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TEST REPORT

IEC/EN 60 065 / UL6500

Audio, video and similar electronic apparatus Safety requirements

Report *Reference No.*	*DI305566-101*
Tested by (+ signature)	*Joseph Janeliunas*
Approved by (+ signature)	*Glenn McLaughlin*
Date of issue	*December 19, 2003*
Contents	*24 pages, Attachment #1 (8 pages), Appendix A (21 pages), Test Equipment List (2 pages)*
Testing laboratory *Name*	*TUV Product Service*
Address	*5 Cherry Hill Drive, Danvers, MA 10923, USA*
Testing location	*Same as above*
Client *Name*	*AudioRail Technologies*
Address	*3 Silver Hill Rd*
	Maynard, MA 01754, USA
Standard	*IEC 60065_2001 / EN 60065_2002 / UL 6500_2002*
Test procedure	*CB-scheme*
Non-standard test method	*None*
Test Report Form/blank test report	
Test Report Form No.	*IECEN60065F*
TRF originator.	*BEAB*
Master TRF	*Dated 2003-02*

Test item *Description*	*Unit is used for transporting many channels of digital audio over a daisy chain of standard Category 5 UTP (Unshielded Twisted Pair) cable or other LAN interconnect media using off the shelf Ethernet transceiver technology, forming a digital audio snake*
Trademark	*AudioRail™*
Model and/or type reference	*ADAT rx32tx32*
Manufacturer	*AudioRail Technologies*
	3 Silver Hill Rd
	Maynard, MA 01754, USA
Rating(s)	*95 – 240 Vac, 50 – 60 Hz, 8 Watts @ 120 V, 12 Watts @ 240 V*

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Test case verdicts

Test case does not apply to the test object.....: N(.A.)

Test item does meet the requirement.....: P(ass)

Test item does not meet the requirement.....: F(ail)

Testing

Date of receipt of test item .....: December 15, 2003

Date(s) of performance of test.....: December 15 – 19, 2003

General remarks

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 a NCB, in accordance with IECEE 02.

This report shall not be reproduced except in full without the written approval of the testing laboratory.

The test results presented in this report relate only to the item(s) tested.

"(see appended table)" refers to a table appended to the report.
"(see remark #)" refers to a remark appended to the report.
"(see Annex #) refers to an annex appended to the report.

Throughout this report a comma (point) is used as the decimal separator.

Summary of Testing and Conclusions

The sample(s) tested complies with the requirements of IEC/EN 60065:2002. Compliance with European Special National Conditions, Annex ZB, and A – Deviations, Annex ZC, is recorded at the end of this report.

The sample tested also complies with UL 6500 : 2002. All USA national differences are covered in Attachment #1.

Copy of marking plate

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

This Class B digital apparatus complies with Canadian ICES-003

~ 95-240 VAC @50-60 Hz
8 Watts @120V
12 Watts @240V

UL6500
EN60065
EN55103-1
EN55103-2

CE

To reduce the risk of electric shock, do not remove cover. No user serviceable parts inside. Refer servicing to qualified service personnel. Do not expose this equipment to rain or moisture.

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN

Cet appareil numérique de la classe B est conform e à la norme NMB-003 du Canada

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Clause	Requirement – Test	Result - Remark	Verdict
3	GENERAL REQUIREMENTS		
	Safety class of the apparatus .....:	Class I	P
4	GENERAL CONDITIONS OF TESTS		
4.1.4	Ventilation instructions require the use of the test box	No	N
5	MARKING		
	Comprehensible and easily discernible		P
	Permanent durability against water and petroleum spirit		P
5.1	Identification, maker, model .....:	AudioRail, ADAT rx32tx32	P
	Class II symbol if applicable	Class I	N
	Rated supply voltage and symbol .....:	95-240 Vac	P
	Frequency if safety dependant	50-60 Hz	P
	Rated current or power consumption .....:	8 or 12 Watts	P
5.2	Earth terminal	Part of the appliance inlet	P
	Hazardous live terminals	No hazardous terminals	N
	Supply output terminals (other than mains)	No supply outouts	N
5.3	Use of triangle with exclamation mark	Unit is marked exclamation mark	P
5.4	Instructions for use		P
5.4.1	Mains powered equipment not exposed to dripping or splashing. Warning concerning objects filled with liquid, etc.		P
	Hazardous live terminals, instructions for wiring		N
	Instructions for replacing lithium battery	No batteries used	N
	Instructions for modem if fitted	No modem fitted	N
	Class I earth connection warning		P
	Instructions for multimedia system connection		P
	Special stability warning for fixed installation		N
5.4.2	Disconnect device: plug/coupler or all-pole mains switch location, accessibility and markings		P
	Instructions for permanently connected equipment		N
6	HAZARDOUS RADIATION		
6.1	Ionizing radiation < 36 pA/kg (0,5 mR/h)		N
6.1 EN 60065	European Council Directive 96/29/Euratom of 13 May 1996 10cm from outer surface of apparatus <1µSv/h (0,1mR/h)		N

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Clause	Requirement – Test	Result - Remark	Verdict
6.2	Laser radiation, emission limits to IEC 60825-1 ...:		N
	Emission limits under fault conditions .....:		N
7	HEATING UNDER NORMAL OPERATING CONDITIONS		
7.1	Temperature rises not exceeding specified values, no operation of fuse links	(see appended table)	P
7.1.1	Temperature rise of accessible parts	(see appended table)	P
7.1.2	Temperature rise of parts providing electrical insulation	(see appended table)	P
7.1.3	Temperature rise of parts acting as a support or as a mechanical barrier		N
7.1.4	Temperature rise of windings	(see appended table)	P
7.1.5	Parts not subject to a limit under 7.1.1 to 7.1.4	(see appended table)	P
7.2	Softening temperature of insulating material supporting parts conductively connected to the mains carrying a current > 0,2 A at least 150°C	All such parts are approved components	N
8	CONSTRUCTIONAL REQUIREMENTS WITH REGARD TO THE PROTECTION AGAINST ELECTRIC SHOCK		
8.1	Conductive parts covered by lacquer, paper, untreated textile oxide films and beads etc. considered to be bare		P
8.2	No shock hazard when changing voltage setting device, fuse-links or handling drawers etc.		P
8.3	Insulation of hazardous live parts not provided by hygroscopic material		P
8.4	No risk of electric shock following the removal of a cover which can be removed by hand	No removable covers	N
8.5	Class I equipment		P
	Basic insulation between hazardous live parts and earthed accessible parts		P
	Resistors bridging basic insulation complying with 14.2.1 a)		N
8.6	Class II equipment and Class II constructions within Class I equipment		N
	Reinforced or double insulation between hazardous live parts and accessible parts		N
	Components bridging reinforced or double insulation complying with 14.1 a) or 14.3		N
	Basic and supplementary insulation each being bridged by a capacitor complying with 14.2.1 a)		N

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Clause	Requirement – Test	Result - Remark	Verdict
	Reinforced or double insulation being bridged with 2 capacitors in series complying with 14.2.1 a)		N
	Reinforced or double insulation being bridged with a single capacitor complying with 14.2.1 b)		N
	Basic insulation bridged by components complying with 14.3.4.3		N
8.7	Basic insulation between parts at 35 V to 71 V (peak) a.c. or 60 V to 120 V d.c. and accessible parts		N
	Reinforced or double insulation between circuits operating at voltages between 35 V and 71 V (peak) a.c. or between 60 V and 120 V d.c. and hazardous live parts at higher voltage		N
	Separation by Class II isolating transformer		N
	Separation by Class I transformer		N
	Separation by earthed conductive part		N
8.8	Basic or supplementary insulation > 0,4 mm (mm) :	8.8 requirements have been evaluated as part of the approved power supply	N
	Reinforced insulation > 0,4 mm (mm) .....:		N
	Thin sheet insulation		N
	Basic or supplementary insulation, at least two layers, each meeting 10.3		N
	Basic or supplementary insulation, three layers any two of which meet 10.3		N
	Reinforced insulation, two layers each of which meet 10.3		N
	Reinforced insulation, three layers any two which meet 10.3		N
8.9	Adequate insulation between internal hazardous live conductors and accessible parts		P
	Adequate insulation between internal hazardous live parts and conductors connected to accessible parts		P
8.10	Double insulation between conductors connected to the mains and accessible parts	Class I equipment	N
8.11	Detaching of wires	All wires are crimped connection	P
	No undue reduction of creepages or clearance distances if wires become detached		P
	Vibration test carried out .....:	Yes	P

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Clause	Requirement – Test	Result - Remark	Verdict
8.12	Adequate cross-sectional area of internal wiring to mains socket-outlets	No mains socket outlets	N
8.13	Adequate fastening of windows, lenses, lamp covers etc. (pull test 20 N for 10 s)		N
8.14	Adequate fastening of covers (pull test 50 N for 10 s)		N
8.15	No risk of damage to the insulation of internal wiring due to hot parts or sharp edges		P
8.16	Only special supply equipment can be used		N
8.17	Insulated winding wire without additional interleaved insulation	Part of the approved power supply evaluation	N
8.18	Endurance test as required by 8.17		N
8.19	Disconnection from the mains		P
8.19.1	Disconnect device	Type: appliance coupler	P
	All-pole switch or circuit breaker with >3mm contact separation		N
8.19.2	Mains switch ON indication		N
8.20	Switch not fitted in the mains cord		N
8.21	Bridging components comply with clause 14		N
9	ELECTRIC SHOCK HAZARD UNDER NORMAL OPERATING CONDITIONS		
9.1	Testing on the outside		
9.1.1	For voltages >1000 V ac or >1500 V dc complies with clause 13.3.1 for basic insulation		N
9.1.1.1	Touch current measured from terminal devices using the network in annex D .....:	All accessible voltages are less than 35V (peak) a.c. or 60 V dc	N
	Discharge not exceeding 45 μC		N
	Energy of discharge not exceeding 350 mJ		N
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 shafts provided	N
9.1.3	Ventilation holes and other holes tested by means of 4 mm x 100 mm test pin	No ventilation holes	N
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
	Terminal devices tested with 1 mm x 100 mm straight wire (1 N); test probe D of IEC 61032		N
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	N

