Enermax MaxTytan 1250W

Serial Number

Lab ID 216

Certification ID 25216

Test Result Report ID:

Certificate Issue Date: Nov 14, 2018

115V

Scheme: ETA-EMI PSU

115V

Scheme: LAMBDA PSU

Aristeidis Bitziopoulos, Certification Body General Manager

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	Enermax
Model	MaxTytan 1250W
OEM/ODM	Channel Well Technology
Serial Number	
Product Specifications	
Manufacturer-Provided Information	
Rated Voltage (Vrms)	100-240
Rated Current (Arms)	15-7

Rated Frequency (Hz)	47-63
Rated Power (W)	1250
Operating Temperature (Continuous Full Load) (°C)	
Type	ATX12V
Cable Design	Fully Modular
Warranty	-
Cybenetics Measurements	
Dimensions (W x H x D)	
Weight	
Cooling	140mm Magnetic Cyclone Bearing Fan (ED142512M-PA)
Semi-Passive Operation	✓
Cybenetics Testing Information	
Lab ID	216
Date of receipt	Nov 1, 2018
Testing Date	Nov 11, 2018
Report Issued Date	Nov 14, 2018
Engineer Name	-
Authorized By the Laboratory Technical Manager	Aristeidis Bitziopoulos
Signature	

Cables and Connectors
(Non-accredited measurements)

Modular Cables				
Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors
ATX connector 20+4 pin (600mm)	1	1	16-20AWG	No
4+4 pin EPS12V (700mm)	1	1	16AWG	No
8 pin EPS12V (700mm)	1	1	16AWG	No
6+2 pin PCIe (600mm)	8	8	16-18AWG	No
SATA (500mm+150mm+150mm+150mm)	4	16	18AWG	No

4 pin Molex (500mm+140mm+140mm+140mm)	2	8	18AWG	No
FDD Adapter (+100mm)	1	1	20AWG	No
Coolergenie - Power Supply Cable (+600mm)	1	1	22-24AWG	No
Coolergenie - 4 pin Fan Cable (+500mm)	1	1	26AWG	No
Coolergenie - 4 pin Fan Extension Cable (+500mm)	1	1	26AWG	No
AC Power Cord (1400mm) - C13 coupler	1	1	18AWG	-

Power Specifications

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	20	20	104	3	0.3
	Watts	100		1248	15	3.6
Total Max. Power (W)		1250				

Parts Description

General Data	
Manufacturer (OEM)	Channel Well Technology
Platform Model	CST
Primary Side	
Transient Filter	6x Y caps, 2x X caps, 2x CM chokes, 1x MOV
Inrush Protection	NTC Thermistor & Bypass Relay
Bridge Rectifier(s)	2x Vishay LVB1560 (600V, 15A @ 125°C)
APFC MOSFETS	2x Toshiba TK25N60X (600V, 25A @ 150°C, 0.105 Ohm)
APFC Boost Diode	2x SCS110AG (600V, 10A & 117°C)
Hold-up Cap(s)	1x Chemi-Con (420V, 560uF, 2000h @ 105°C, KMR) 1x Nichicon (400V, 680uF, 2000h @ 105°C, GG)
Main Switchers	4x Alpha & Omega AOTF29S50 (600V, 18A @ 100°C, 0.15 Ohm)
FET Drivers	2x Silicon Labs Si8230BD
Primary MCU	Texas Instruments UCD3138 (31.25MHz, 32-bit ARM7TDMI-S Processor, 32KB Flash, 3x Feedback loop control, 14bit DAC, up to 2MHz switching freq)
Secondary MCU	Microchip PIC32MX230F064D (40 MHz, 64KB Flash, 13x analog chanels, 10bit ADC, USB interface)
Topology	Primary side: Full-Bridge & LLC Resonant Converter Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	

