connected apparatus		**N/A**
	Complies with the current pulse, fire hazard and thermal stress requirements of 14.12		**N/A**
15	**Terminals**		**P**
15.1.1	Mains plug, appliance inlet, interconnection couplers and mains socket-outlet meet the appropriate standard	Mains plug meets the appropriate standard	**P**
	Overloading of plugs or appliance inlets prevented if the apparatus has mains socket outlets	No mains socket outlets used	**N/A**
	Overloading of internal wiring prevented if the apparatus has mains socket outlets		**N/A**
15.1.2	Connectors for antenna, earth, audio, video or data:		**N/A**
	No risk of insertion in mains socket-outlets		**N/A**
	No risk of insertion into audio or video: outlets marked with the symbol of 5.2	No such outlets	**N/A**
15.1.3	Output terminals of a.c. adaptors or similar devices not compatible with household mains socket-outlets	Output plug not compatible with sockets according to IEC 60083 or IEC 60320	**P**
15.2	Provision for protective earthing		**N/A**
	Accessible conductive parts of Class I equipment reliably connected to earth terminal, within equipment	Class II equipment	**N/A**
	Protective earth conductors correctly coloured		**N/A**

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Clause	Requirement – Test	Result - Remark	Verdict
	Equipment with non-detachable mains cord provided with separate protective earth terminal near mains input		**N/A**
	Protective earth terminal resistant to corrosion		**N/A**
	Earth resistance test: < 0,1 Ω at 25 A .....:		**N/A**
15.3	Terminals for external flexible cords and for permanent connection to the mains supply	No such terminals	**N/A**
15.3.1	Adequate terminals for connection of permanent wiring		**N/A**
15.3.2	Reliable connection of non-detachable cords:		**N/A**
	Not soldered to conductors of a printed circuit board		**N/A**
	Adequate clearances and creepage distances between connections should a wire break away		**N/A**
	Wire secured by additional means to the conductor		**N/A**
15.3.3	Screws and nuts clamping conductors have adequate threads: ISO 261, ISO 262 or similar	No such screws and nuts	**N/A**
15.3.4	Soldered conductors wrapped around terminal prior to soldering or held in place by additional means		**N/A**
	Clamping of conductor and insulation if not soldered or held by screws		**N/A**
15.3.5	Terminals allow connection of appropriate cross-sectional area of conductors, for the rated current of the equipment		**N/A**
15.3.6	Terminals to 15.3.3 have sizes required by table 16		**N/A**
15.3.7	Terminals clamp conductors between metal and have adequate pressure		**N/A**
	Terminals designed to avoid conductor slipping out when tightened or loosened		**N/A**
	Terminals adequately fixed to avoid loosening when the clamping is tightened or loosened and stress on internal wiring is avoided		**N/A**
15.3.8	Terminals carrying a current more than 0,2 A: contact pressure not transmitted by insulating material except ceramic		**N/A**
15.3.9	Termination of non-detachable cords: wires terminated near to each other		**N/A**
	Terminals located and shielded: test with 8 mm strand		**N/A**
15.4	Devices forming a part of the mains plug	Not Direct plug-in	**N/A**
15.4.1	No undue strain on mains socket-outlets		**N/A**