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Clause	Requirement – Test	Result - Remark	Verdict
9.1.6	No shock hazard due to stored charge on withdrawal of the mains plug; voltage (V) after 2 s :	See test results	P
	If C is not greater than 0,1 µF no test needed		N
9.1.7	Enclosure sufficiently resistant to external force	See test results	P
	Test probe 11 of IEC 61032 for 10 s (50 N)		P
	Test hook of fig. 4 for 10 s (20 N)		P
	30 mm diameter test tool for 5 s (100 or 250 N) ...:		P
9.2	No hazard after removing a cover by hand	No removable covers	N
10	INSULATION REQUIREMENTS		
10.1	Insulation resistance (MΩ) at least 2 MΩ min. after surge test for basic and 4 MΩ min. for reinforced insulation .....:	Class I equipment	N
10.2	Humidity treatment 48 h or 120 h .....:	48 h	P
10.3	Insulation resistance and dielectric strength	(see appended table)	P
11	FAULT CONDITIONS		
11.1	No shock hazard under fault condition	No fault testing was deemed necessary. All fault testing of the power supply has been covered under the power supply approval. The undit has no vent openings or cooling required. All outputs are low voltage / lower power outputs.	N
11.2	Heating under fault condition		N
	No hazard from softening solder		N
11.2.1	Measurement of temperature rises		N
11.2.2	Temperature rise of accessible parts		N
11.2.3	Temperature rise of parts, other than windings, providing electrical insulation		N
	Temperature rise of printed circuit boards (PCB) exceeding the limits of table 3 by max. 100 K for max. 5 min		N
	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
	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
	Meets all the special conditions if conductors on printed circuit boards are interrupted		N

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Clause	Requirement – Test	Result - Remark	Verdict
	Class I protective earthing maintained		N
11.2.4	Temperature rise of parts acting as a support or mechanical barrier		N
11.2.5	Temperature rise of windings		N
11.2.6	Temperature rise of parts not subject to the limits of 11.2.1 to 11.2.5		N
12	MECHANICAL STRENGTH		
12.1.1	Bump test where mass >7 kg	Mass is 2 kg	N
12.1.2	Vibration test		P
12.1.3	Impact hammer test	See test results	P
	Steel ball test	See test results	P
12.1.4	Drop test for portable apparatus where mass < 7 kg	See test results	P
12.1.5	Thermoplastic enclosures strain relief test	Metal enclosure	N
12.2	Fixing of knobs, push buttons, keys and levers		N
12.3	Remote controls with hazardous live parts		N
12.4	Drawers (pull test 50 N, 10 s)		N
12.5	Antenna coaxial sockets providing isolation		N
12.6	Telescoping or rod antennas construction		N
12.6.1	Telescoping or rod antennas securement		N
13	CLEARANCE AND CREEPAGE DISTANCES		
13.1	Clearances in accordance with 13.3		P
	Creepage distances in accordance with 13.4	See test results	P
13.2	Determination of operating voltage	Upper range of the rating of the unit : 240 V Primary to secondary creepage and clearance evaluation is part of the power supply approval.	P
13.3	Clearances	See test results	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		N
13.4	Creepage distances		P
	Creepage distances greater than table 11 minima	See test results	P
13.5	Printed boards	Part of the approved power supply evaluation	N

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Clause	Requirement – Test	Result - Remark	Verdict
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
13.5.2	Type B coated printed circuit boards complying with IEC 60664-3 (basic insulation only)		N
13.6	Conductive parts along uncemented joints clearances and creepage distances comply with 13.3 and 13.4		N
	Conductive parts along reliably cemented joints comply with 8.8		N
13.7	Enclosed, enveloped or hermetically sealed parts: not conductively connected to the mains: clearances and creepage distances as in table 12		N
13.8	Parts filled with insulating compound, meeting the requirements of 8.8		N
14	COMPONENTS		
14.1	Resistors		
	a) Resistors between hazardous live parts and accessible metal parts		N
	b) Resistors, other than between hazardous live parts and accessible parts		N
	b) Resistors separately approved .....:		N
14.2	Capacitors and RC units		N
	Capacitors separately approved	Part of the approved power supply	N
14.2.1	Y capacitors tested to IEC 60384-14, 2nd edition ..:		N
14.2.2	X capacitors tested to IEC 60384-14, 2nd edition ..:		N
14.2.3	Capacitors operating at mains frequency but not connected to the mains: tests for X2 .....:		N
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 .....:		N
	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
	Shielded by a barrier to V-0 or metal .....:		N
14.3	Inductors and windings		N

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Clause	Requirement – Test	Result - Remark	Verdict
	Comply with IEC 61558-1, IEC 61558-2 (as relevant) and clause 20.1.4	Part of the approved power supply	N
14.3.1	Transformers and inductors marked with manufacturer's name and type .....:		N
	Transformers and inductors separately approved :		N
14.3.2	General		N
14.3.3	Constructional requirements		N
14.3.3.1	Clearances and creepage distances comply with clause 13		N
14.3.3.2	Transformers meet the constructional requirements		N
14.3.4.1	Class II transformers have adequate separation between hazardous live parts and accessible parts (double or reinforced insulation)		N
	Coil formers and partition walls > 0,4 mm		N
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		N
14.3.4.3	Separating transformers with at least basic insulation		N
14.3.5.1	Class II transformers have adequate insulation between hazardous live parts and accessible parts (double or reinforced insulation)		N
	Coil formers and partition walls > 0,4 mm		N
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		N
	Winding wires connected to protective earth have adequate current-carrying capacity		N
14.4	High voltage components	No high voltage components used	N
	High-voltage components and assemblies: U > 4 kV (peak) separately approved		N
	Component meets category V-1 of IEC 60707		N
14.4.1	High voltage transformers and multipliers tested as part of the submission		N
14.4.2	High voltage assemblies and other parts tested as part of the submission		N
14.5	Protective devices	Part of the approved power supply	N

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Clause	Requirement – Test	Result - Remark	Verdict
	Protective devices used within their ratings		N
	External clearances and creepage distances meet requirement of clause 13 for the voltage across the device when opened		N
14.5.1.1	a) Thermal cut-outs separately approved		N
	b) Thermal cut-outs tested as part of the submission		N
14.5.1.2	a) Thermal links separately approved		N
	b) Thermal links tested as part of the submission		N
14.5.1.3	Thermal devices re-settable by soldering		N
14.5.2.1	Fuse-links in the mains circuit according to IEC 60127		N
14.5.2.2	Correct marking of fuse-links adjacent to holder ..:		N
14.5.2.3	Not possible to connect fuses in parallel .....:		N
14.5.2.4	Not possible to touch hazardous live parts when replacing fuse-links without the use of a tool .....:		N
14.5.3	PTC-S thermistors comply with IEC 60730-1		N
	PTC-S devices (15 W) category V-1 or better		N
14.5.4	Circuit protectors have adequate breaking capacity and their position is correctly marked		N
14.6	Switches	No switches used	N
14.6.1 a)	Separate testing to IEC 61058 including: 10 000 operations Normal pollution suitability Resistance to heat and fire level 3 and V-0 compliance with annex G, G.1.1		N
14.6.1 b)	Tested in the apparatus:		N
	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
	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
	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

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Clause	Requirement – Test	Result - Remark	Verdict
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
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
14.6.4	Switch tested to 14.6.1 b) has adequate dielectric strength		N
14.6.5	Mains switch controlling mains socket outlets additional tests to IEC 60058-1		N
	Socket outlet current marking correct		N
14.7	Safety interlocks	No safety interlocks	N
	Safety interlocks to 2.8 of IEC 60950		N
14.8	Voltage setting devices		N
	Voltage setting device not likely to be changed accidentally		N
14.9	Motors	No motors used	N
14.9.1	Endurance test on motors		N
	Motor start test		N
	Dielectric strength test		N
14.9.2	Not adversely affected by oil or grease etc.		N
14.9.3	Protection against moving parts		N
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
14.10	Batteries	No batteries used	N
14.10.1	Batteries mounted with no risk of accumulation of flammable gases		N
14.10.2	No possibility of recharging non-rechargeable batteries		N
14.10.3	Recharging currents and times within manufacturers limits		N
	Lithium batteries discharge and reverse currents within the manufacturers limits		N
14.10.4	Battery mould stress relief		N
14.10.5	Battery drop test		N
14.11	Optocouplers	Evaluated as part of the approved power supply	N
	Optocouplers comply with Cl. 8		N