+12V MOSFETS	12x Alpha & Omega AON6240 (40V, 67A @ 100°C, 1.6 mOhm)
5V & 3.3V	DC-DC Converters: 6x Sinopower SM3117NSUC (30V, 85A @ 100°C, 7.2 mOhm @ Vgs=10V) PWM Controller: 1x Anpec APW7159C
Filtering Capacitors	Electrolytics: Nippon Chemi-Con (105°C, KY, KZE) Polymers: Apaq, Nippon Chemi-Con
Supervisor IC	Infinno ST9S313-DAG(OVP, UVP) & LM358
Fan Model	Enermax ED142512M-PA (139mm, 12V, 0.30A, 1560 RPM, twister bearing)
5VSB Circuit	
Rectifier	1x M03N65D FET
Standby PWM Controller	On Bright OB5269CP & SPN5003 (N-Channel Enhancement Mode FET)

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 115V

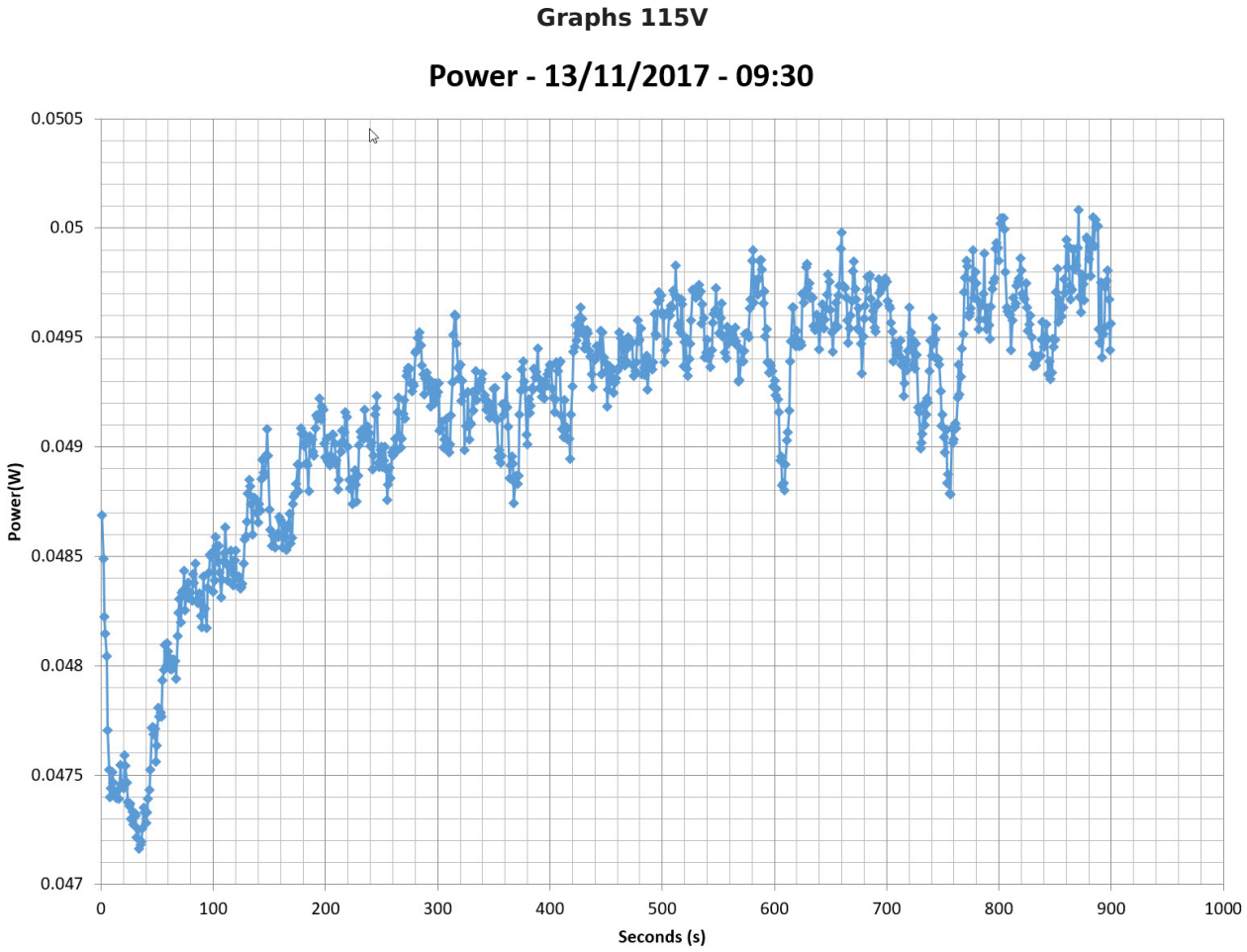
Accredited	
Average Efficiency (>1450 load combinations)	91.244%
Average Noise Output (>1450 Load Combinations)	23.12dBA
Average PF (>1450 Load Combinations)	0.995
Efficiency With 10W (≤500W) or 2% (>500W) Load	-
Standby Power Consumption	0.0496W
Non-Accredited	
12V Ripple (Full Load)	30.33mV
5V Ripple (Full Load)	17.47mV
3.3V Ripple (Full Load)	14.66mV
5VSB Ripple (Full Load)	21.37mV
12V Load Regulation	0.48%