EN 60065			
Clause	Requirement – Test	Result - Remark	Verdict
15.4.2	Device complies with standard for dimensions of mains plugs		**N/A**
15.4.3	Device has adequate mechanical strength (tests a,b,c)		**N/A**
16	**External flexible cords**		**P**
16.1	Mains cords sheathed type, complying with IEC 60227 for PVC or IEC 60245 for synthetic rubber cords ...:		**P**
	Non-detachable cords for Class I have green/yellow core for protective earth		**N/A**
16.2	Mains cords conductors have adequate cross-sectional area for rated current consumption of the equipment	0.75mm^{2}x2	**P**
16.3	a) Flexible cords not complying with 16.1, used for interconnections between separate units of equipment used in combination and carrying hazardous live voltages, have adequate dielectric strength	No such flexible cords	**N/A**
	b) Flexible cords not complying with 16.1, withstand bending and mechanical stress (3.2 of IEC 60227-2)		**N/A**
16.4	Flexible cords used for connection between equipment have adequate cross-sectional areas to avoid temperature rise under normal and fault conditions	Cross-sectional areas of output cord suitable for the intended current	**P**
16.5	Adequate strain relief on external flexible cords	Cord anchorage used on external flexible cord. It provided adequate strain relief. Displacement: 0,6mm.	**P**
	Not possible to push cord back into equipment		**P**
	Strain relief device unlikely to damage flexible cord		**P**
	For mains cords of Class I equipment, hazardous live conductors become taut before earth conductor	Class II equipment	**N/A**
16.6	Apertures for external flexible cord: no risk of damage to the cord during assembly or movement in use		**N/A**
16.7	Transportable musical instruments and amplifiers fitted with detachable cord set with appliance inlet to IEC 60320-1	No transportable musical instrument	**N/A**
	Transportable musical instruments and amplifiers fitted with detachable cord sets or with means of stowage to protect the cord		**N/A**

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Clause	Requirement – Test	Result - Remark	Verdict
17	**Electrical connections and mechanical fixings**		**P**
17.1	Torque test to table 20:	No fixing screws used.	**N/A**
	- screws into metal: 5 times		**N/A**
	- screws into non-metallic material: 10 times		**N/A**
17.2	Correct introduction into female threads in non-metallic material		**N/A**
17.3	Cover fixing screws: captive		**N/A**
	Non-captive fixing screws: no hazard when replaced by a screw whose length is 10 times its diameter		**N/A**
17.4	No loosening of conductive parts carrying a current > 0,2 A		**N/A**
17.5	Contact pressure not transmitted through plastic other than ceramic for connections carrying a current > 0,2 A		**P**
17.6	Stranded conductors of flexible supply cords carrying a current > 0,2 A with screw terminals not consolidated by solder		**N/A**
17.7	Cover fixing devices other than screws have adequate strength and their positioning is unambiguous		**N/A**
17.8	Fixing devices for detachable legs or stands provided		**N/A**
17.9	Internal pluggable connections, affecting safety, unlikely to become disconnected	No such connections	**N/A**
18	**Mechanical strength of picture tubes and protection against the effects of implosion**		**N/A**
	Picture tube separately approved to IEC 61965:	No picture tube used	**N/A**
	Picture tube separately approved to 18.1		**N/A**
18.1	Picture tubes > 16 cm intrinsically protected		**N/A**
	Non-intrinsically protected tubes > 16 cm used with protective screen		**N/A**
	Protective film as part of implosion protection: edges covered by enclosure		**N/A**
18.2	Intrinsically protected tubes: tests on 12 samples		**N/A**
18.2.1	Samples subject to ageing: 6		**N/A**
18.2.2	Samples subject to implosion test: 6		**N/A**
18.2.3	Samples subject to mechanical strength test (steel ball): 6		**N/A**
18.3	Non-intrinsically protected tubes tested to 18.3		**N/A**

