EINAREX

Einarex Apex L1 750W

Serial Number

Lab ID EX75002546

Certification ID 252546

Test Result Report ID: 24PS2546A

Certificate Issue Date: Aug 27, 2024

115V 230V

Scheme: ETA-EMI PSU

CYBENETICS BRONZE 230v

115V 230V

No LAMBDA level

Average noise output 45.30 dB(A), above the 45 dB(A) limit of the lowest LAMBDA level (Standard).

Scheme: LAMBDA PSU

General Information

Test Equipment

Electronic Loads	Chroma 63601-5 x2 Chroma 63600-2 Chroma 63640-80-80 x10 Chroma 63610-80-20
AC Sources	Chroma 6530, APM SP300VAC4000W-P, GW Instek ASR-3500
Power Analyzers	Rohde & Schwarz HMC8015 & NPA701
Oscilloscopes	Picoscope 4444, Siglent SDS2104X PLUS
Sound Analyzer	Bruel & Kjaer 2270 G4
Microphone	Bruel & Kjaer Type 4955-A
Temperature Logger	Picoscope TC-08
Tachometer	UNI-T UT372
Multimeters	Keysight 34465A
EMI Analyzer	TekBox TBMR-110M-EU
Isolation Transformer	4kVA
UPS	FSP Champ Tower 3kVA, CyberPower OLS3000E 3kVA
Testing Methodology	Cybenetics PSU Test Protocol

DUT Information(Non-accredited measurements)

Product Identification Details	
Brand	Einarex
Model	Apex L1 750W
OEM/ODM	Tecnomall Technology
Serial Number	
Product Specifications	
Manufacturer-Provided Information	
Rated Voltage (Vrms)	200-240
Rated Current (Arms)	6

Rated Frequency (Hz)	50-60
Rated Power (W)	750
Operating Temperature (Continuous Full Load) (°C)	
Type	ATX12V
Cable Design	Semi Modular
Warranty	-
Cybenetics Measurements	
Dimensions (W x H x D)	
Weight	
Cooling	120mm Hydro Dynamic Bearing Fan
Semi-Passive Operation	✗
Cybenetics Testing Information	
Lab ID	EX75002546
Date of receipt	Aug 13, 2024
Testing Date	Aug 23, 2024
Report Issued Date	Aug 27, 2024
DUT Notes	Protections are not properly set. Not smooth voltage waveform and voltage spikes during turn on tests.
Engineer Name	-
Authorized By the Laboratory Technical Manager	Aristeidis Bitziopoulos
Signature	

Cables and Connectors(Non-accredited measurements)

Captive Cables				
Description	**Cable Count**	**Connector Count (Total)**	**Gauge**	In Cable Capacitors
ATX connector 20+4 pin (520mm)	1	1	18-22AWG	No
8 pin EPS12V (610mm) / 4 + 4 pin EPS12V (+150mm)	1	2	18AWG	No
Modular Cables				
6+2 pin PCIe (530mm)	1	1	18AWG	No
6+2 pin PCIe (550mm+145mm)	1	2	18AWG	No
SATA (450mm+155mm+155mm)	2	6	18AWG	No

4-pin Molex (450mm+150mm)	1	1	18AWG	No
AC Power Cord (1410mm) - C13 coupler	1	1	18AWG	-

Protection Features(Manufacturer)

Over Power Protection	✓
Over Current (+12V) Protection	✗
Over Temperature Protection	✓
Short Circuit Protection	✓
Surge Protection	✓
Inrush Current Protection	✓
Fan Failure Protection	✗

Power Specifications

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	18	18	62	3	0.3
	Watts	120		744	15	3.6
Total Max. Power (W)		750				