5V Load Regulation	0.53%
3.3V Load Regulation	0.91%
5VSB Load Regulation	1.40%
Inrush Current	30.234A

Hold-Up Time & PWR_OK Signal

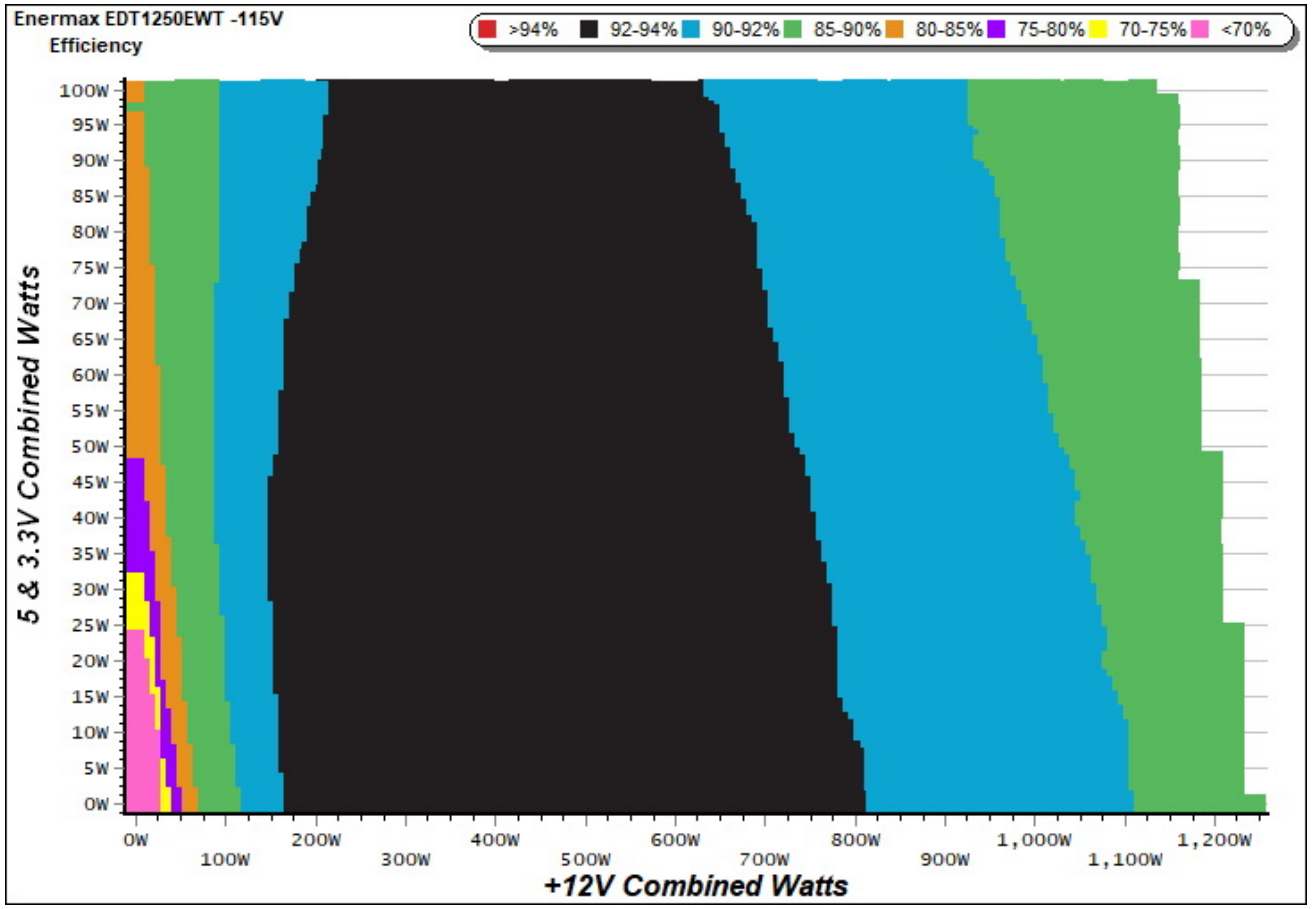
Hold-Up Time (ms)	20.4
AC Loss to PWR_OK Hold Up Time (ms)	16.3
PWR_OK Inactive to DC Loss Delay (ms)	4.1