EN 60065			
Clause	Requirement – Test	Result - Remark	Verdict
19	**Stability and mechanical hazards**		**P**
	Mass of the equipment exceeding 7 kg .....:	No glass surface	**N/A**
	Apparatus intended to be fastened in place – suitable instructions	Not this type apparatus	**N/A**
19.1	Test on a plane, inclined at 10^{o} to the horizontal		**N/A**
19.2	100 N force applied vertically downwards		**N/A**
19.3	100 N force, or 13% of weight, applied horizontally to point of least stability.		**N/A**
19.4	Edges or corners not hazardous	Edges and corners are smoothed	**P**
19.5	Glass surfaces (exc. Laminated) with an area exceeding 0,1 m² or maximum dimension > 450 mm, pass the test of 19.5.1	No glass surface	**N/A**
19.6	Wall or ceiling mountings adequate		**N/A**
20	**Resistance to fire**		**P**
20.1	Electrical components and mechanical parts		**P**
	a) Exemption for components contained in an enclosure of material V-0 to IEC 60695-11-10 with openings not exceeding 1 mm in width	Plastic enclosure with a flammability category of V-0 used. Openings less than 1mm width or completely filled by wiring.	**P**
	b) Exemption for small components as defined in 20.1	Some small components mounted on UL approved PCB with flammability of V-0.	**P**
20.1.1	Electrical components meet the requirements of Clause 14 or 20.1.4		**P**
20.1.2	Insulation of internal wiring working at voltages > 4 Kv or leaving an internal fire enclosure, or located within the areas mentioned in Table 21, not contributing to the spread of fire	a) wiring working at voltage < 4 kV (peak) a.c or d.c; b) no internal fire enclosure; c) no such wiring	**N/A**
20.1.3	Material of printed circuit boards on which the available power exceeds 15 W at a voltage between 50 V and 400 V (peak) a.c. or d.c. meets V-1 or better to IEC60707, unless used in a fire enclosure	V-0 PCB used.	**P**
	Material of printed circuit boards on which the available power exceeds 15 W at a voltage > 400 V (peak) a.c. or d.c. meets V-0 to IEC 60707	See above.	**P**

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Clause	Requirement – Test	Result - Remark	Verdict
20.1.4	Components and parts not covered by 20.1.1, 20.1.2 and 20.1.3 (other than fire enclosures) mounted nearer to a potential ignition source than the distances in Table 21 comply with the relevant flammability category in Table 21	See clause 20.1	**N/A**
	Components and parts as above but shielded from a potential ignition source, with the barrier area in accordance with Table 21 and fig. 13		**N/A**
	Apparatus with voltages > 4Kv under normal operating conditions and distances to the enclosure exceed those specified Table 21, flammability classification HB40 or better is required for the enclosure.		**N/A**
20.2	Fire enclosure		**N/A**
20.2.1	Potential ignition sources with open circuit voltage > 4 Kv (peak) a.c. or d.c. contained in a fire enclosure to V-1	Open circuit voltage not exceeding 4 kV (peak) a.c. or d.c.	**N/A**
20.2.2	Internal fire enclosures with openings not exceeding 1 mm in width and with openings for wires completely filled	No internal fire enclosure.	**N/A**
20.2.3	Requirements of 20.2.1 and 20.2.2 met by an internal fire enclosure		**N/A**
A	**Annex A, Additional requirements for apparatus with protection against splashing water**		**N/A**
A.5	Marking and instructions		**N/A**
A.5.1	j) Marked with IPX4 (IEC 60529), 5.4.1 a) does not apply	IP20, not applied for	**N/A**
A.10.2	Insulation requirements		
A.10.2.1	Enclosure provides protection against splashing water		**N/A**
A.10.2.2	Humidity treatment carried out for 7 days		**N/A**
B	**Annex B, Apparatus to be connected to the TELECOMMUNICATION NETWORKS**		**N/A**
	Complies with IEC 62151 clause 1	EUT not intended for connection to telecommunication networks	**N/A**
	Complies with IEC 62151 clause 2		**N/A**
	Complies with IEC 62151 clause 3 but with 3.5.4 modified to 2.4.10 of this standard		**N/A**