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Clause	Requirement – Test	Result - Remark	Verdict
	Internal and external dimensions to 13.1. or alternatively 13.6 (jointed insulation)		N
14.12	Surge suppression varistors	Evaluated as part of the approved power supply	N
	Comply with IEC 61051-2		N
	Not connected between mains and accessible parts except for earthed parts of permanently connected apparatus		N
	Complies with the current pulse, fire hazard and thermal stress requirements of 14.12		N
15	TERMINALS		
15.1.1	Mains plug, appliance inlet, interconnection couplers and mains socket-outlet meet the appropriate standard	Appliance coupler is an approved component	P
15.1.2	Connectors for antenna, earth, audio, video or data:		
	No risk of insertion in mains socket-outlets		P
	No risk of insertion into audio or video: outlets marked with the symbol of 5.2		N
15.1.3	Output terminals of a.c. adaptors or similar devices not compatible with household mains socket-outlets		N
15.2	Provision for protective earthing		
	Accessible conductive parts of Class I equipment reliably connected to earth terminal, within equipment		P
	Protective earth conductors correctly coloured	Green / yellow	P
	Equipment with non-detachable mains cord provided with separate protective earth terminal near mains input	Detachable line cord	N
	Protective earth terminal resistant to corrosion		P
	Earth resistance test: < 0,1 Ω at 25 A .....:	See test results	P
15.3	Terminals for external flexible cords and for permanent connection to the mains supply		N
15.3.1	Adequate terminals for connection of permanent wiring		N
15.3.2	Reliable connection of non-detachable cords:		N
	Not soldered to conductors of a printed circuit board		N
	Adequate clearances and creepage distances between connections should a wire break away		N
	Wire secured by additional means to the conductor		N

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Clause	Requirement – Test	Result - Remark	Verdict
15.3.3	Screws and nuts clamping conductors have adequate threads: ISO 261, ISO 262 or similar		N
15.3.4	Soldered conductors wrapped around terminal prior to soldering or held in place by additional means		N
	Clamping of conductor and insulation if not soldered or held by screws		N
15.3.5	Terminals allow connection of appropriate cross-sectional area of conductors, for the rated current of the equipment		N
15.3.6	Terminals to 15.3.3 have sizes required by table 16		N
15.3.7	Terminals clamp conductors between metal and have adequate pressure		N
	Terminals designed to avoid conductor slipping out when tightened or loosened		N
	Terminals adequately fixed to avoid loosening when the clamping is tightened or loosened and stress on internal wiring is avoided		N
15.3.8	Terminals carrying a current more than 0,2 A: contact pressure not transmitted by insulating material except ceramic		N
15.3.9	Termination of non-detachable cords: wires terminated near to each other		N
	Terminals located and shielded: test with 8 mm strand		N
15.4	Devices forming a part of the mains plug		N
15.4.1	No undue strain on mains socket-outlets		N
15.4.2	Device complies with standard for dimensions of mains plugs		N
15.4.3	Device has adequate mechanical strength (tests a,b,c)		N
16	EXTERNAL FLEXIBLE CORDS		
16.1	Mains cords sheathed type, complying with IEC 60227 for PVC or IEC 60245 for synthetic rubber cords .....:	Detachable line cord was not part of the evaluation	N
	Non-detachable cords for Class I have green/yellow core for protective earth		N
16.2	Mains cords conductors have adequate cross-sectional area for rated current consumption of the equipment		N

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Clause	Requirement – Test	Result - Remark	Verdict
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		N
	b) Flexible cords not complying with 16.1, withstand bending and mechanical stress (3.2 of IEC 60227-2)		N
16.4	Flexible cords used for connection between equipment have adequate cross-sectional areas to avoid temperature rise under normal and fault conditions		N
16.5	Adequate strain relief on external flexible cords	Detachable line cord	N
	Not possible to push cord back into equipment		N
	Strain relief device unlikely to damage flexible cord		N
	For mains cords of Class I equipment, hazardous live conductors become taut before earth conductor		N
16.6	Apertures for external flexible cord: no risk of damage to the cord during assembly or movement in use		N
16.7	Transportable musical instruments and amplifiers fitted with detachable cord set with appliance inlet to IEC 60320-1		N
	Transportable musical instruments and amplifiers fitted with detachable cord sets or with means of stowage to protect the cord		N
17	ELECTRICAL CONNECTIONS AND MECHANICAL FIXINGS		
17.1	Torque test to table 20:	No screw terminals used	N
	- screws into metal: 5 times		N
	- screws into non-metallic material: 10 times		N
17.2	Correct introduction into female threads in non-metallic material	None used	N
17.3	Cover fixing screws: captive	None used	N
	Non-captive fixing screws: no hazard when replaced by a screw whose length is 10 times its diameter		N
17.4	No loosening of conductive parts carrying a current > 0,2 A		N
17.5	Contact pressure not transmitted through plastic other than ceramic for connections carrying a current > 0,2 A	None used	N

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Clause	Requirement – Test	Result - Remark	Verdict
17.6	Stranded conductors of flexible supply cords carrying a current > 0,2 A with screw terminals not consolidated by solder	No screw terminals are used	N
17.7	Cover fixing devices other than screws have adequate strength and their positioning is unambiguous	None used	N
17.8	Fixing devices for detachable legs or stands provided	None used	N
17.9	Internal pluggable connections, affecting safety, unlikely to become disconnected	No connections affect safety	N
18	MECHANICAL STRENGTH OF PICTURE TUBES AND PROTECTION AGAINST THE EFFECTS OF IMPLOSION		
	Picture tube separately approved to IEC 61965:		N
	Picture tube separately approved to 18.1		N
18.1	Picture tubes > 16 cm intrinsically protected		N
	Non-intrinsically protected tubes > 16 cm used with protective screen		N
18.2	Intrinsically protected tubes: tests on 12 samples		N
18.2.1	Samples subject to ageing: 6		N
18.2.2	Samples subject to implosion test: 6		N
18.2.3	Samples subject to mechanical strength test (steel ball): 6		N
18.3	Non-intrinsically protected tubes tested to 18.3		N
19	STABILITY AND MECHANICAL HAZARDS		
	Mass of the equipment exceeding 7 kg .....:	No (2 kg)	N
	Apparatus intended to be fastened in place – suitable instructions		N
19.1	Test on a plane, inclined at 10° to the horizontal		N
19.2	100 N force applied vertically downwards		N
19.3	Apparatus mass > 25 kg or height > 1 M or supplied with cart or stand		N
19.4	Edges or corners not hazardous		P
19.5	Glass surfaces with an area exceeding 0,1 m² or maximum dimension > 450 mm, pass the test of 19.5.1	No glass surfaces	N
19.6	Wall or ceiling mountings adequate	None used	N
20	RESISTANCE TO FIRE		
20.1	Electrical components and mechanical parts		

TÜV PRODUCT SERVICE

Clause	Requirement – Test	Result - Remark	Verdict
	a) Exemption for components contained in an enclosure of material V-0 to IEC 60707 with openings not exceeding 1 mm in width	All components are inside the metal enclosure that has no openings.	P
	b) Exemption for small components as defined in 20.1		N
20.1.1	Electrical components meet the requirements of Clause 14 or 20.1.4	meets 20.1 a) above	N
20.1.2	Insulation of internal wiring working at voltages > 4 Kv or leaving an internal fire enclosure, not contributing to the spread of fire	meets 20.1 a) above	N
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	meets 20.1 a) above	N
	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		N
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	meets 20.1 a) above	N
	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
20.2	Fire enclosure		
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		N
20.2.2	Internal fire enclosures with openings not exceeding 1 mm in width and with openings for wires completely filled		P
20.2.3	Requirements of 20.2.1 and 20.2.2 met by an internal fire enclosure		P
A	APPENDIX A, ADDITIONAL REQUIREMENTS FOR APPARATUS WITH PROTECTION AGAINST SPLASHING WATER		
A.5.1	j) Marked with IPX4 (IEC 60529), 5.4.1 a) does not apply	Not rated	N
A.10.2.1	Enclosure provides protection against splashing water		N
A.10.2.2	Humidity treatment carried out for 7 days		N

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Clause	Requirement – Test	Result - Remark	Verdict
B	APPENDIX B, APPARATUS TO BE CONNECTED TO THE TELECOMMUNICATION NETWORKS		
	Complies with IEC 62151 clause 1	No TNV connections	N
	Complies with IEC 62151 clause 2		N
	Complies with IEC 62151 clause 3 but with 3.5.4 modified to 2.4.10 of this standard		N
	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
	Complies with IEC 62151 cause 5 but with 5.3.1 modified in accordance with annex B of this standard		N
	Complies with IEC 62151 clause 6		N
	Complies with IEC 62151 clause 7		N
	Complies with IEC 62151 annex A, B and C		N

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

Operating conditions			
Un (V)	In (A)	Pn (W)	Pout (W)

	Loudspeaker impedance (Ω) .....:		—
	Several loudspeaker systems		
	Marking of loudspeaker terminals		

Monitored point:	dT (K)	Limit dT (K)
See Appendix A		

	Winding temperature rise measurements		
	Ambient temperature t1 (°C) .....:		—
	Ambient temperature t2 (°C) .....:		—

Temperature rise dT of winding:	R_1 (Ω)	R_2 (Ω)	dT (K)	Limit dT (K)	Insulation class

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7.2	TABLE: softening temperature of thermoplastics			N
Temperature T of part		T - normal conditions (°C)	T - fault conditions (°C)	T softening (°C)

10.3	TABLE: insulation resistance measurements		P
Insulation resistance R between:		R (MΩ)	Required R (MΩ)
Between mains poles (primary fuse disconnected)		See Appendix A	2
Between parts separated by basic or supplementary insulation		See Appendix A	2
Between parts separated by double or reinforced insulation		See Appendix A	4

10.3	TABLE: electric strength measurements		P
Test voltage applied between:		Test voltage (V)	Breakdown
Mains poles (primary fuse disconnected)		See Appendix A	
Between parts separated by basic or supplementary insulation		See Appendix A	
Between parts separated by double or reinforced insulation		See Appendix A	

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11.2	TABLE: summary of fault condition tests		N
	Voltage (V) 0,9 or 1,1 times rated voltage .....:		—
	Ambient temperature (°C) .....:		—

Monitored point: Under fault conditions specified below	dT (K)	Limit dT (K)

