EFFICIENCY AND NOISE REPORT IN ACCORDANCE WITH
CYBENETICS ETA AND CYBENETICS LAMBDA PROCEDURE

Enermax Revolution D.F. 850W

Lab ID#: EM85001619
Receipt Date: Mar 3, 2020
Test Date: Mar 9, 2020

Report: 20PS1619A
Report Date: Mar 11, 2020

DUT INFORMATION

Brand	Enermax
Manufacturer (OEM)	Channel Well Technology
Series	Revolution D.F.
Model Number	ERF850EWT
Serial Number	18C7110160206
DUT Notes	

DUT SPECIFICATIONS

Rated Voltage (Vrms)	100-240
Rated Current (Arms)	12
Rated Frequency (Hz)	47-63
Rated Power (W)	850
Type	ATX12V
Cooling	140mm Twister Bearing Fan (ED142512M-FA-1)
Semi-Passive Operation	✗
Cable Design	Fully Modular

TEST EQUIPMENT

Electronic Loads	Chroma 63601-5 x4 Chroma 63600-2 x2 63640-80-80 x20 63610-80-20 x2
AC Sources	Chroma 6530, Keysight AC6804B
Power Analyzers	N4L PPA1530 x2
Sound Analyzer	Bruel & Kjaer 2270 G4
Microphone	Bruel & Kjaer Type 4955-A
Data Loggers	Picoscope TC-08 x2, Labjack U3-HV x2
Tachometer	UNI-T UT372 x2
Digital Multimeter	Keysight U1273AX, Fluke 289, Keithley 2015 - THD
UPS	CyberPower OLS3000E 3kVA x2
Transformer	3kVA x2

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RESULTS

Temperature Range (°C /°F)	30-32 / 86-89.6 (+-2°C / +- 3.6°F)
ErP Lot 3/6 Ready	✓
(EU) No 617/2013 Compliance	✓

115V

Average Efficiency	88.616%
Efficiency With 10W (≤500W) or 2% (>500W)	65.335
Average Efficiency 5VSB	77.400%
Standby Power Consumption (W)	0.0845174
Average PF	0.978
Avg Noise Output	25.78 dB(A)
Efficiency Rating (ETA)	GOLD
Noise Rating (LAMBDA)	A-

230V

Average Efficiency	90.838%
Average Efficiency 5VSB	76.022%
Standby Power Consumption (W)	0.1241690
Average PF	0.934
Avg Noise Output	25.06 dB(A)
Efficiency Rating (ETA)	GOLD
Noise Rating (LAMBDA)	A-

POWER SPECIFICATIONS

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	22	22	25	2.5	0.3
	Watts	120		850	12.5	3.6
Total Max. Power (W)		850				

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CABLES AND CONNECTORS

Modular Cables

Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors
ATX connector 20+4 pin (600mm)	1	1	18AWG	No
4+4 pin EPS12V (700mm)	2	2	16AWG	No
6+2 pin PCIe (500mm+150mm)	3	6	16-18AWG	No
SATA (450mm+150mm+150mm+150mm)	3	12	18AWG	No
4-pin Molex (450mm+150mm+150mm+150mm)	1	4	18AWG	No
FDD Adapter (150mm)	1	1	20AWG	No
AC Power Cord (1100mm) - C13 coupler	1	1	18AWG	-