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Clause	Requirement – Test	Result - Remark	Verdict
	Complies with IEC 62151 clause 4 but with 4.1.2, 4.1.3 and 4.2.1.2 modified in accordance with annex B of this standard		**N/A**
	Complies with IEC 62151 cause 5 but with 5.3.1 modified in accordance with annex B of this standard		**N/A**
	Complies with IEC 62151 clause 6		**N/A**
	Complies with IEC 62151 clause 7		**N/A**
	Complies with IEC 62151 annex A, B and C		**N/A**
L	**ANNEX L, Additional requirements for electronic flash apparatus for photographic purposes**		**N/A**
L5	Marking and Instructions	Not this type apparatus	**N/A**
L.5.4	Instructions for battery chargers and Supply apparatus indicating type or model number of flash apparatus with which it is to be used …….:		**N/A**
	Instructions for flash apparatus indicating type or model number of battery chargers or Supply apparatus with which it is to be used …….:		**N/A**
L.7	Heating under normal operating conditions		**N/A**
L7.1.5 & L11.2.6	Lithium batteries meet permissible temp rise in Table 3 , unless comply with 6.2.2.1.or 6.2.2.2 of IEC 60086-4 ……..…..:		**N/A**
L. 9	Electric shock hazard under normal operating conditions		**N/A**
L9.1.1	Terminals to connection to synchroniser not HAZARDOUS LIVE		**N/A**
L.10	Insulation requirements		**N/A**
L.10.3.2	High frequency puls ignition ……..:		**N/A**
L.12	Mechanical strength		**N/A**
L.12.1.3	Windows for flash tubes are excluded from steel ball impact test ……...:		**N/A**
L.14	Components		**N/A**
L14.6.6	Mains switch characteristics appropriate to its function under normal conditions		**N/A**
L.20	Resistance to fire		**N/A**
L.20.1 c)	Trigger coil for discharge purpose is not considered to be a POTENTIAL IGNITION SOURCE ……..:		**N/A**

EN 60065			
Clause	Requirement – Test	Result - Remark	Verdict

7.1	TABLE: temperature rise measurements		**P**
	Power consumption in the OFF/Stand-by…….	--	
	Position of the functional switch (W) ..... :	--	—

Operating conditions					
Un (Vac)	In (A)		Pn (W)		Pout (W)
For model:	**50Hz**	**60Hz**	**50Hz**	**60Hz**	--
90	0.53	0.55	24.1	24.0	
100	048	0.49	24.0	24.0	
240	0.20	0.21	24.0	23.9	
264	0.18	0.18	23.9	23.9	

	Loudspeaker impedance (Ω)	No speaker	—
	Several loudspeaker systems	--	-
	Marking of loudspeaker terminals	-	-

		dT (K)				Limit dT (K)
	Supply voltage (Vac)	90V/60Hz		264V/50Hz		
	Position	Label down	Label up	Label down	Label up	
1	Power cord internal	12.0	14.1	8.7	8.7	70-35=35
2	CX1	34.7	36.6	25.3	24.9	100-35=65
3	L1 coil	49.2	50.1	29.8	29.7	130-35-10=85
4	PCB under BR1	65.9	66.3	41.2	41.3	130-35=95
5	C1	54.3	56.1	43.5	43.2	105-35=70
6	PCB under Q1	59.7	60.4	49.3	49.1	130-35=95
7	T1 winding	63.6	65.8	59.2	59.2	120-35-10=75
8	T1 core	63.0	64.1	57.5	56.5	120-35-10=75
9	CY1	59.2	59.1	51.6	52.1	125-35=90
10	U3	59.8	60.8	57.3	58.3	100-35=65
11	PCB under D1	61.6	63.3	56.9	57.0	130-35=95
12	Output wire	37.4	38.9	34.6	34.1	80-35=45
13	Enclosure inside, near T1	55.2	58.1	51.4	49.4	115-35=80
14	Enclosure outside, near T1	37.2	42.9	37.9	32.9	95-35=60
15	Ambient	26.0	26.0	26.3	26.3	--

Notes:

- The temperature rise limit is based on max. ambient operating temperature 35°C declared by the client.
  Repeated three times and the temperature measured for each time, the average value for the three times listed.

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Clause	Requirement – Test	Result - Remark	Verdict

7.2	TABLE: softening temperature of thermoplastics		**N/A**
Temperature T of part	T – normal conditions (°C)	T – fault conditions (°C)	T softening(°C)
--	--	--	--
Notes: - see clause 7.2			

9.1.1	TABLE: Electric shock hazard under normal condition			**P**
Touch current measured between:	U1 (V)	Required U1 (Vpk)	U2 (V)	Required U2 (Vpk)
L/N-enclosure with metal foil	1.8	35	0.10	0.35
L/N-output terminal	3.8	35	0.24	0.35

Measured between:	Neutral Switch (S1) open		Neutral Switch (S1) close	
	MIU	Limit MIU	MIU	Limit MIU
L/N to output	0.205	0.5	0.135	0.5
L/N to enclosure (with metal foil)	0.005	0.5	0.005	0.5

Note: 1. The touch current is measured according to 9.1.1 b) with the test circuit of Annex D connected between the specified points. Input: 264V, 60Hz.