	Winding temperature rise measurements		
	Ambient temperature t1 (°C) .....:		—
	Ambient temperature t2 (°C) .....:		—

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14	TABLE: list of critical components and materials				P
Component	Manufacturer/ trademark	Type/model	Value / rating	Standard	Approval/ Reference
Power Supply	Mean Well	PS-25-3.3	100-240 Vac, 50 / 60 Hz, 0.6 A	EN60950 / UL1950	UL, TUV
Appliance Inlet	Qualtek electronics Corp.	703W	250 Vac, 10A, 94-V0		UL, CSA, VDE
Primary Wire	Any	Any	18 AWG, 600 V		UL, CSA
PWB	Any	Any	94-V0		UL

[1]) an asterisk indicates a mark which assures the agreed level of surveillance

Remarks:

TÜV PRODUCT SERVICE

Clause	Requirement – Test	Result - Remark	Verdict
ZB	ANNEX ZB TO EN 60 065, SPECIAL NATIONAL CONDITIONS		
2.6.1	DK: certain types of Class I apparatus, see 15.1.1, may be provided with a plug not establishing earthing continuity when inserted in Danish socket-outlets	Detachable line cord, line cord was not evaluated	N
13.3.1	NO: In Norway, due to IT power distribution system used, the a.c. MAINS supply voltage is considered to be equal to the line-to-line voltage, and will remain 230V in case of a single earth fault.		P
15.1.1	DK: mains cord for single-phase equipment having a rated current not exceeding 10 A shall be provided with a plug according to Heavy Current Regulations Section 107-2-D1	Detachable line cord, line cord was not evaluated	N
	DK: Class I equipment with socket-outlets with earthing contact, or which are intended to be used in locations where protection against indirect contact is required shall be provided with a plug in compliance with Standard Sheet DK 2-1a	No socket outlets	N
	DK: socket-outlets for providing power to Class II equipment with a rated current of 2,5 A shall have dimensions according to the drawing on page 131 of EN 60 065:98 other dimensions shall be to IEC 60 083 Standard Sheet C 1a for portable socket-outlets		N
	DK: mains socket-outlets with earthing contact shall comply with Heavy Current Regulations Section 107-2-D1, Standard Sheet DK 1-3a, DK 1-5a or DK 1-7a		N
	GB: equipment fitted with a flexible cable or cord provided with a 13A BS 1363 plug as in Statutory Instrument 1768:94	Detachable line cord, line cord was not evaluated	N
	IE: equipment fitted with a flexible cable or cord provided with a 13 A plug in accordance with Statutory Instrument 525:97	Detachable line cord, line cord was not evaluated	N
	NO: mains socket-outlets on Class II equipment meet CEE Publication 7 with the following amendments:		N
	- dimensions 2,5 A, 250 V socket-outlets shall comply with Standard Sheet 1 page 132 of EN 60 065:98	No mains socket outlets	N
	- mechanical strength 2,5 A, 250 V socket-outlets tested as specified in EN 60 065, 12.1.3		N
	- protecting rim also tested		N

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Clause	Requirement – Test	Result - Remark	Verdict
	NO: method b) of 8.1 is not permitted. Double or reinforced insulation is required between parts connected to the mains and parts connected to the public telecommunications network		N
J.2	NO: In Norway, due to IT power distribution system used, the a.c. MAINS supply voltage is considered to be equal to the line-to-line voltage, and will remain 230V in case of a single earth fault.		P
ZC	ANNEX ZC TO EN 60 065, A-DEVIATIONS		
5	DE: additional markings required in German language:		
	- cathode ray tubes with an accelerating voltage between 20 kV and 30 kV (marking on the tube)		N
	- TV receivers whose picture tube has an accelerating voltage between 20 kV and 30 kV		N
	- TV receivers whose picture tube has an accelerating voltage greater than 30 kV		N
	- TV receivers whose picture tube has an accelerating voltage less than 20 kV		N
5.1	IT: additional markings on the outside of the TV receiver in Italian language		N
	IT: user instructions in Italian language including a conformity declaration		N
	IT: certification number on the back cover		N
14	SE: Switches containing mercury such as thermostats, relays and level controllers are not allowed.		N

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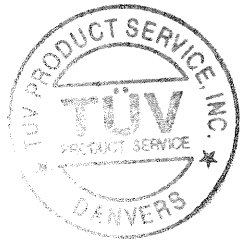
TÜV
PRODUCT SERVICE

Attachment No.1

USA National Deviations

Attachment contains

total:	8 pages
Cover page:	1 page



TÜV
PRODUCT SERVICE

Clause	Requirement - Test	Result - Remark	Verdict
US			
1.1.1	Clarifies the type of games covered by the standard Adds healthcare apparatus, cellular phones and battery operated apparatus to the scope	Considered	P
1.1.3	Replaces "splashing water" with "outdoor use"	Considered	P
1.1.6	Products may be investigated using other additional UL standards where appropriate	Considered	P
1.2	Deletion of IEC Standard references and addition of UL Standard references	Considered	P
2.1	Add accessory, major enclosure part and stationary apparatus to list of defined terms	Considered	P
2.8.3	Replaces IEC probe with UL articulated finger	Considered	P
4.2.1	Mains tolerance increased to 110%; 120V and 120/240V identified as standard US supply voltages		P
4.2.4	Operation at one-eighth max undistorted reduced if protectors operate		N
4.2.4.1	Identifies input signal sources used that produce maximum output		N
Table 1	External supply sources are assumed to be capable of delivering 30A		N
4.3.4b	Reference to requirements of UL 1434		N
4.3.6	Solenoids tested with the plunger blocked in the de-energized (at-rest) state.	No solenoids	N
4.3.9	External MAINS socket-outlets separately overloaded to 110% of the current rating for the socket outlet configurations	No mains socket outlets	N
4.3.13	Voltage selector switch may be misadjusted on all products	Auto ranging	N
4.3.16	The battery-supply cord intended to be connected to an external battery is to be short-circuited at any point on the load side of the overcurrent protective device in the cord while the cord is connected to the battery supplied with the apparatus or while the cord is connected to a power supply with the output voltage equivalent to the battery voltage.	No battery	N

Clause	Requirement - Test	Result - Remark	Verdict
5.1 j	Date of manufacture is required		
5.1k	Manufacturing ID required		
5.11	Add "Caution - Risk Of Electric Shock - Do Not Open" marking requirement		
5.1 m	Equipment rack marking for audio/video systems required		
5.1n	High leakage current marking (>0.75 MIU and = or <1.5 MIU, as permitted in 9.1.1)		
5.2b (2°d par)	Precautions identified in owners manual when audio shock hazard on speaker terminals		
5.2c (15` sent)	Frequency and power markings required		
5.3	Explanation of graphical symbols required in instructions		
5.4	Important Safeguards instructions required		
5.4.1	Outdoor Use marking required		
5.4.3	Service instructions in Owner's Manual separated from other instructions		
7.1	Use of redundant protection circuits during temperature test		
Table 2	Introduction of insulation classes		
Table 2	(Notes) Add material temperature ratings (Indirect reference to UL 746B)		
7.2	Add material temperature ratings (Indirect reference to UL 746B)		
8.1	Corrosion protection required for metal parts when corrosion part may result in a hazard		
8.9.1	Use of UL Recognized sleeving, tape and tubing required		
8.17	Use of UL Recognized Printed Wiring Boards required		
9.1.1c	1.5 MIU to earth allowed for a Class I, cord connected commercial Audio amplifier designed solely for rack mounting or stationary use		
Table 3	Identifies test voltages for basic, supplementary and reinforced insulation for 120 V products		

Clause	Requirement - Test	Result - Remark	Verdict
12.1.3	*The enclosure surfaces shall withstand a single impact of the value specified in Table 3A. The impact force obtained using a steel sphere 50 mm in dia., having a mass of 0.5 kg. The sphere moved freely from rest through the distance required to result in it striking the enclosure with the specified impact. Dielectric strength test of 10.3 after the impact test.*	*Metal enclosure*	*P*
12.1.4	*Three samples of a portable apparatus dropped onto a hardwood surface. The height of the drop shall be 1 m for apparatus that might be held in one hand during any phase of normal operation or 75 cm for all other apparatus.*	*See appendix A for test results*	*P*
12.1.5	*Enclosure of molded or formed thermoplastic material placed in an oven and subjected to a temperature 10 K or higher than the maximum temperature observed on the enclosure during the test in 7.1.3, but not less than 70°C, for a period of 7 h.*	*Metal enclosure*	*N*
12.1.6	*Handle strength test - the weight of the apparatus, plus a weight that exerts a force of three times the weight of the apparatus uniformly applied over a 75 mm width at the center of the handle, without clamping.*	*No handles*	*N*
12.6	*A telescoping antenna or rod antenna shall be provided with a minimum 6.0 mm diameter button or ball on the end. A telescoping or rod antenna shall be provided with a guard or barrier that prevents any part of the antenna from falling into the apparatus and contacting LIVE PARTS in the event the antenna or any part of it were to break.*	*No antenna*	*N*
12.6.1	*The end piece subjected to a 20 N force along the major antenna axis for 1 min. If the end piece is attached by screw threads, a loosening torque in accordance with table 3B is to be applied to the end pieces of five additional samples.*		*N*
12.7	*For wall & ceiling mounted apparatus a force in addition to the apparatus weight is applied downwards through the geometric center of the apparatus, for I min. The additional force is equal to three times the weight of the apparatus, but not less than 50 N.*		*N*
12.8	*Adhesive tests - Compliance must be checked by the relevant tests in UL 746C.*	*No adhesives used*	*N*