Parts Description

General Data	
Manufacturer (OEM)	Tecnomall Technology
PCB Type	Single-Sided
Primary Side	
Transient Filter	4x Y caps, 2x X caps, 2x CM chokes
Inrush Protection	1x NTC Thermistor 2.5d-11 (2.5 ohm) & Relay
Bridge Rectifier(s)	1x GBU1508 (800V, 15A @ 40°C)
APFC MOSFETs	1x Fuxin FXN25N50F (500V, 13.7A @ 100°C, Rds(on): 0.26Ohm)
APFC Boost Diode	1x SI15U600F (600V, 15A)

Bulk Cap(s)	1x Teapo (400V, 390uF, 2,000h @ 105°C, LH)
Main Switchers	2x Fuxin FXN25S55GF (550V, 20A @ 100°C, Rds(on): 0.12Ohm)
PFC/PWM Controller	Champion CM6805BG
Topology	Primary side: APFC, Half-Bridge & Double Forward Secondary side: Passive Rectification & Group Regulation
Secondary Side	
+12V MOSFETs	4x Maple Semi SLP150N06G (60V, 150A @ 100°C, Rds(on): 3mOhm)
5V & 3.3V	2x Kanghong P30U45CT SR (45V, 15A @ 25°C)
Filtering Capacitors	Electrolytic: 3x Shenzhen Technology (3,000h @105°C, WE) 11x Hangcon (105°C)
Supervisor IC	UTC8313
Fan Model	Einarex (120mm, 12V, 0.30A, Hydraumatic Bearing Fan)
5VSB	
TVS Diode	Littelfuse P6SMB
Rectifier	Chongqing PS1045L SBR (45V, 10A)
Standby PWM Controller	Esthome EST.2816D

Test Results

Temperature & Compliance Info

Temperature Range (°C /°F)	28-32 / 82.4-89.6
ErP Lot 3/6 Ready	✓
(EU) No 617/2013 Compliance	✓

Performance Summary 230V

Accredited	
Average Efficiency (>1450 load combinations)	85.973%

Average Noise Output (>1450 Load Combinations)	45.30dBA	
Average PF (>1450 Load Combinations)	0.922	
Efficiency With 10W (≤500W) or 2% (>500W) Load	-	
Standby Power Consumption	0.1072W	
Non-Accredited		
12V Ripple (Full Load)	71.44mV	
5V Ripple (Full Load)	35.56mV	
3.3V Ripple (Full Load)	28.98mV	
5VSB Ripple (Full Load)	27.01mV	
12V Load Regulation	3.51%	
5V Load Regulation	3.45%	
3.3V Load Regulation	4.87%	
5VSB Load Regulation	5.99%	
Inrush Current	130.500A	
Hold-Up Time & PWR_OK Signal	11.90ms	
AC Loss to PWR_OK Hold Up Time	9.10ms	
PWR_OK Inactive to DC Loss Delay	2.80ms	
PSU Timings: T1 (20% / 100%)	51.0ms	48.0ms
PSU Timings: T3 (20% / 100%)	306.0ms	311.0ms
12V OCP (25.9°C / 42.2°C)	66.00A (106.45%), 11.416V*	64.00A (103.23%), 11.425V*
5V OCP (25.9°C / 42.2°C)		
3.3V OCP (25.9°C / 42.2°C)		
5VSB OCP (25.9°C / 42.2°C)	27.2A (151.11%), 3.143V*	22A (122.22%), 3.151V*
OPP (27.12°C / 43.60°C)	123.07%	122.67%

Hold-Up Time & PWR_OK Signal

Hold-Up Time (ms)	11.9
AC Loss to PWR_OK Hold Up Time (ms)	9.1
PWR_OK Inactive to DC Loss Delay (ms)	2.8