2. MIU measured according to UL 60065.

9.1.6	TABLE: discharge test			**P**
Condition	After 2s (V)	U → 0V t (s)	Comments	
L and N	0	--	Vmax=392V	
Note: CX1=0.22μF.				

10.3	TABLE: insulation resistance measurements		**P**
Insulation resistance R between:	R (MΩ)	Required R (MΩ)	
L and N (Fuse disconnect)	500	2	
L/N and plastic enclosure (with metal foil)	500	4	
L/N and output terminal	500	4	
T1 primary winding and secondary winding	500	4	
T1 secondary winding and core	500	4	
One layer insulation tape of used in and around T1 and on heat sinks	500	4	
Note: above test performed immediately after the humidity test according to 10.2 and after test of clause 10.1			

EN 60065			
Clause	Requirement – Test	Result - Remark	Verdict

10.3	TABLE: electric strength measurements		**P**
Test voltage applied between:		Test voltage (V)	Breakdown
L and N (Fuse disconnect)		2120Vdc	No
L/N and plastic enclosure (with metal foil)		3000Vac	No
L/N and output terminal		4240Vdc	No
T1 primary winding and secondary winding		3000Vac	No
T1 secondary winding and core		3000Vac	No
One layer insulation tape of used in and around T1 and on heat sinks		3000Vac	No
Note: above test performed immediately after the humidity test according to 10.2 and for tests of unit after surge test of 10.1			

11.1	TABLE: Electric shock hazard under abnormal condition				**P**
Touch current measured between:	Condition	U1 (V)	U1 (Vpk) Limit	U2 (V)	U2 (Vpk) Limit
N to output terminal	BR1 s-c	5.08	70	0.245	1.4
L/N to output terminal	C1 s-c	4.98	70	0.239	1.4
L/N to output terminal	PC1 pin 1-2 s-c	3.97	70	0.189	1.4
L/N to output terminal	PC1 pin 3-4 s-c	3.89	70	0.202	1.4
L/N to output terminal	PC1 pin 1 o-c	3.98	70	0.197	1.4
L/N to output terminal	D1 s-c	3.95	70	0.189	1.4
L/N to output terminal	Output s-c	4.12	70	0.197	1.4
L/N to output terminal	Output o-l	4.52	70	0.189	1.4
L/N to output terminal	Transformer o-l	4.52	70	0.195	1.4
Note: 1. The touch current is measured according to 9.1.1 b) with the test circuit of Annex D connected between the specified points. Input: 264V, 60Hz.					

EN 60065			
Clause	Requirement – Test	Result - Remark	Verdict

11.2	TABLE: summary of fault condition tests		**P**
	Voltage (V) 0,9 or 1,1 times rated voltage .....:	See below.	—
	Ambient temperature (^{o}C) .....:	See below.	—

No.	Component no.	Fault	Test voltage (V)	Test time	Fuse no.	Fuse current (A)	Result
1	BR1(pin-～pin+)	S-C	264	1s	F1	0.18→0	Fuse open(F101), no hazards.
2	C1	S-C	264	1s	F1	0.18→0	Fuse open(F101), no hazards.
3	Q1(D-G)	S-C	264	1s	F1	0.18→0	Fuse open(F101), no hazards.
4	Q101(D-S)	S-C	264	1s	F1	0.18→0	Fuse open(F101), no hazards.
5	Q101(G-S)	S-C	264	10mins	F1	0.18→0.02	Unit shutdown, no hazards.
6	U1(pin1-pin2)	S-C	264	10mins	F1	0.18→0.02	Unit shutdown, no hazards.
7	U1(pin6-pin2)	S-C	264	10mins	F1	0.18→0.02	Unit shutdown, no hazards.
8	U1(pin5-pin6)	S-C	264	10mins	F1	0.18→0.02	Unit shutdown, no hazards.
9	T1(pin1-pin2)	S-C	264	1s	F1	0.18→0	Fuse open(F101), no hazards.
10	T1(pin4-pin5)	S-C	264	10mins	F1	0.18→0.13	Unit shutdown, no hazards.
11	T1(pin11-pin12)	S-C	264	10mins	F1	0.18→0.13	Unit shutdown, no hazards.
12	D1	S-C	264	10mins	F1	0.18→0.02	Unit shutdown, no hazards.
13	U3(pin1-pin2)	S-C	264	10mins	F1	0.18→0.12	Unit shutdown, no hazards.
14	U3(pin3-pin4)	S-C	264	10mins	F1	0.18→0.02	Unit shutdown, no hazards.
15	U2 pin1	O-C	264	10mins	F1	0.18→0.09	Unit shutdown, no hazards.
16	D201	S-C	264	10mins	F1	0.18→0.05	Unit shutdown, no hazards.
17	Output	S-C	264	10mins	F1	0.18→0.11	Unit shutdown, no hazards.