Clause	Requirement - Test	Result - Remark	Verdict
12.8.1	Label and foil sheet - Six samples, each secured to its intended mounting surface are tested. Three samples subjected to the air-circulating oven conditioning, and three samples are to be subjected to the humidity conditioning. Each label shall withstand a minimum peel force of 5.0 N/30 mm width both before and after conditioning.		N
13.5	Reference to UL 746C.		P
14	Reference to Annex N and other general comments relating to compliance of components		P
14.2	Reference to UL 1414	Part of the approved power supply evaluation	N
14.4	Clarification and compliance criteria added for Hi-Voltage components	No high voltage components used	N
14.4.1	A component operating at more than 4 kV (peak) or a part of a different potential with less than the specified clearance distance subjected to the high voltage arcing test.		N
14.4.2	Exterior materials of a component operating at more than 4 kV (peak) shall not continue to flame for more than 10 seconds after each application of five 15 sec test flames and after the fifth application of the test flame, conductive internal high-voltage parts shall not be exposed. The period between applications of the flame is 15 seconds.		N
14.4.3	High voltage insulation test conducted on three samples of the high-voltage component. The operating temperature of the oven is that required for the component winding to reach the winding aging temperature. The winding aging temperature is obtained from the horizontal axis of figure 19. The aging time is determined by the manufacturer.		N
14.5.1	Delete reference to 14.5.1.3	Thermal releases not used	N
14.5.1.1	Reference to UL 8730-2-9 (IEC 60730-2-9)		N
14.5.1.2	Reference to UL 1020 (IEC 60691)		N
14.5.1.3	Delete subclause		N
14.5.2.1	Reference to requirements of UL 248-14	Thermal links not used	N

Clause	Requirement - Test	Result - Remark	Verdict
14.5.2.2	*Delete IEC 127 reference & current breaking capacity symbol; add voltage rating marking*		*N*
14.5.2.4	*Delete reference to IEC 127-6*		*N*
14.5.3	*Reference to requirements of UL 1434*	*PTC Thermistors not used*	*N*
14.5.4	*Reference to requirements of UL 873, -1416, -1417, and -21 I 1*	*None used*	*N*
14.6.2	*Delete requirement*	*No switches used*	*N*
14.6.3	*"ON" position marked by mains switches*		*N*
14.6.4	*Delete standby switch requirements*		*N*
14.6.6	*Reference to requirements of UL 61508-1 and UL 508*		*N*
14.6.7 -10	*Switch tests deleted*		*N*
14.6.11 - 11.2	*Inrush requirements applicable for switches and relays*		*N*
14.6.12	*Double pole switch controlling ac and do circuits*		*N*
14.10.4	*External battery requirements*	*No battery used*	*N*
14.10.5	*Battery temperature stability test per clause 12.1.5 without release of corrosive material.*		*N*
14.10.6	*Drop test on three samples of a folly rechargeable battery subjected to a single drop through a distance of 1 m to strike a hardwood surface without leakage of the electrolyte.*		*N*
14.11	*Reference to requirements of UL 1577*	*Optocouplers evaluated as part of the approved power supply*	*N*
15.1.1	*Attachment cap suitable for apparatus voltage setting; receptacles on Class I apparatus provided with a protective earth terminal.*		*N*
15.1.2	*Delete "Banana" plug note*		*N*
16.1	*Reference to UL 817 and VW- Imarking requirement*	*External cord was not part of the evaluation*	*N*
Table 9a	*Types of cords and cord lengths allowed for various apparatus*		*N*
16.3c	*VW-1 marking requirements*		*N*
17.8	*Expanded to include all cart/stand parts supplied by the manufacturer; suitable assembly instructions required*		*N*

Clause	Requirement - Test	Result - Remark	Verdict
17.10	Aluminum wire terminated with suitable/compatible means	Not used	N
17.11	Accessory safe with respect to fire and shock and provided with installation instructions	No accessory evaluated	N
17.11.1	Describes qualifications for installation of accessory by a SKILLED PERSON		N
18	The bulb of a picture tube shall be enclosed		N
18.1	Tubes with face of 7.5 cm shall be protected Non-intrinsically protected picture tubes may be totally enclosed		N
18.2	Reference to requirements of UL 1418		N
18.2.1 - 3	Clauses deleted		N
18.3	Non-intrinsically protected picture tubes subjected to thermal shock or high energy impact method of implosion		N
19.1 - 2	Doors, wheels, appurtenances, etc. adjusted for least stability		N
19.2.1	Force stability tests required		N
19.5	Rack mounting test required		P
20	Reference to cellulose nitrate flame characteristics		N
20.1	Components enclosed in FV-0 materials are not exempt	Metal enclosure	N
20.1b	Reference to requirements of UL 94 and V-1 rating; miscellaneous parts are exempted		N
20.1.2	Sleeving, tubing and wiring rated VW-1; Tape should be flame retardant		N
20.1.3	PWBs rated V-1 or V-0; reference to UL 94		P
20.1.4	Requirements applicable to fire enclosures; reference to requirements of UL 94		P
Table 13	Material applications and flammability categories added	Considered	P
20.2.1	Fire enclosure required for high-voltage products and products with power transformers		N
Table 14	Identifies flammability ratings for materials used in various enclosure applications		N
20.2.2	Limits opening sizes used in internal fire enclosures	No openings	N

Clause	Requirement - Test	Result - Remark	Verdict
20.2.3	Outer enclosure rated minimum HB		N
U.S. Code Differences			
1.1.1	Refer supply source to the National Electric Code (NEC)		P
4.2.4.1	Adds input test, due to required input rating in the NEC		N
5.1g	Frequency required per NEC		P
5.1h	Input current or power required by the NEC		P
5.2b(I"par)	Output marking per NEC		N
5.2c	Wiring class per NEC	No terminals	N
6.1	X-ray measurement per Federal Code		N
6.2	Laser measurement per Federal Code		N
9.1.1.1	100 V ac output for audio output circuits ANSI metering and the MIU		N
11.1	Reference changed due to 100 V ac audio output deviation ANSI Metering and the MIU		N
15.1.1	Attachment plug rated not less than 125% of the current drawn by the apparatus Apparatus is polarized if provided with lampholder, receptacle, or on-off line switch and Lampholders, receptacles and switches in appropriate side of line per the NEC	Detachable line cord, not part of the evaluation	N
15.1.3.1	Class 1 audio output terminations on fixed apparatus as required by the NEC		N
15.1.3.2	Class 1 audio output terminations on cord connected apparatus as required by the NEC		N
15.2.1	Earthing conductor same size as supply cord leads per NEC		P
15.3.5	Current limit reduced to harmonize with NEC		N
Table 7	Current changed to conform to US wire sizes and Wire sizes revised to AWG, the US National Standard		N
16.1	Cord ampacity suitable for product per NEC	Detachable line cord, not part of the evaluation	N
Table 10	Current limit reduced to harmonize with the NEC		N
16.2	Current limits referenced to the NEC		N

Project number: DI305566-101
Manufacturer: AudioRail Technologies Ratings: 95-240V~, 8W/12W
Model: ADAT rx32 tx32 Serial/Sample# 1

IEC 60065: 2001/EN 60065: 2002 / UL6500: 2002

TEST DATA SHEETS

Project number: DI305566-101
Manufacturer: AudioRail Technologies Ratings: 95-240V~
Model: ADAT rx32 tx32 Serial/Sample# 1

	Test	Clause	Comments
x	Input	5.1	
x	Marking Durability	5	
x	Heating	7	
	Electric Shock Hazard	9	
x	Hazardous live parts (leakage)	9.1.1.1	
x	Accessible parts	9.1.1.2	
	Openings in Encl	9.1.3	
x	Cap Discharge	9.1.6	
	External forces	9.1.7	
x	Humidity	10.2	
x	Dielectric Strength	10.3	
x	Insulation Res.	10.3	
	Fault conditions	11.0	
x	Mechanical Strength	12.1	
x	Creepage + Clearance	13.0	
	Components	14.0	
	Motors	14.9	
	Batteries	14.10	
x	Ground Continuity	15.2	
	Picture Tubes	18.0	
x	Stability Test	19.0	

By: Brad Lewis

Project number: DI305566-101
Manufacturer: AudioRail Technologies Ratings: 95-240V~
Model: ADAT rx32 tx32 Serial/Sample# 1

INPUT CURRENT

Sub-clause 5.1

i)The measured comsumption at RATED SUPPLY VOLTAGE shall not exceed the marked value by more than 10%.

Input Voltage(Vac)	Input Frequency (Hz)	Input Current (mA)	Input Power (W)	
85.5	60	82.6	3.31	
95	60	75.3	3.29	
240	50	50.5	4.2	
264	50	49.6	4.4	

Loads: _____

Comments: _____

Test Equipment ID#: 4004, 4020 Date: 15 -Dec -2003

By: Brad Lewis

Project number: DI305566-101

Manufacturer: AudioRail Technologies Ratings: 95-240V~

Model: ADAT rx32 tx32 Serial/Sample# 1

MARKING DURABILITY

Clause 5

Each of the marking labels is subjected to this test. The surface of each marking is to be rubbed by hand for a period of 15 seconds with a water soaked cloth, and again for a period of 15 seconds with cloth soaked with petroleum spirits (Hexanes).