Stromverbrauch im Ruhezustand



Efficiency Graph

115V

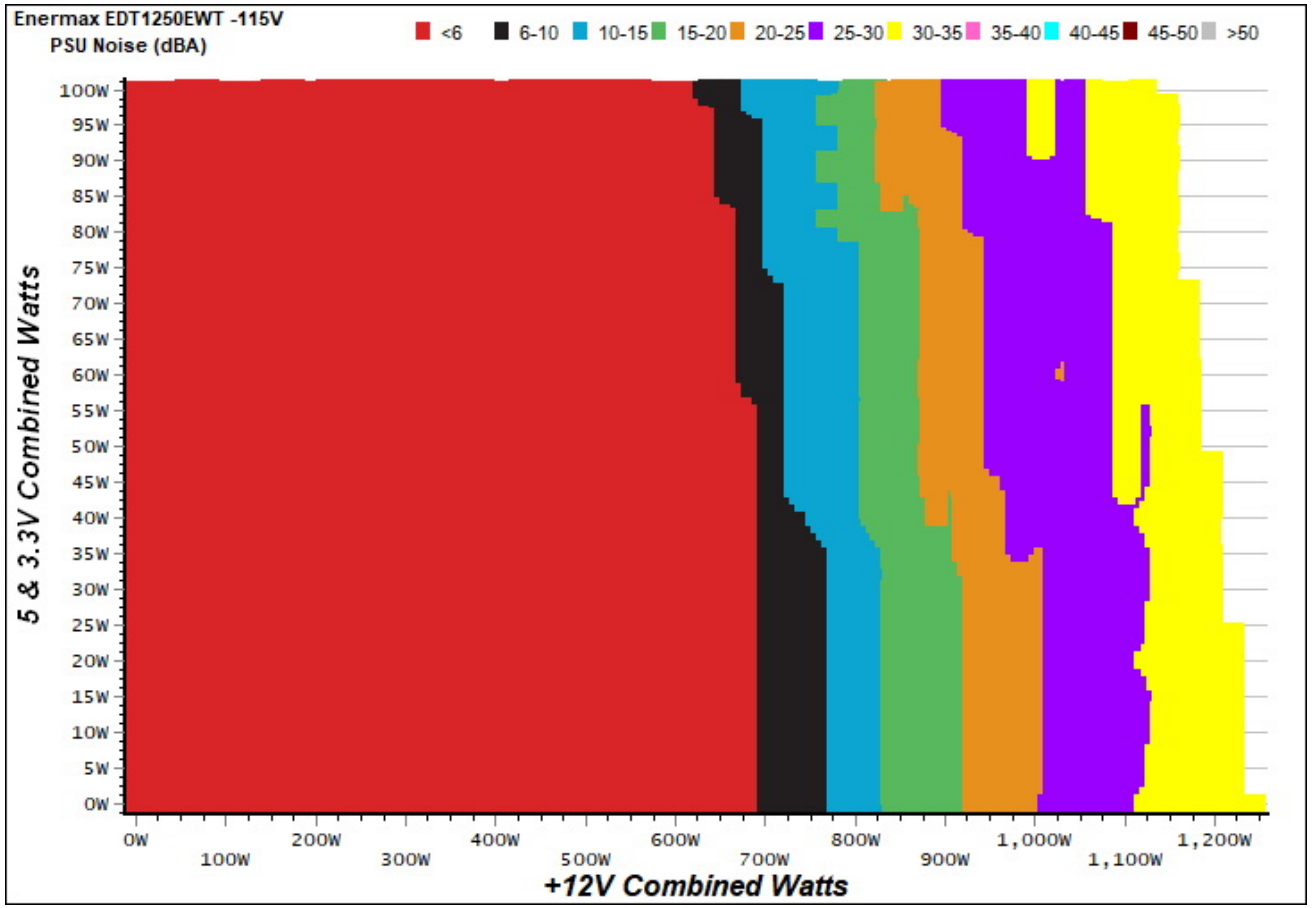


INFO

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

115V

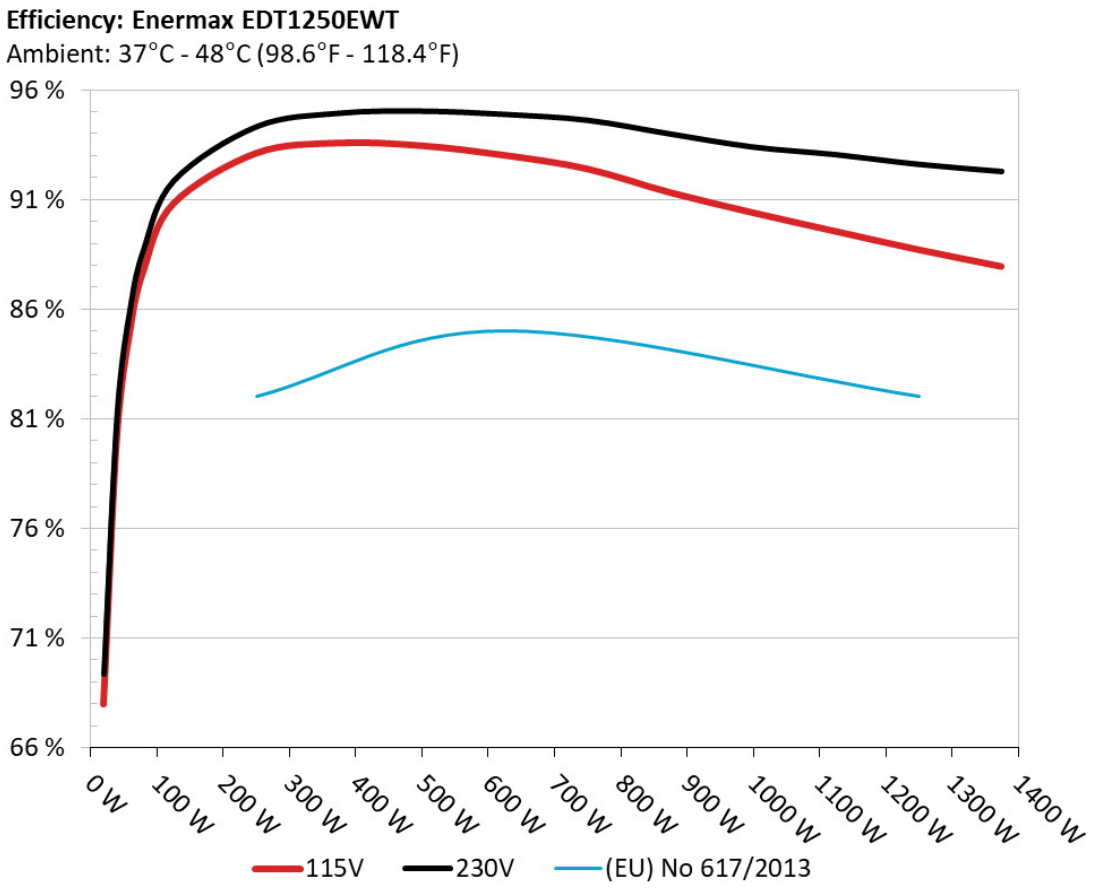


INFO

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