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Clause	Requirement – Test	Result - Remark	Verdict

18	Output	O-L	264	5.5hrs	F1	0.18→0.35 →0.10	Overload to 2.5A, unit shutdown. Highest temperature rise at T1 winding= 80.9K, T1 core=77.5K, U3=76.9K, Enclosure outside=47.3K, Ambient=26.4°C, No hazards.

Note(s): S-C=short-circuited, O-C=open-circuited, O-L=overload.

After the single fault test the unit passed 3000V hi-pot test between primary and accessible parts.

The max. ambient temperature declared by the manufacturer is 35°C. Temperature rise based on Class B during fault condition limited to 175-10-35=130K, 65K for enclosure outside and 125-35=90K for optocoupler.

Each fault where fuse opened was tested with each source of fuse with the same result.

13.2	Table: working voltage measurement		**P**
Location	RMS voltage (V)	Peak voltage (V)	Comments
T1(pin1-pin11)	241	532	--
T1(pin2-pin11)	205	408	--
T1(pin4-pin11)	206	380	--
T1(pin5-pin11)	206	364	--
T1(pin1-pin12)	257	552	Max.Vrms and Max.Vpeak
T1(pin2-pin12)	203	356	--
T1(pin4-pin12)	207	420	--
T1(pin5-pin12)	204	352	--
U3(pin1-pin3)	210	364	--
U3(pin1-pin4)	203	356	--
U3(pin2-pin3)	209	368	--
U3(pin2-pin4)	203	352	--
CY1	203	352	--

Note (s): Supply 240V/60Hz, normal load.

13.3&13.4	TABLES: clearances and creepage distances	**P**

EN 60065			
Clause	Requirement – Test	Result - Remark	Verdict

Clearance cl and creepage distance dcr at/of:	U p (V)	U r.m.s. (V)	Required cl (mm)	cl (mm)	Required dcr (mm)	dcr (mm)
On primary						
L-N on PCB (BI)*	420	250	2.0	2.8	2.5	2.8
Different polarity of fuse F101 (BI)	420	250	2.0	2.7	2.5	2.7
Primary components to accessible part						
Components (C1, F1) in primary (with 10N) to enclosure outside (RI)*	420	250	4.0	5.9	5.0	5.9
Primary components to secondary components						
Primary to secondary of Opto-coupler U3 (RI)	420	250	4.0	5.2	5.0	5.2
Primary to secondary of Y1-cap CY1 (RI)	420	250	4.0	7.2	5.0	7.2
Secondary components (body of C5) to primary winding of transformer (RI)	552	257	4.4	>4.4	5.2	>5.2
Secondary pin of transformer to primary winding of transformer (RI)	552	257	4.4	9.0	5.2	9.0
Primary trace to secondary trace under PCB (RI)	552	257	4.4	7.2	5.2	7.2

Note(s):

* BI=Basic insulation, RI=reinforced insulation.

1) 2 layers insulation tape wrapped around external and core of transformer as reinforced insulation.

2) 2 layers insulation tape wrapped on primary heat sink and secondary heat sink as reinforced insulation.