	Label Tested	Pass	Fail	N/A
1.	ID label	[x]	[ ]	[ ]
2.	Ratings label	[x]	[ ]	[ ]
3.		[ ]	[ ]	[ ]
4.		[ ]	[ ]	[ ]

Comments:

Test Equipment ID#: Date: 17 -Dec -2003

By: Brad Lewis

Project number: DI305566-101
Manufacturer: AudioRail Technologies Ratings: 95-240V~
Model: ADAT rx32 tx32 Serial/Sample# 1

Clause 7.0 **Heating**

Test	Description (including test voltage, frequency)
1	Heating @264V~ 50Hz
2	Heating @85.5V~ 60Hz
3	
4	
5	
6	
7	
8	

Comments:

Test Equipment ID#: Date: 16-Dec-2003

By: Brad Lewis

Project number: DI305566-101
Manufacturer: AudioRail Technologies Ratings: 95-240V~
Model: ADAT rx32 tx32 Serial/Sample# 1

SUMMARY TABLE - HEATING TESTS

Clause 7

7	TABLE: maximum temperatures.....Test 1 / Test 2 / Test 3 / Test 4 /Test 5						
	test voltage (V) ..... :	264	85.5				—
	t_{amb1} (°C) ..... :	23.0	22.4				—
	t_{amb2} (°C) ..... :						—

maximum temperature T of part/at::	T (°C)					allowed T_{max} (°C)
1) inlet	25.1	24.0				
2) Primary wire	26.1	26.0				
3) T1 (Pwr sup)	39.6	33.0				
4) U4	29.1	28.6				
5) LF1 (Pwr sup)	31.9	31.4				
6)	34.2	29.0				
7) Encl.	27.0	25.0				
8)						
9)						
10)						
11)						
12)						
13)						
14)						
15)						
16)						

temperature T of winding:	R_1 (Ω)	R_2 (Ω)	T (°C)	allowed T_{max} (°C)	insulation class

☒ Plot or Printout attached ☐ Timeline Data Table Attached

Comments:

Test Equipment ID#: 4004, 4020, 4274, 4303 Date: 16 -Dec-2003

By: Brad Lewis

Project number: DI305566-101
Manufacturer: AudioRail Technologies Ratings: 95-240V~, 8W/12W
Model: ADAT rx32 tx32 Serial/Sample# 1

Determination of Hazardous Live Parts

Clause 9.1.1.1

	TABLE: Values in NORMAL CONDITION													Form A.7
Item	Voltage			Current					Capacitance		10 s test			Comments
(See 9.1.1.2)	V r.m.s.	V peak	V d.c.	Test circuit	mA r.m.s.	mA peak	mA d.c.	µC	mJ	V	µC	mJ		
1	0	0	0	-	-	-	-	-	-	-	-	-		Pass

6.3.2	TABLE: Values in SINGLE FAULT CONDITION											Form A.8
Item	fault	Voltage			Transient (see NOTE)		Current				Capacitance	Comments
(See 9.1.1.2)		V r.m.s.	V peak	V d.c.	V	s	Test circuit	mA r.m.s.	mA peak	mA d.c.	µF	
1	Grnd lifted	127.3	0	0	-	-	Simpson 228	.35	-	-	-	Pass

Comments:

Test Equipment ID#: 4114, 4193, 4278 Date: 17-Dec -2003

Project number: DI305566-101

Manufacturer: AudioRail Technologies Ratings: 95-240V~, 8W/12W

Model: ADAT rx32 tx32 Serial/Sample# 1

Accessible parts

Clause 9.1.1.2

Accessible parts to be determined with: Jointed test finger, Straight finger with force of 20N +/- 2N (see standard for equipment intend for use by children and Class II)

	Accessible Part description
1	Enclosure
2	
3	
4	
5	
6	
7	
8	

Comments:

Test Equipment ID#: 4114, 4193, 4278 Date: 17-Dec -2003

Project number: DI305566-101
Manufacturer: AudioRail Technologies Ratings: 95-240V~
Model: ADAT rx32 tx32 Serial/Sample# 1

Withdrawal of Mains Plug
(INPUT CAPACITOR DISCHARGE TEST)

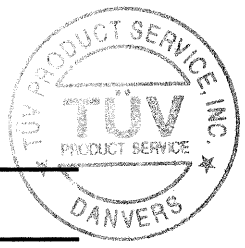
Clause 9.1.6

Two seconds after withdrawal of the plug, the voltage shall not be hazardous live (exceed 35 VAC or 60 VDC). In order to reasonably cover the most unfavorable situation, the test may be repeated up to 10 times.

TEST #	Equipment **ON**	Equipment **OFF**
1	0V	N/A
2	0V	N/A
3	0V	N/A
4	2V	N/A
5	0V	N/A
6	0V	N/A
7	2V	N/A
8	0V	N/A
9	2V	N/A
10	0V	N/A

Worst Case ON/OFF value : 2Volts

Comments:



Test Equipment ID#: 4250, 4296, 4113 Date: 17-Dec-2003

By: Brad Lewis

Project number: DI305566-101
Manufacturer: AudioRail Technologies Ratings: 95-240V~
Model: ADAT rx32 tx32 Serial/Sample# 1

RESISTANCE TO EXTERNAL FORCES

Sub-clause 9.1.7

		P	F	N/A
a)	Different points of the ENCLOSURE are subject to a steady force directed inwards of 50 ± 5 N applied by means of a straight unjointed version of the test finger for 10sec (no hazardous live shall be exposed of touched)	[x]	[ ]	[ ]
b)	Test hook 20N ± 2N, directed outwards for 10s	[x]	[ ]	[ ]
c)	External enclosures shall be subjected to a steady force of 250 ± 10 N for a period of 5 sec., applied to the enclosure, fitted to the equipment, by means of a suitable test tool providing contact over a circular plane surface 30 mm in diameter.	[x]	[ ]	[ ]

Comments: _____

_____

Test Equipment ID#: 4085, 4153, 4088 Date: 17 -Dec-2003

By: Brad Lewis

Project number: DI305566-101
Manufacturer: AudioRail Technologies Ratings: 95-240V~
Model: ADAT rx32 tx32 Serial/Sample# 1

HUMIDITY TREATMENT

Clause 10.2

Humidity chamber shall contain air with a relative humidity between 91% and 95%.
The temperature of the air, at all places, is maintained at 30° C.

	PASS	FAIL	N/A
10.2 Humidity	[x]	[ ]	[ ]

DESCRIPTION OF TEST:

48Hrs 95%RH 25°C

COMMENTS:

TÜV PRODUCT SERVICE, INC. TÜV PRODUCT SERVICE DANVERS

Test Equipment ID#: 4111 Date: 17 -Dec -2003

By: Brad Lewis

Project number: DI305566-101
Manufacturer: AudioRail Technologies Ratings: 95-240V~
Model: ADAT rx32 tx32 Serial/Sample# 1

DIELECTRIC STRENGTH

Clause 10.3

To be performed immediately following humidity treatment.

	TABLE: electric strength tests, impulse tests and voltage surge tests	
test voltage applied between:	test voltage (V) d.c.	breakdown Yes / No
Primary - ground	2120	No
supplementary information		

Comments:

Test Equipment ID#: 4010 Date: 17-Dec-2003

TÜV PRODUCT SERVICE, INC. TÜV PRODUCT SERVICE DANVERS

By: Brad Lewis

Project number: DI305566-101
Manufacturer: AudioRail Technologies Ratings: 95-240V~
Model: ADAT rx32 tx32 Serial/Sample# 1

INSULATION RESISTANCE TEST

Clause 10.3

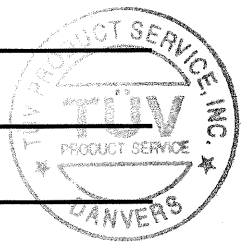
The insulation resistance is measured with d.c. voltage of approximately 500 V applied, the measurement being made 1 minute after application of the voltage, heating elements, if any, being disconnected.

Note: This test is run after humidity treatment.
Humidity chamber shall be set as follows: 20° C<T<30° , 91%<RH<95% time=48 hrs

The insulation resistance shall be no less than that shown in the following table.

Insulation to be tested	Insulation resistance required (M ohm)	Insulation resistance recorded (M ohm)
Between live parts and the body: -for basic insulation	2	>999
-for reinforced insulation	4	N/A
-between live parts and metal parts of class II appliances which are separated from live parts by basic insulation only.	2	N/A

Comments:



Test Equipment ID#: 4015 Date: 17 -Dec -2003

By: Brad Lewis

Project number: DI305566-101

Manufacturer: AudioRail Technologies Ratings: 95-240V~

Model: ADAT rx32 tx32 Serial/Sample# 1

FAULT CONDITIONS

Clause 11.0

	TABLE: fault condition tests		
	ambient temperature (°C) ..... :		—
	model/type of power supply ..... :		—
	manufacturer of power supply ..... :		—
	rated markings of power supply ..... :		—

com-ponent No.	fault	test vol-tage (V)	test time	fuse No.	fuse current (A)	result
Ground	OPN	264	~1min	-	49.6	Pass – see 9.1.1.1
supplementary information						

Faults: OVD = overload
LCK = locked
BLK = blocked

OPN = open
SRT = short

Comments: _____

_____

_____

Test Equipment ID#: _____ Date: 17 -Dec -2003

By: Brad Lewis

Project number: DI305566-101
Manufacturer: AudioRail Technologies Ratings: 95-240V~
Model: ADAT rx32 tx32 Serial/Sample# 1

MECHANICAL STRENGTH

Clause 12.0

		P	F	N/A
	Weight: 2.1 Kg			
12.1.1	Bump Test The apparatus is placed on a horizontal support of wood which is allowed to fall 50 times from a height of 5cm onto a wooden table.	[ ]	[ ]	[x]
12.1.2	Vibration Test Apparatus is fastened in its normal position of use to the vibration-generator. -See attached data	[x]	[ ]	[ ]
12.1.3	Impact Test Apparatus is held firmly against a rigid support and is subjected to three blows from a spring-operated impact hammer (.5J), applied to every point of the exterior that protects live parts.	[x]	[ ]	[ ]
	Non-ventalated solid areas Ball impact	[x]	[ ]	[ ]
12.1.4	Drop test Unit with mass <7Kg are dropped 3 times 1.0m onto hardwood fixure	[x]	[ ]	[ ]
	Hi-pot 2120 Vdc	[x]	[ ]	[ ]
12.1.5	7hr @ 70C or 10K higher than max encl. temp	[ ]	[ ]	[x]