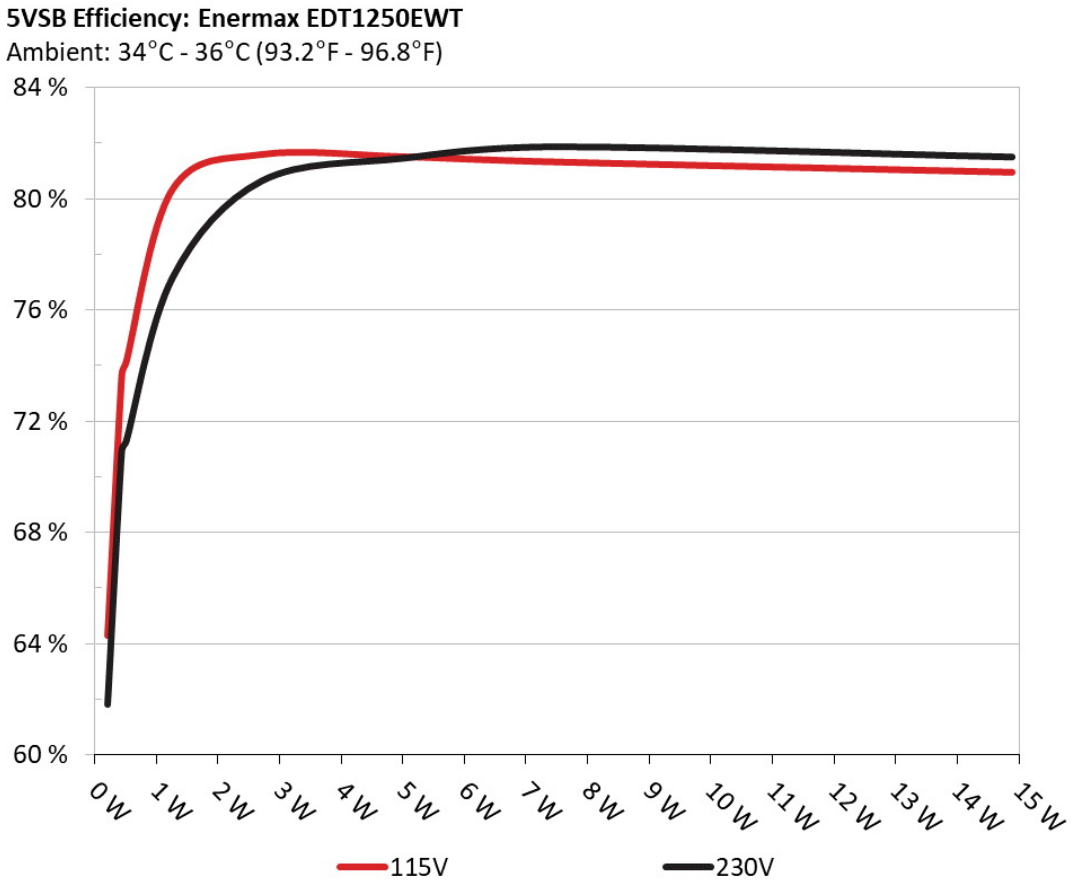
Efficiency under high ambient temperature



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) 115V

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.042A	0.209	64.308%	0.032
	5.016V	0.325		115.06V

2	0.088A	0.439	73.658%	0.059
	5.015V	0.596		115.06V
3	0.542A	2.716	81.586%	0.270
	5.008V	3.329		115.04V
4	1.002A	5.010	81.503%	0.389
	4.999V	6.147		115.05V
5	1.502A	7.493	81.313%	0.456
	4.990V	9.215		115.05V
6	3.001A	14.892	80.944%	0.529
	4.962V	18.398		115.05V

Supplementary Tests (For Reference)