3) Triple insulated wire used for secondary winding of the transformer.

4) Core is considered as primary.

5) Heat shrinkable tube used on F1 as basic insulation.

14	TABLE: list of critical components and materials				**P**
Object/part no.	Manufacturer/ trademark	Type/model	Technical data	Standard	Mark(s) of conformity [1.]
Enclosure	BAYER MATERIAL SCIENCE LTD.	6485(f2)	V-0, min. thickness 2.0mm, 115°C	UL94	UL E178485
PCB	--	--	V-0, Min.130°C	UL94	UL
Power plug					

EN 60065			
Clause	Requirement – Test	Result - Remark	Verdict

Fuse (F1)	KING WAHOO ELECTRONICS CO., LTD.	3SC	T2.0A, 250Vac	UL 248 IEC 60127-3	VDE 40021545
(Alternative)	LITTELFUSE INC	676	T2.0A, 250Vac	UL 248 IEC 60127-3	VDE 40006254
(Alternative)	WALTER ELECTRONIC CO., LTD.	ICP	T2.0A, 250Vac	UL 248 IEC 60127-3	VDE 40012824
X-capacitor (CX1)	TENTA ELECTRIC INDUSTRIAL CO., LTD.	MEX	0.22uF, Min 275Vac, 100°C	IEC/EN 60384-14	VDE 119119
(Alternative)	DAIN ELECTRONICS CO., LTD.	MPX, NPX	0.22uF, Min 250Vac, 100°C	IEC/EN 60384-14	VDE 40018798
(Alternative)	CARLI ELECTRONICS CO., LTD.	MPX	0.22uF, Min 275Vac, 100°C	IEC/EN 60384-14	VDE 40008520
(Alternative)	CAMEL TECHNOLOGY CORP	MPX	0.22uF, Min 275Vac, 100°C	IEC/EN 60384-14	VDE 136014
Bleeding Resistor (R1, R2)	--	--	1M ohm, 1/4W	--	--
Line choke (L1)	HANG SING INDUSTRIAL CO., LTD.	UU-10.5	130°C	Applicable part according to IEC 60065 and IEC 60085	Accepted by TÜV Rheinland
Bridge Diodes (BR1)	--	--	Minimum 600V, 4A	--	--
Electrolytic Capacitor (C1)	--	--	15uF, 400V, Minimum, 105°C	--	--
Photo Coupler (U3)	LITE-ON TECHNOLOGY CORP	LTV 817	Di=0.8mm, int dcr=5.2mm, ext dcr=7.8mm, 100°C, 5000Vac	IEC/EN 60747-5-2	VDE 40015248
(Alternative)	BRIGHT LED ELECTRONICS CORP	BPC-817	Di. >1.0mm, ext. dcr >7.0mm, 100℃, 5000Vac	IEC/EN 60747-5-2	VDE 40007240
Bridge Capacitor(CY1) (Y1type)	JYH CHUNG ELECTRONICS CO., LTD.	JD	250Vac, 3300pF, 125°C	IEC/EN 60384-14	VDE 40016598
(Alternative)	HSUAN TAI ELECTRONICS CO., LTD.	CY	250Vac, 3300pF, 125°C	IEC/EN 60384-14	VDE 40008912

EN 60065			
Clause	Requirement – Test	Result - Remark	Verdict

(Alternative)	SHANTOU HIGH-NEW TECHNOLOGY DEVELOPMNT ZONE SONGTIAN ENTERPRISE CO., LTD.	CD	250Vac, 3300pF, 125 °C	IEC/EN 60384-14	VDE 40003586
Transformer (T1)	--	--	Class B	Applicable part according to IEC 60065 and IEC 60085	Test with appliance
Bobbin of B1	CHANG CHUN	T375J	Phenolic, V-0, 150°C, min. thickness 0.86mm	UL	UL
Triple insulated wire	FURUKAWA	TEX-E	130°C	UL	UL
(Alternative)	CHANGYUAN	CB-TIW	130°C	UL	UL
Output wire	--	--	18AWG, VW-1, 80°C, 300V	--	--
Insulation tape used in and around T1 and on heat sinks	--	--	130°C	--	UL
Note(s): An asterisk indicates a mark which assures the agreed level of surveillance.					