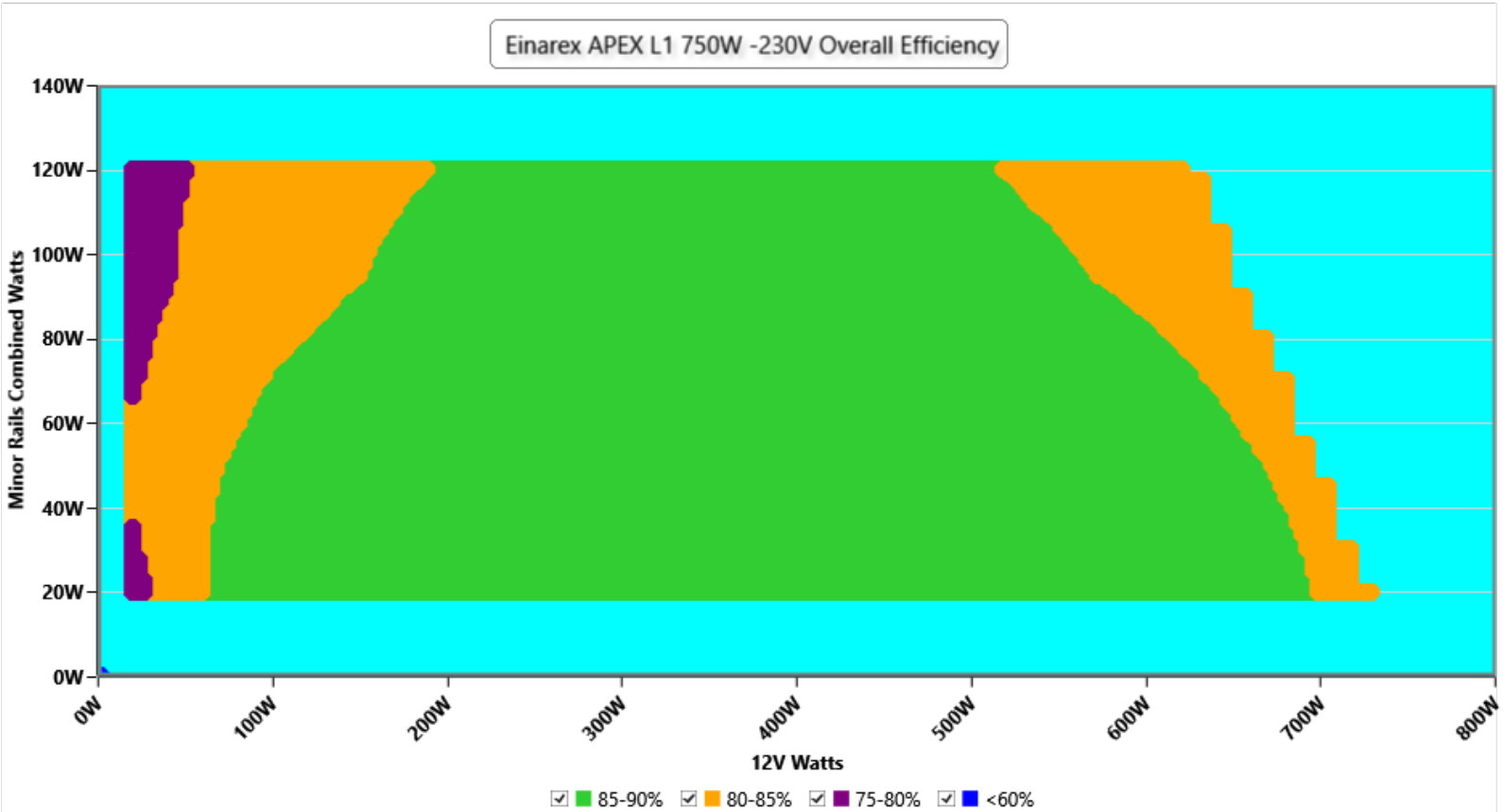
Stromverbrauch im Ruhezustand

Tables 230V

Detailed Results						
	Average	Min	Limit Min	Max	Limit Max	Result
Mains Voltage RMS:	231.05 V	230.93 V	227.70 V	231.10 V	232.30 V	PASS
Mains Frequency:	50.00 Hz	49.99 Hz	49.50 Hz	50.01 Hz	50.50 Hz	PASS
Mains Voltage CF:	1.417	1.417	1.340	1.419	1.490	PASS
Mains Voltage THD:	0.17 %	0.14 %	N/A	0.29 %	2.00 %	PASS
Real Power:	0.107 W	0.065 W	N/A	0.183 W	N/A	N/A
Apparent Power:	21.648 W	21.271 W	N/A	22.045 W	N/A	N/A
Power Factor:	0.006	N/A	N/A	N/A	N/A	N/A