Comments:

Test Equipment ID#: 4145, 4084, 4010, 4169, 4233 Date: 17 -Dec-2003

By: Brad Lewis

Project number: DI305566-101
Manufacturer: AudioRail Technologies Ratings: 95-240V~
Model: ADAT rx32 tx32 Serial/Sample# 1

CREEPAGE AND CLEARANCE

Clause 13

Insulation between	Clearance required (mm)	Clearance measured (mm)	Creepage required (mm)	Creepage measured (mm)	Comments
Primary to ground	2.0	>2.5	2.5	>2.5	Bottom of power supply to enclosure
Primary to ground	2.0	>3.0	2.5	>3.0	Appliance coupler

Comments:

TÜV PRODUCT SERVICE, INC. DANVERS

Test Equipment ID#: 4107, 4129 Date: 17 -Dec- 2003

By: Brad Lewis

Project number: DI305566-101
Manufacturer: AudioRail Technologies Ratings: 95-240V~
Model: ADAT rx32 tx32 Serial/Sample# 1

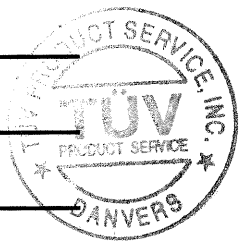
Provisions for protective earthing

Clause 15.2

Test shall be carried out for 1 minute with a test current of 25 A; the test voltage shall not exceed 12 V.

Test Point	Test Current (A)	Resistance (mΩ)
Ground to Enclosure	25	40

Comments:



Test Equipment ID#: 4016 Date: 17 -Dec-2003

By: Brad Lewis

Project number: DI305566-101
Manufacturer: AudioRail Technologies Ratings: 95-240V~
Model: ADAT rx32 tx32 Serial/Sample# 1

-

STABILITY TEST

Clause 19.0

		P	F	N/A
19.1	Apparatus is placed in its normal position of use on a plane inclined at an angle of 10° to the horizontal and rotated slowly through an angle of 360° about its axis.	[x]	[ ]	[ ]
19.2	Apparatus is placed on a non-skid surface that is at an angle not exceeding 1° to the horizontal with lids, flaps, drawers and doors in the most unfavorable position. A force of 100 N directed vertically downwards is applied.	[ ]	[ ]	[x]

Comments:

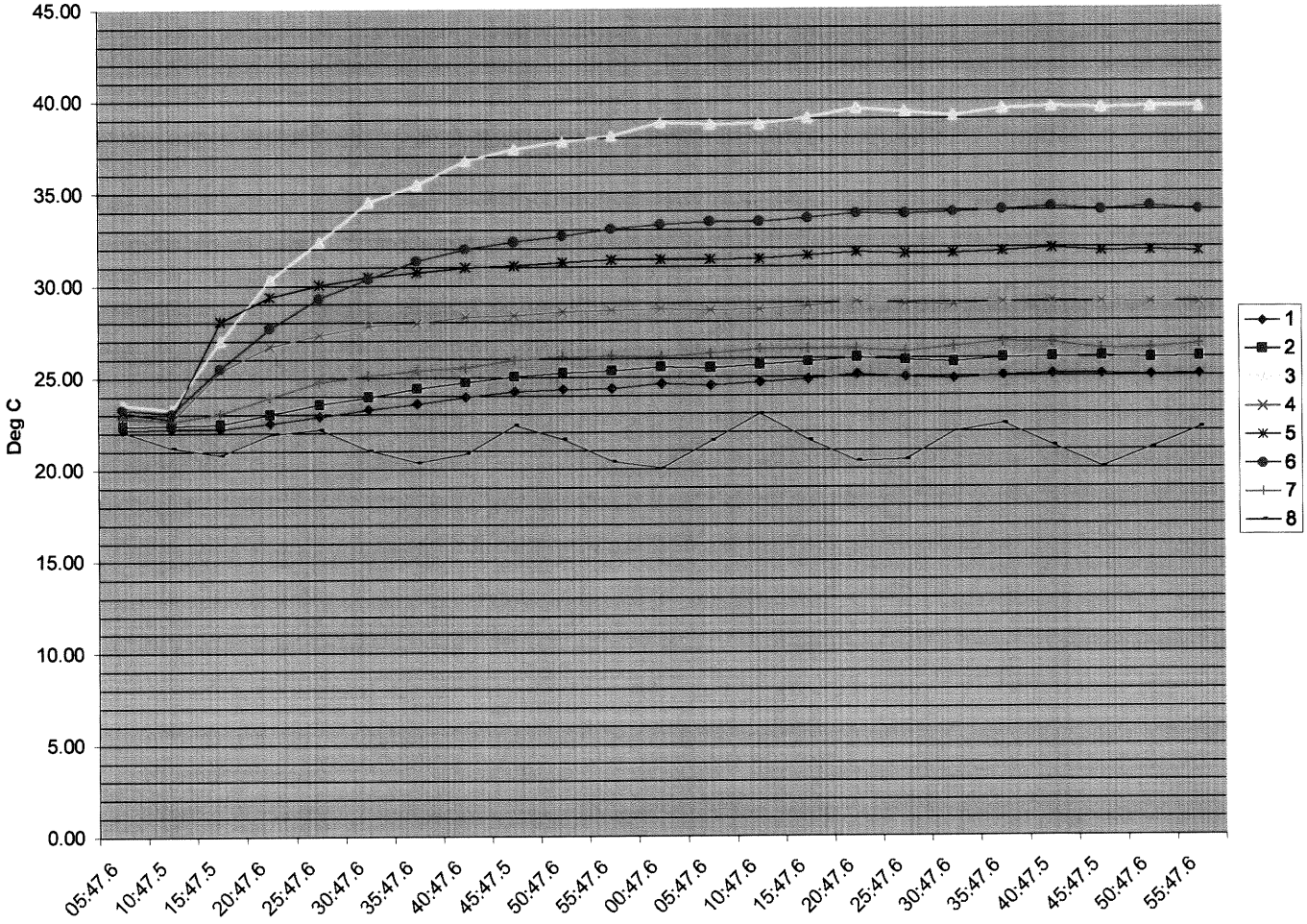
Test Equipment ID#: 4163 Date: 17-Dec- 2003

TÜV PRODUCT SERVICE, INC. TÜV PRODUCT SERVICE DANVERS

By: Brad Lewis

Project number: DI305566-101
Manufacturer: AudioRail Technologies Ratings: 95-240V~
Model: ADAT rx32 tx32 Serial/Sample# 1