EN 60065			
Clause	Requirement – Test	Result - Remark	Verdict

Appendix 1	**Safety isolation transformer**		**P**
	Construction details:		
Transformer part name: T1			
Manufacturer: See appended table 14			
Type: See appended table 14			
Note:			
Recurring peak voltage		552	
Required clearance for reinforced			
insulation (from table 8 and table 9)		4.4 mm	
Effective voltage rms		257	
Required creepage distance for reinforced			
insulation (from table 11 with interpolation)		5.2mm	
Measured min. creepage distance			
Location		inside (mm)	outside (mm)
Primary-secondary		Triple insulated wires used	9.0 (between soldering pin of sec. and pri. winding)
Primary-core		Core considered as primary	Core considered as primary
Secondary-core		Triple insulated wires used	10.0 (between soldering pin of sec. and core.)
Primary-primary		%	%
Measured min. clearances			
Location		inside (mm)	outside (mm)
Primary-secondary		Triple insulated wires used	9.0 (between soldering pin of sec. and pri. winding)
Primary-core		Core considered as primary	Core considered as primary

EN 60065			
Clause	Requirement – Test	Result - Remark	Verdict

Secondary-core	Triple insulated wires used	10.0 (between soldering pin of sec. and core.)
Primary-primary	%	%
Construction:		
Concentric windings on bobbin, two layers insulation tape wrapped around external and core (wrapped back on the bottom at least 2mm height) of transformer as reinforced insulation. Triple insulated wires used as secondary winding. Insulating tube used to separate primary windings and secondary triple insulated wires where crossing. The lead pins soldered to primary windings were directly moulded in bobbin and the lead wires of secondary windings were directly soldered in PCB.		
Pin numbers		
Pri.	5→4, 1→2	
Sec.	11→12 (flying leads)	
Bobbin		
Material	CHANG CHUN PLASTIC CO LTD, type T375J, Phenolic, V-0, 150°C.	
Thickness	0.8mm	
Electric strength test		
With AC 3000V after humidity treatment		
Result	Pass	

Photos documentation

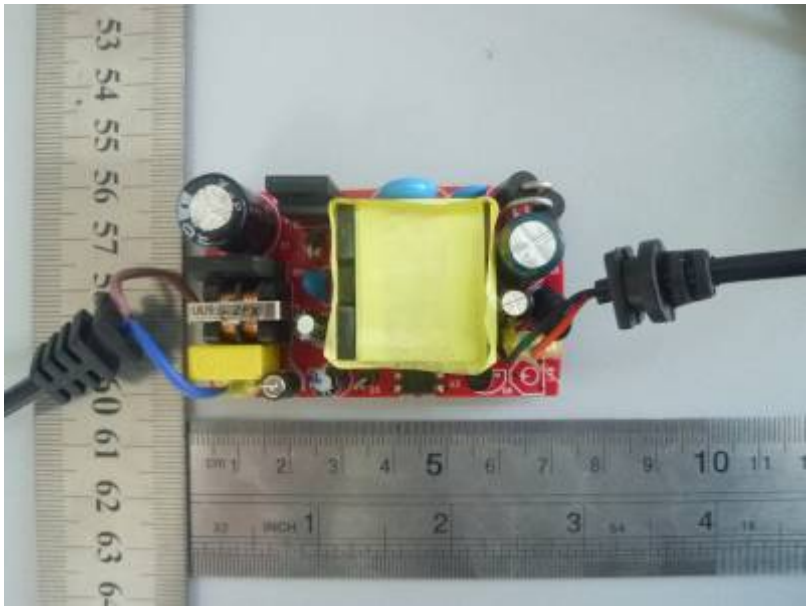
Details of: Figure 1. top View

Details of: Figure 2. bottom View

Photos documentation

Details of: Figure 3. Inside View

Details of: Figure 4. Top View of PCB



Photos documentation

Details of: Figure 5. Bottom View of PCB