Efficiency Graph

230V

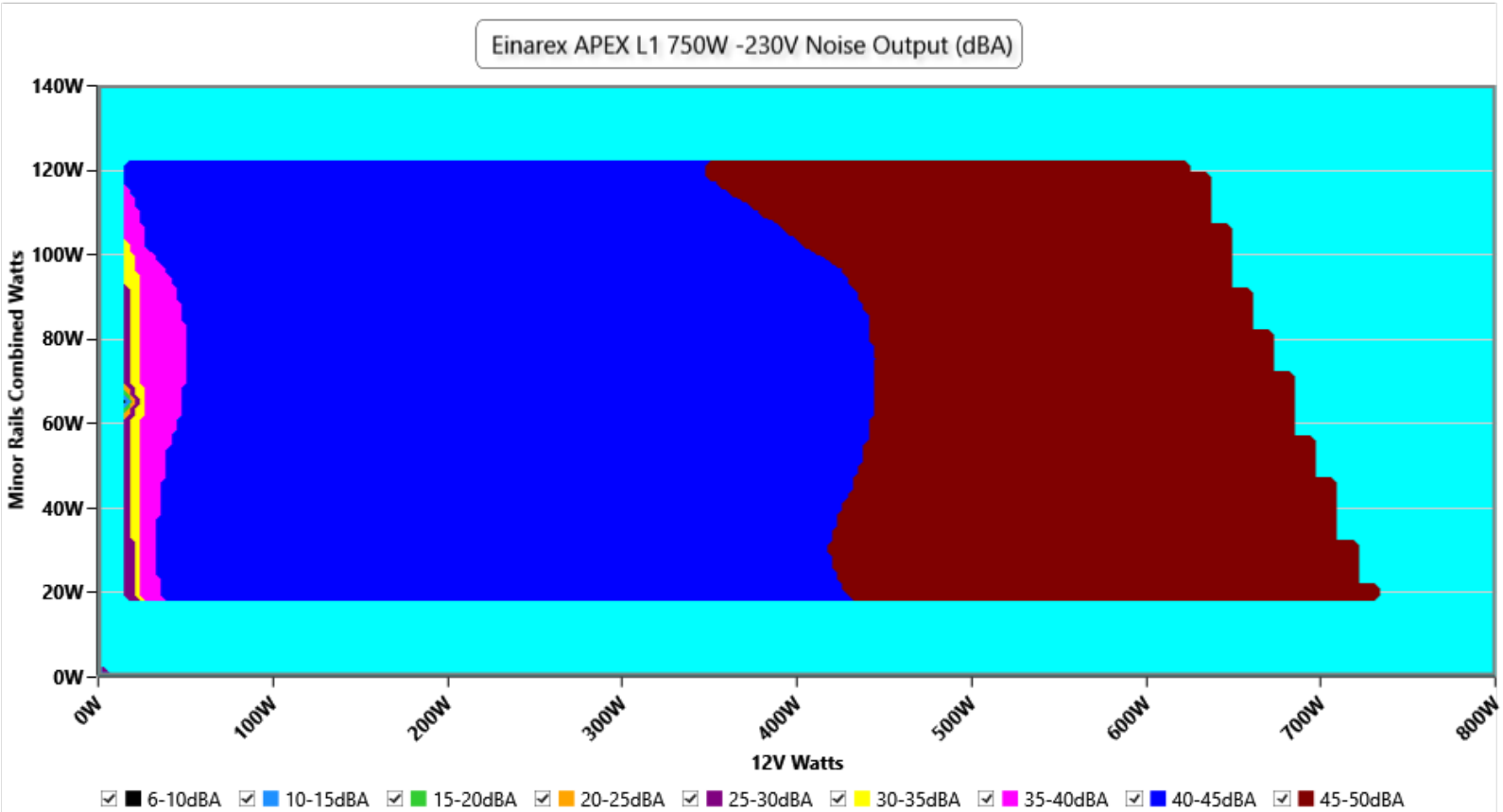


INFO

This graph depicts the PSU`s efficiency throughout its entire operational range. For the generation of the efficiency and noise graphs we set our loaders to auto mode through our custom-made