Hating @264V~ 50Hz



TÜV PRODUCT SERVICE, INC. TÜV PRODUCT SERVICE DANVERS

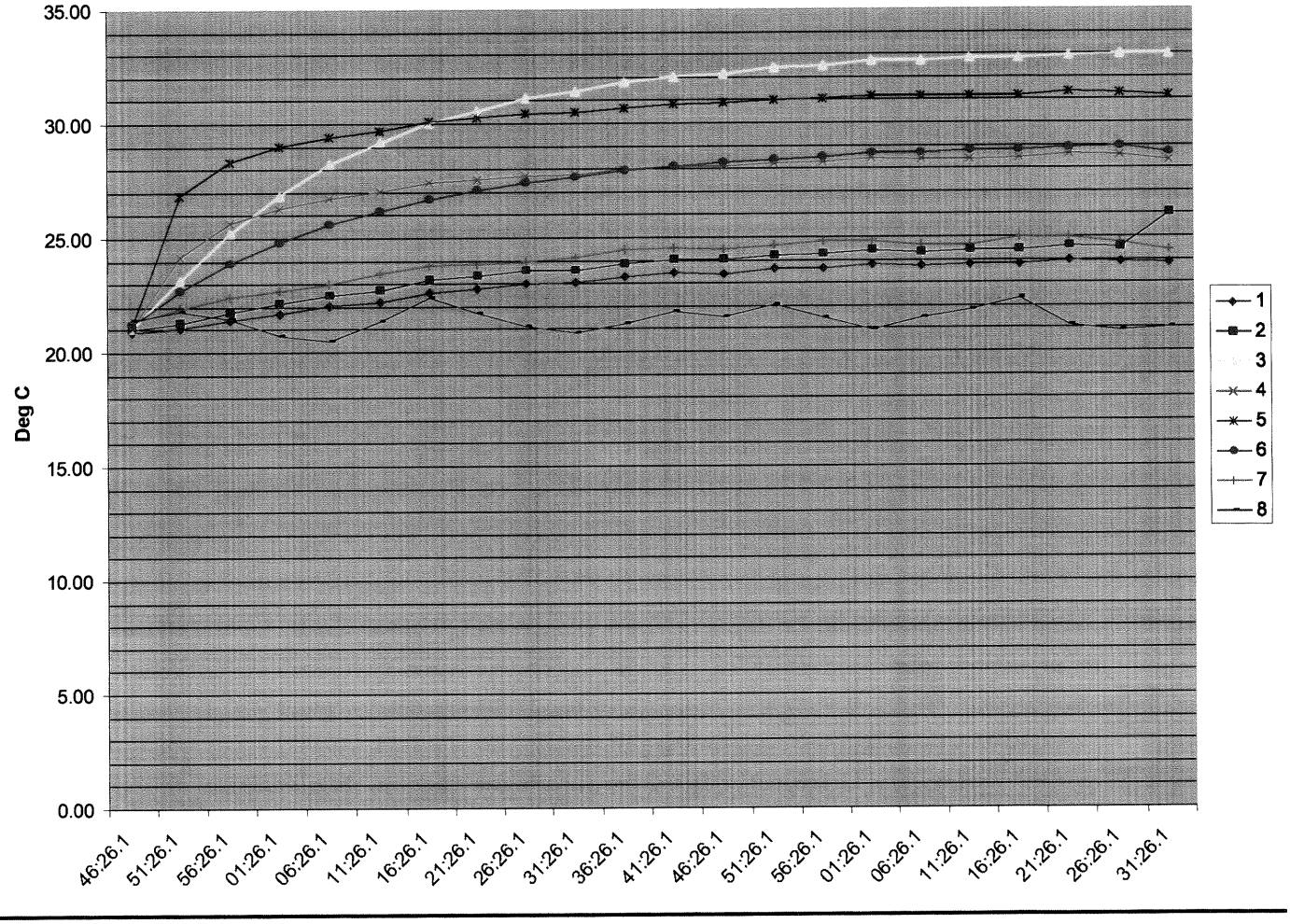
By: Brad Lewis

Project number: DI305566-101

Manufacturer: AudioRail Technologies Ratings: 95-240V~

Model: ADAT rx32 tx32 Serial/Sample# 1

Heating @85.5V~ 60Hz



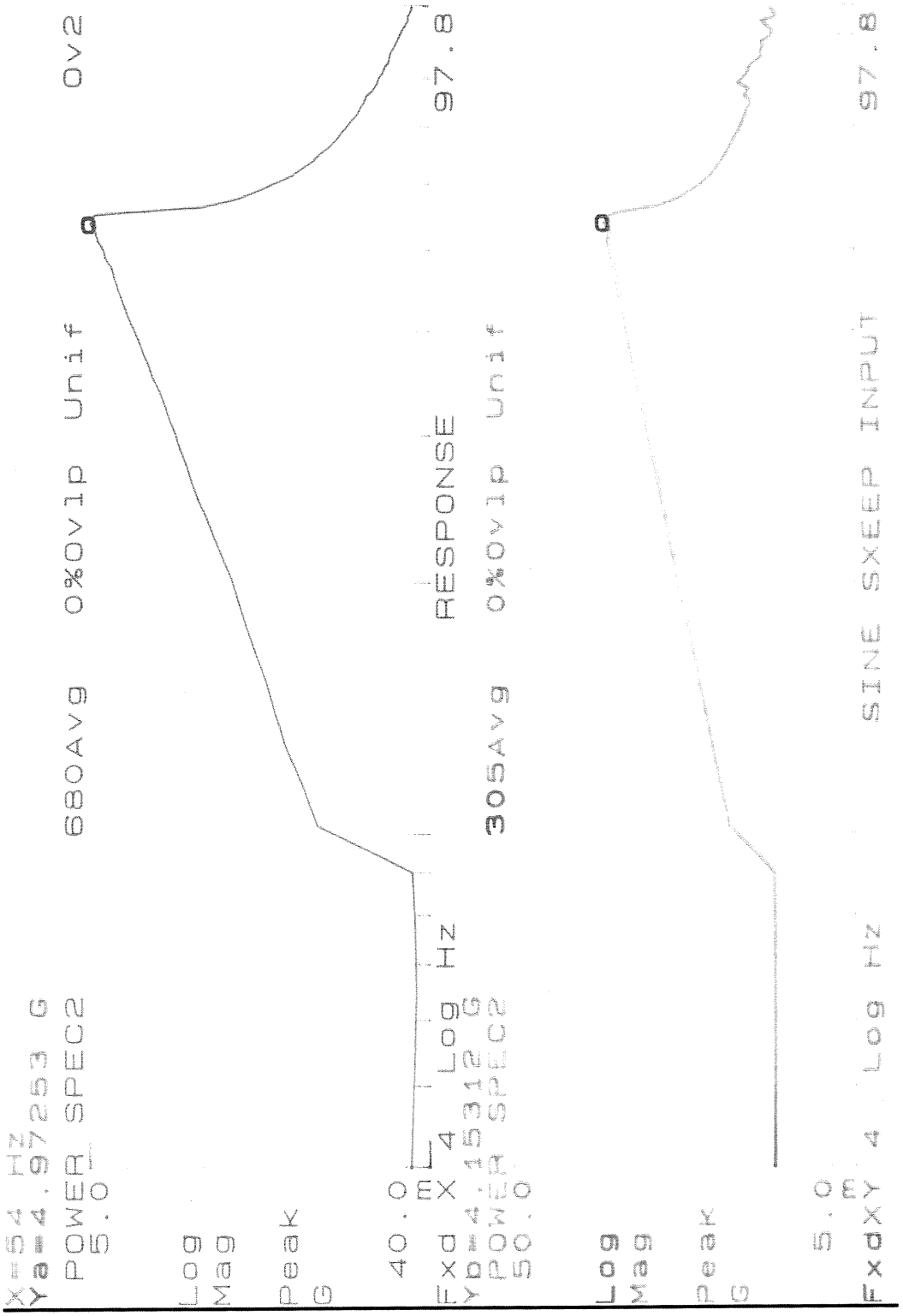
By: Brad Lewis

Project number: DI305566-101

Manufacturer: AudioRail Technologies Ratings: 95-240V~

Model: ADAT rx32 tx32 Serial/Sample# 1

Graph of Clause 12.1.2



By: Brad Lewis

Equipment Report

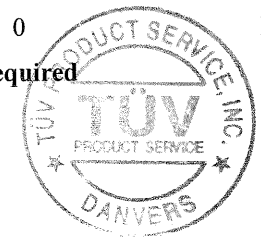
17-Dec-2003

Project Number: DI305566101 **Project Date:** 17-Dec-2003

Company Name: AudioRail

Equip ID	Manufacturer	Model Number	Serial Number	Description	Calibration Date	Interval	Due	Cal Code	Verification Date	Interval	Due
Test Performed											
4004	VALHALLA SCIENTIFI	2100	3-6134	Power Analyzer - True RMS V, A, W	30-May-2003	12	29-May-2004	G		0	
4010	HIPOTRONICS	HD100	021347-00	HiPot Tester - 0-15KVAC, 0-40KVDC	10-Sep-2003	12	09-Sep-2004	G		0	
4015	BIDDLE	210200	1188	Insulation Tester - Megger	23-Sep-2003	12	22-Sep-2004	G		0	
4016	HYPATIA	306	41	High Current	27-Jan-2003	12	27-Jan-2004	G		0	
4020	ELGAR	1751SX-00TDP-	10769, 7124	AC Power Source / Osc. Module	26-Jun-2003	12	25-Jun-2004	G		0	
4084	PTL	F22.50		Impact Hammer	26-Jun-2002	24	25-Jun-2004	G		0	
4085	CHILLIONS	DPPH1000N	TUV-202	Force Gage	02-May-2003	12	01-May-2004	G		0	
4088	PTL	P-10.38		IEC Test Finger	22-Apr-2003	12	21-Apr-2004	G		6	
4107	FOWLER & NSK	Max / cal seris	335558	Calipers	01-Jul-2003	12	30-Jun-2004	G		0	
4111	TENNEY	TH-JR	9712524	Oven	26-Jun-2003	12	25-Jun-2004	G		0	
4113	TUV PS			Capacitor Discharge Box		0		B	14-Feb-2004	3	15-May-2004
4114	PTL	P-10-04	8701057.01	Jointed Test Finger		0		B	08-Jan-2002	24	08-Jan-2004
4129	ED & D	CC-23		1.0 to 8mm Gauge		0		B	10-Feb-2003	24	09-Feb-2005

Cal Code Legend: G=Out Source, Y=No Cal required, R=Out of Service, B=In-House Verification Required



Project Number: DI305566101 **Project Date:** 17-Dec-2003

Company Name: AudioRail

Equip ID	Manufacturer	Model Number	Serial Number	Description	Calibration Date	Calibration Interval	Calibration Due	Cal Code	Verification Date	Verification Interval	Verification Due
4145	PTL	ITB-01		Impact Ball		0		B	08-Jan-2002	24	08-Jan-2004
4153	TUV PS	30mmPP01		30 mm Pressure Plate		0		B	26-Nov-2002	24	25-Nov-2004
4163	STARRETT	0490	97270896	Protractor	21-Feb-2003	24	20-Feb-2005	G		0	
4169	OHAUS	DS44L	23425	Scale	22-Apr-2003	12	21-Apr-2004	G		0	
4193	FLUKE	87 Series III	70600064	Digital Multimeter	30-Jun-2003	12	29-Jun-2004	G		0	
4233	TUV PS			Hardwood Floor		0		Y		0	
4250	TEKTRONIX	TDS3052	B010463	Digital Phosphor Oscilloscope	21-Feb-2003	12	21-Feb-2004	G		0	
4274	AGILENT TECHNOLO	34970A	US37042050	Data Acquisition/Switch Unit	13-Feb-2003	12	13-Feb-2004	G		0	
4278	SIMPSON	228	011802	Leakage Current Meter	28-Jan-2003	12	28-Jan-2004	G		0	
4296	TEKTRONIX	P6139A		Scope probe	08-Apr-2003	12	07-Apr-2004	G		0	
4303	DELL			Laptop Computer		0		B	19-Feb-2003	12	19-Feb-2004

Cal Code Legend: G=Out Source, Y=No Cal required, R=Out of Service, B=In-House Verification Required

TÜV PRODUCT SERVICE, INC. TÜV PRODUCT SERVICE DANVERS