Typical Load Tests 115V

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
1	8.597A	1.974A	2.003A	0.991A	124.785	90.803%	0	<6.0	45.25°C	0.983
	12.004V	5.062V	3.293V	5.043V	137.424				38.07°C	115.10V
2	18.235A	2.959A	3.006A	1.190A	249.621	93.105%	0	<6.0	45.76°C	0.995
	11.997V	5.059V	3.290V	5.038V	268.107				38.41°C	115.10V
3	28.245A	3.464A	3.523A	1.391A	374.781	93.574%	0	<6.0	46.57°C	0.997
	11.991V	5.056V	3.287V	5.033V	400.518				38.77°C	115.11V
4	38.241A	3.953A	4.017A	1.591A	499.522	93.450%	0	<6.0	47.45°C	0.998
	11.986V	5.053V	3.284V	5.028V	534.533				39.30°C	115.10V
5	47.903A	4.953A	5.028A	1.791A	624.388	93.017%	0	<6.0	48.24°C	0.999
	11.980V	5.052V	3.280V	5.022V	671.263				39.75°C	115.10V
6	57.570A	5.943A	6.038A	1.990A	749.301	92.394%	505	7.7	41.67°C	0.999
	11.977V	5.049V	3.278V	5.018V	810.988				50.48°C	115.12V
7	67.251A	6.939A	7.052A	2.194A	874.081	91.322%	778	17.7	42.85°C	0.999
	11.970V	5.045V	3.274V	5.010V	957.138				52.11°C	115.13V
8	76.937A	7.930A	8.070A	2.396A	999.077	90.402%	979	25.1	44.37°C	0.999
	11.967V	5.042V	3.271V	5.005V	1105.151				54.38°C	115.13V

9	87.096A	8.443A	8.596A	2.395A	1124.191	89.549%	1144	29.0	45.19°C	0.999
	11.959V	5.039V	3.267V	5.003V	1255.396				55.53°C	115.14V
10	97.008A	8.940A	9.096A	3.006A	1249.039	88.713%	1357	33.9	46.71°C	0.998
	11.951V	5.035V	3.264V	4.988V	1407.947				57.34°C	115.13V
11	107.506A	8.946A	9.103A	3.005A	1373.966	87.951%	1411	35.6	47.71°C	0.998
	11.946V	5.033V	3.262V	4.985V	1562.199				58.45°C	115.14V
CL1	0.098A	12.011A	12.005A	0.004A	101.505	85.883%	0	<6.0	52.96°C	0.977
	12.006V	5.061V	3.292V	5.087V	118.190				46.72°C	115.14V
CL2	104.103A	1.002A	1.004A	1.002A	1258.954	89.096%	1410	35.6	47.10°C	0.998
	11.965V	5.039V	3.270V	5.019V	1413.035				56.61°C	115.13V

The results above are not used in the certification process

Light Load Tests 115V

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	PF/AC Volts
1	1.217A	0.490A	0.484A	0.195A	19.679	68.013%	0	<6.0	0.822
	12.010V	5.064V	3.295V	5.059V	28.934				115.10V
2	2.458A	0.979A	1.000A	0.396A	39.769	80.212%	0	<6.0	0.909
	12.009V	5.062V	3.294V	5.054V	49.580				115.10V
3	3.698A	1.476A	1.513A	0.590A	59.842	85.095%	0	<6.0	0.938
	12.008V	5.062V	3.294V	5.051V	70.324				115.10V
4	4.932A	1.973A	2.001A	0.790A	79.780	87.753%	0	<6.0	0.955
	12.006V	5.062V	3.294V	5.048V	90.914				115.10V

The results above are not used in the certification process

Ripple Measurements 115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	15.1 mV	7.9 mV	5.9 mV	5.7 mV	Pass
20% Load	23.3 mV	8.3 mV	6.3 mV	7.1 mV	Pass
30% Load	31.5 mV	9.5 mV	7.0 mV	9.1 mV	Pass
40% Load	35.6 mV	10.5 mV	7.4 mV	10.8 mV	Pass

Test	12V	5V	3.3V	5VSB	Pass/Fail
50% Load	41.0 mV	11.4 mV	8.3 mV	12.6 mV	Pass
60% Load	32.3 mV	12.4 mV	9.3 mV	13.8 mV	Pass
70% Load	33.5 mV	13.6 mV	10.3 mV	15.7 mV	Pass
80% Load	29.5 mV	15.1 mV	10.8 mV	16.0 mV	Pass
90% Load	27.9 mV	14.6 mV	11.3 mV	17.0 mV	Pass
100% Load	30.3 mV	17.5 mV	14.7 mV	21.4 mV	Pass
110% Load	32.0 mV	16.7 mV	12.4 mV	20.9 mV	Pass
Crossload 1	14.4 mV	13.2 mV	9.0 mV	4.9 mV	Pass
Crossload 2	29.1 mV	13.7 mV	12.0 mV	22.1 mV	Pass

The results above are not used in the certification process

Enermax MaxTytan 1250W



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