software before trying thousands of possible load combinations

Noise Graph

230V

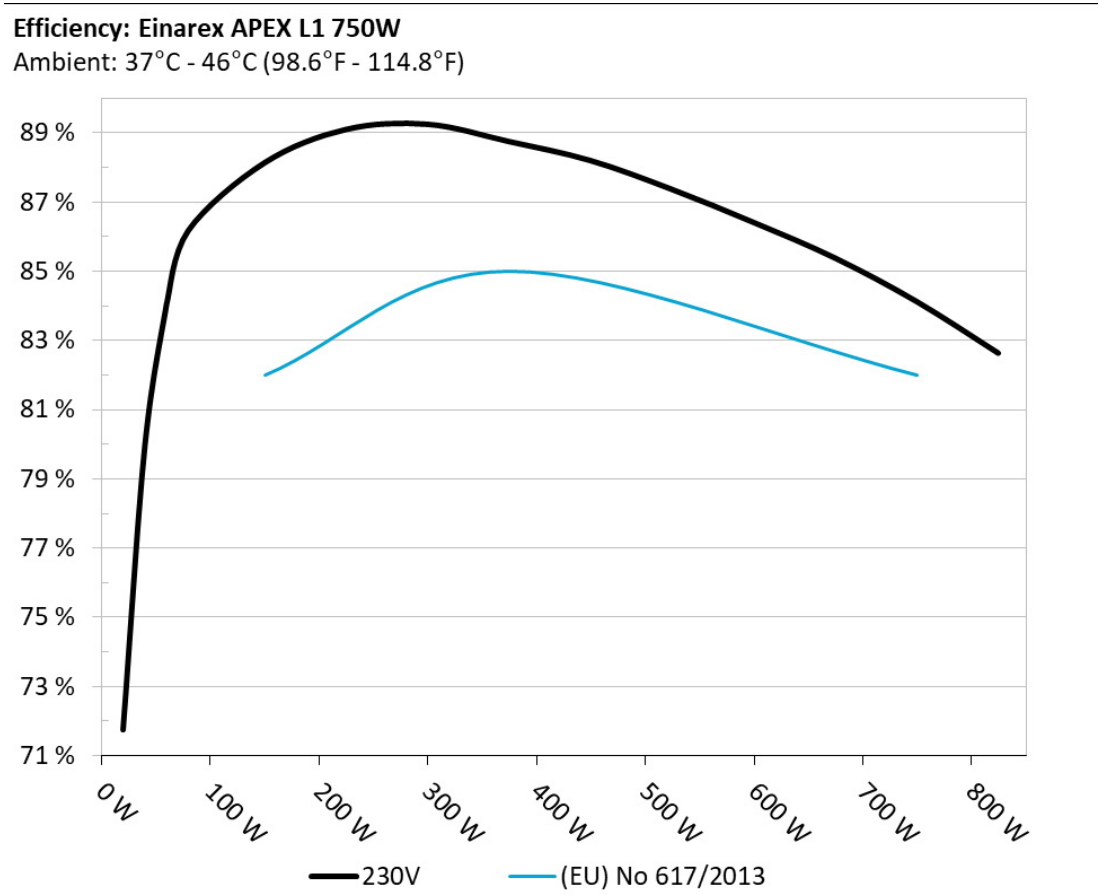


INFO

The PSU`s noise in its entire operational range and under 30-32 °C ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails

Indicative Performance

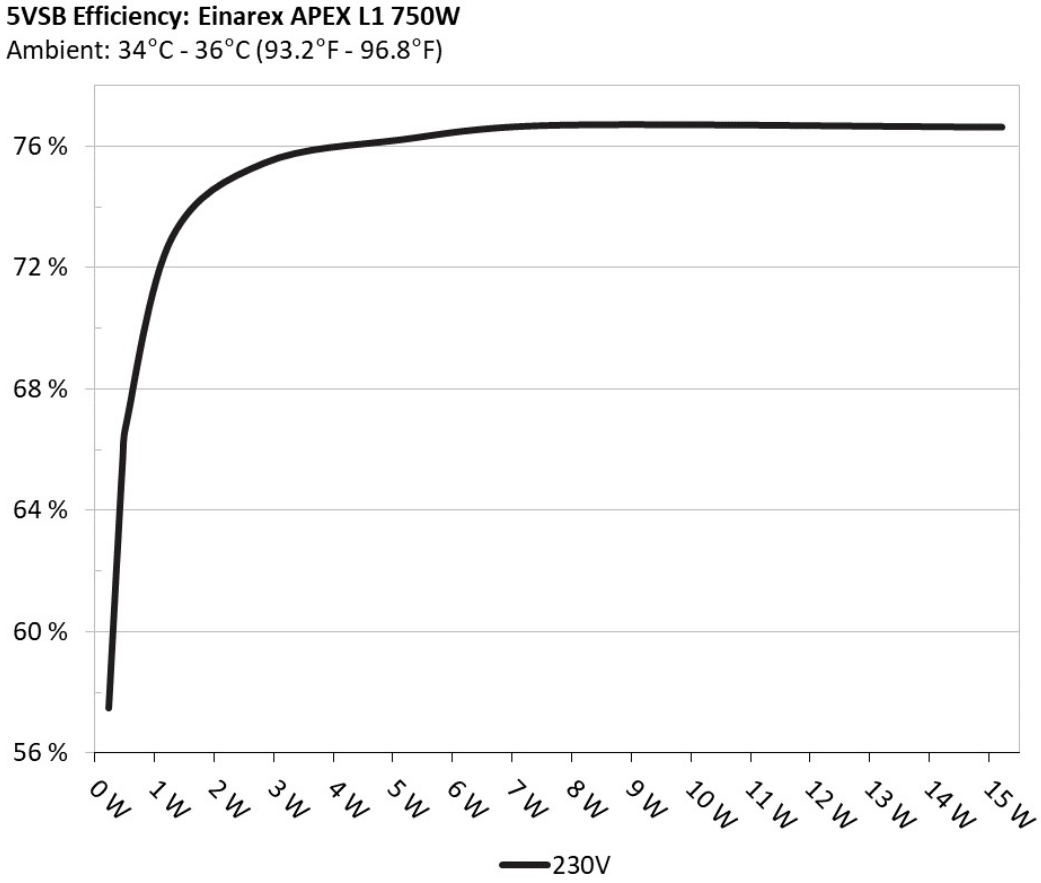
Efficiency under high ambient temperature



INFO

The PSU`s efficiency under high ambient temperatures with 115V and 230V input. For this graph the results of the 10-110% load regulation table are used

5VSB Efficiency



INFO

This graph depicts the efficiency levels of the 5VSB rail with 115V and 230V input

5VSB Efficiency (ERP LOT 3/6 & CEC) 230V

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	**0.045A**	0.233W	57.472%	0.017
	5.178V	0.406W		229.84V

2	**0.09A**	0.466W	65.663%	0.03
	5.175V	0.711W		229.86V
3	**0.55A**	2.838W	75.453%	0.143
	5.159V	3.761W		229.84V
4	**1A**	5.144W	76.227%	0.219
	5.143V	6.749W		229.84V
5	**1.5A**	7.689W	76.7%	0.251
	5.125V	10.025W		229.84V
6	**3A**	15.215W	76.639%	0.335
	5.071V	19.852W		229.84V

Protection Features

OCP (Cold @ 25.9°C)	12V: 66.00A (106.45%), 11.416V* *Didn't shut down, low voltage (11.099V@80A) 5V: <4.75V @18A 3.3V: 27.2A (151.11%), 3.143V* *Didn't shut down, low voltage (3.126V@27.3A) 5VSB: 4.7A (156.67%), 4.919V
OCP (Hot) @ 42.2°C)	12V: 64.00A (103.23%), 11.425V* *Didn't shut down, low voltage (11.055V@81A) 5V: <4.75V @18A 3.3V: 22A (122.22%), 3.151V* *Didn't shut down, low voltage (2.507V@27.1A) 5VSB: 4.3A (143.33%), 4.95V
OPP (Cold @ 27.1°C)	923.03W (123.07%)
OPP (Hot @ 43.6°C)	920.03W (122.67%)
OTP	✓ (156°C @ Heat Sink)
SCP	12V to Earth: ✓ 5V to Earth: ✓ 3.3V to Earth: ✓ 5VSB to Earth: ✓ -12V to Earth: ✓
PWR_OK	Accurate but lower than 16.0ms
NLO	✓

Fan Failure Protection	✗
SIP	Surge: None Inrush: NTC

Supplementary Tests (For Reference)

Typical Load Tests 230V

Test	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
10%	**4.392A**	**1.945A**	**1.947A**	**0.976A**	75.002	84.231%	1455	42.2	40.08°C	0.768
	12.158V	5.141V	3.389V	5.125V	89.043				42.23°C	229.83V
20%	**9.811A**	**2.93A**	**2.934A**	**1.177A**	149.933	88.12%	1571	43.8	40.71°C	0.841
	12.134V	5.119V	3.374V	5.1V	170.146				43.5°C	229.82V
30%	**15.624A**	**3.423A**	**3.436A**	**1.379A**	224.932	89.085%	1677	43.3	41.26°C	0.872
	12.089V	5.113V	3.361V	5.076V	252.492				45.2°C	229.81V
40%	**21.492A**	**3.916A**	**3.944A**	**1.584A**	300.021	89.234%	1746	45.1	41.79°C	0.896
	12.043V	5.107V	3.347V	5.052V	336.218				46.68°C	229.79V
50%	**26.994A**	**4.915A**	**4.954A**	**1.791A**	374.417	88.739%	1831	49.7	42.44°C	0.918
	12.000V	5.087V	3.331V	5.026V	421.932				48.52°C	229.78V
60%	**32.514A**	**5.921A**	**5.975A**	**2A**	449.334	88.192%	1902	49.3	42.76°C	0.935
	11.980V	5.067V	3.314V	5V	509.496				50.59°C	229.77V
70%	**38.122A**	**6.934A**	**7.006A**	**2.212A**	524.263	87.361%	1922	49.9	43.33°C	0.95
	11.940V	5.048V	3.297V	4.973V	600.112				52.71°C	229.76V
80%	**43.806A**	**7.952A**	**8.049A**	**2.325A**	599.49	86.406%	1923	49.9	43.67°C	0.959
	11.907V	5.03V	3.28V	4.947V	693.806				55.99°C	229.74V
90%	**50.023A**	**8.466A**	**8.578A**	**2.438A**	674.525	85.377%	1919	49.8	44.56°C	0.966
	11.835V	5.02V	3.264V	4.923V	790.059				60.1°C	229.72V
100%	**56.093A**	**8.974A**	**9.146A**	**3.077A**	749.755	84.119%	1915	49.7	45.32°C	0.972
	11.767V	5.014V	3.247V	4.875V	891.312				64.46°C	229.71V
110%	**62.002A**	**10.002A**	**10.318A**	**3.094A**	824.779	82.63%	1912	49.5	46.47°C	0.976
	11.717V	4.999V	3.227V	4.848V	998.162				69.87°C	229.68V

Test	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
CL1	**1.910A**	**15.201A**	**14.417A**	**0.491A**	146.418	77.315%	1962	51.1	40.3°C	0.843
	12.576V	4.75V	3.308V	5.096V	189.382				46.61°C	229.82V
CL2	**1.902A**	**18.328A**	**0.981A**	**0.488A**	116.487	79.698%	1891	49.4	40.03°C	0.827
	12.620V	4.729V	3.365V	5.119V	146.161				44.34°C	229.82V
CL3	**1.974A**	**0.976A**	**16.336A**	**0.488A**	85.902	73.882%	1838	49.7	40.48°C	0.805
	12.162V	5.123V	3.33V	5.12V	116.27				43.7°C	229.83V
CL4	**64.933A**	**0.943A**	**1.002A**	**0.501A**	749.957	84.493%	1888	49.5	44.98°C	0.974
	11.383V	5.302V	3.293V	4.995V	887.605				56.96°C	229.71V

The results above are not used in the certification process

Light Load Tests 230V

Test	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
20W	**1.219A**	**0.484A**	**0.485A**	**0.194A**	20.004	71.764%	928	27.7	36.69°C	0.563
	12.181V	5.165V	3.405V	5.167V	27.876				37.88°C	229.85V
40W	**2.700A**	**0.675A**	**0.679A**	**0.291A**	40.002	79.946%	1058	31.4	37.79°C	0.616
	12.109V	5.187V	3.401V	5.16V	50.04				38.95°C	229.85V
60W	**4.171A**	**0.869A**	**0.874A**	**0.388A**	60	84.06%	1194	36.1	38.57°C	0.726
	12.114V	5.18V	3.397V	5.152V	71.376				40.04°C	229.84V
80W	**5.641A**	**1.063A**	**1.07A**	**0.486A**	79.94	86.164%	1307	38.8	39.29°C	0.775
	12.110V	5.173V	3.393V	5.144V	92.775				41.3°C	229.83V

The results above are not used in the certification process

Ripple Measurements 230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	23.22mV	19.14mV	16.11mV	16.68mV	Pass
20% Load	24.45mV	18.48mV	18.21mV	17.14mV	Pass
30% Load	25.78mV	19.71mV	18.67mV	17.34mV	Pass
40% Load	26.03mV	19.71mV	18.98mV	15.60mV	Pass
50% Load	29.46mV	19.96mV	20.52mV	16.32mV	Pass

Test	12V	5V	3.3V	5VSB	Pass/Fail
60% Load	33.66mV	20.63mV	20.52mV	17.08mV	Pass
70% Load	34.37mV	21.04mV	23.03mV	18.16mV	Pass
80% Load	38.46mV	22.07mV	24.88mV	19.96mV	Pass
90% Load	51.15mV	25.61mV	25.65mV	21.24mV	Pass
100% Load	71.44mV	35.56mV	28.98mV	27.01mV	Pass
110% Load	78.22mV	40.01mV	33.41mV	31.21mV	Pass
Crossload1	30.24mV	31.39mV	25.33mV	15.64mV	Pass
Crossload2	27.26mV	28.33mV	15.75mV	13.14mV	Pass
Crossload3	22.20mV	20.12mV	21.96mV	14.42mV	Pass
Crossload4	80.14mV	35.40mV	33.55mV	31.13mV	Pass

The results above are not used in the certification process

Einarex Apex L1 750W

Top side

Power specifications label

Cybenetics bietet freiwillige Zertifizierungsprogramme für Netzteile – ETA für Effizienz, LAMBDA für Lautstärke und SAFE für Sicherheit und korrekten Betrieb – sowie für Kühlprodukte mit DELTA für die Schalldämmung von Gehäusen und PHI für Luftstrom und statischen Druck von Lüftern

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