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General Data	-
Manufacturer (OEM)	CWT
PCB Type	Double Sided
Primary Side	-
Transient Filter	4x Y caps, 2x X caps, 2x CM chokes, 1x MOV, 1x Discharge IC
Inrush Protection	NTC Thermistor (SCK-055) & Relay
Bridge Rectifier(s)	1x GBU15L06 (600V, 15A @ 115°C)
APFC MOSFETs	2x Champion GP28S50G (500V, 28A @ 150°C, 0.125Ohm)
APFC Boost Diode	1x CREE C3D08060A (600V, 8A @ 152°C)
Hold-up Cap(s)	1x Nichicon (400V, 680uF, 2,000h @ 105°C, GG)
Main Switchers	2x Toshiba TK25A60X5 (600V, 25A @ 150°C, 0.14Ohm)
APFC Controller	Champion CM6500UNX & CM03X Phantom Power Remover
Resonant Controller	Champion CM6901X
Topology	Primary side: Half-Bridge & LLC converter Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	-
+12V MOSFETs	6x International Rectifier IRFH7004PBF (40V, 100A @ 100°C, 1.4mOhm)
5V & 3.3V	DC-DC Converters: 2x UBIQ Semiconductor QM3006D (30V, 57A @ 100°C, 5.5mOhm) & 2x Sync Power SPN3004D (30V, 68A @ 100°C, 4.2mOhm) PWM Controllers: ANPEC APW7159C
Filtering Capacitors	Electrolytic: 11x Nippon Chemi-Con (4-10,000h @ 105°C, KY), 2x Nippon Chemi-Con (4-10,000h @ 105°C, KYA), 2x Nippon Chemi-Con (5-6,000h @ 105°C, KZH), 6x Nichicon (4-10,000h @ 105°C, HE), 1x Nichicon (1,000h @ 105°C, VZ) Polymer: 18x FPCAP
Supervisor ICs	Weltrend WT7518D (OCP, SCP) & Sitronix ST9S429-PG14 (OVP, UVP, OCP, SCP, PG)
Fan Model	Enermax ED142512M-FA-1 (140mm, 12V, 0.25A, Twister Bearing Fan)
5VSB Circuit	-
Rectifier	-
Standby PWM Controller	Power Integrations TNY177PN

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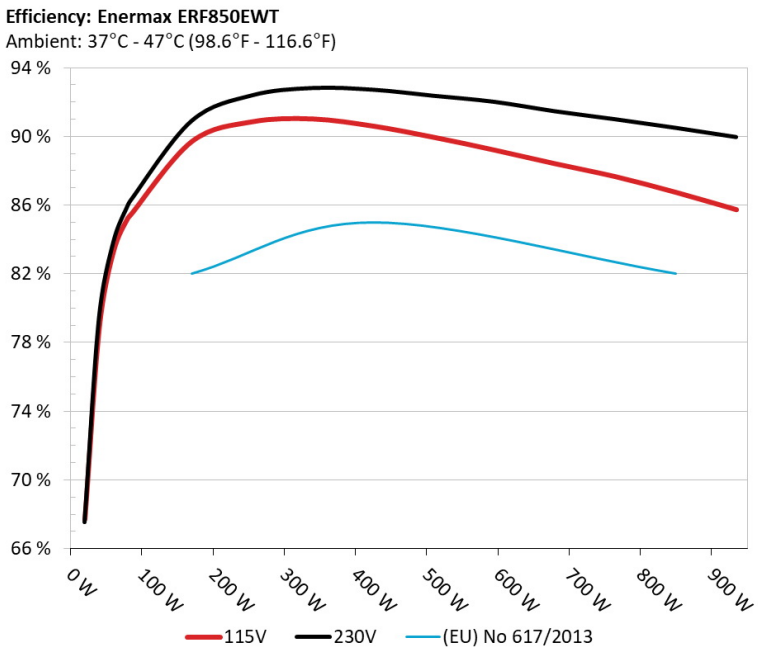
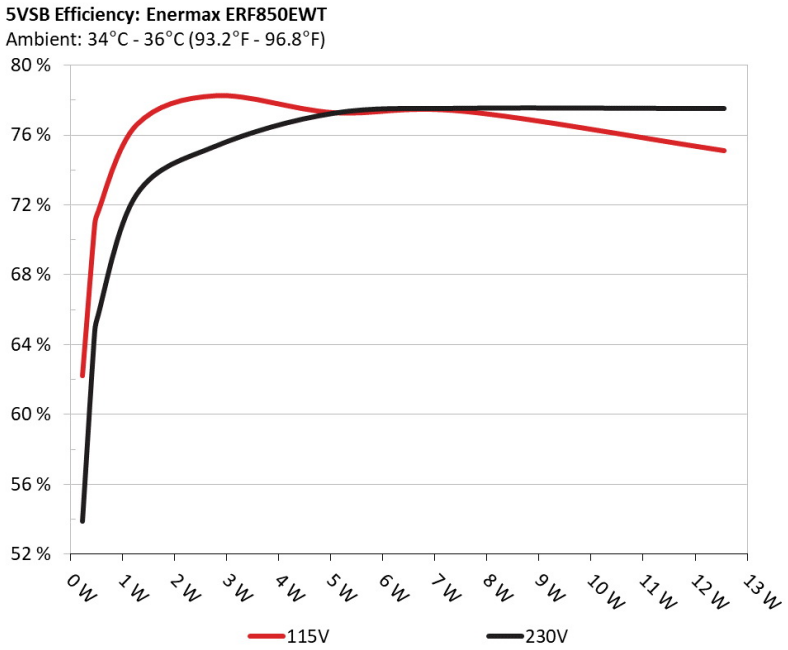
EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE



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

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5VSB EFFICIENCY -115V (ERP LOT 3/6 & CEC)

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.229	62.228%	0.037
	5.085V	0.368		115.11V
2	0.090A	0.458	70.679%	0.063
	5.084V	0.648		115.11V
3	0.550A	2.790	78.261%	0.264
	5.072V	3.565		115.11V
4	1.000A	5.061	77.291%	0.361
	5.061V	6.548		115.11V
5	1.500A	7.573	77.362%	0.413
	5.048V	9.789		115.11V
6	2.500A	12.560	75.115%	0.465
	5.024V	16.721		115.11V

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.229	53.882%	0.153
	5.056V	0.425		230.24V
2	0.090A	0.458	64.507%	0.021
	5.084V	0.710		230.24V
3	0.550A	2.790	75.385%	0.102
	5.072V	3.701		230.24V
4	1.000A	5.061	77.267%	0.167
	5.061V	6.550		230.24V
5	1.500A	7.573	77.552%	0.225
	5.048V	9.765		230.24V
6	2.500A	12.561	77.537%	0.301
	5.024V	16.200		230.24V

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115V

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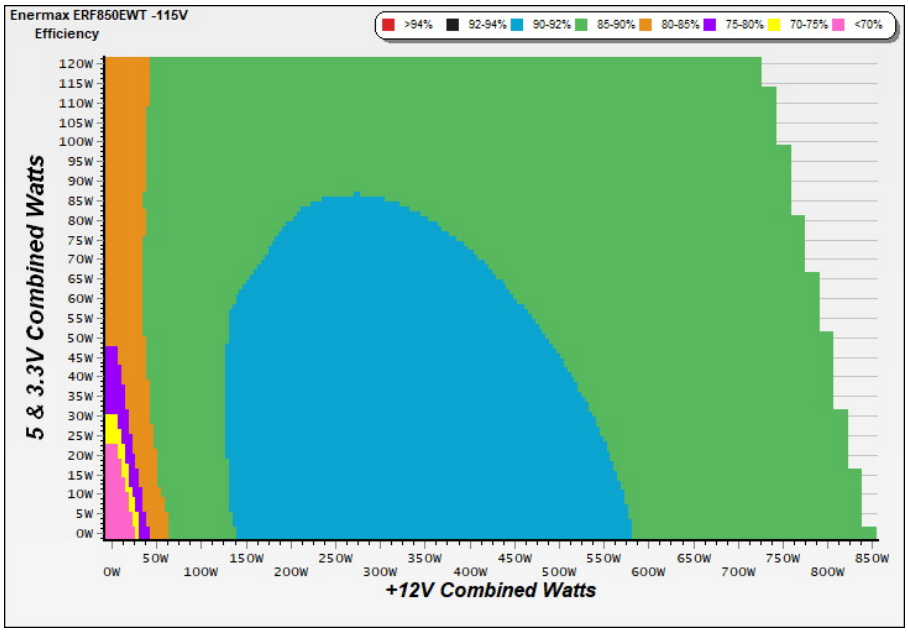
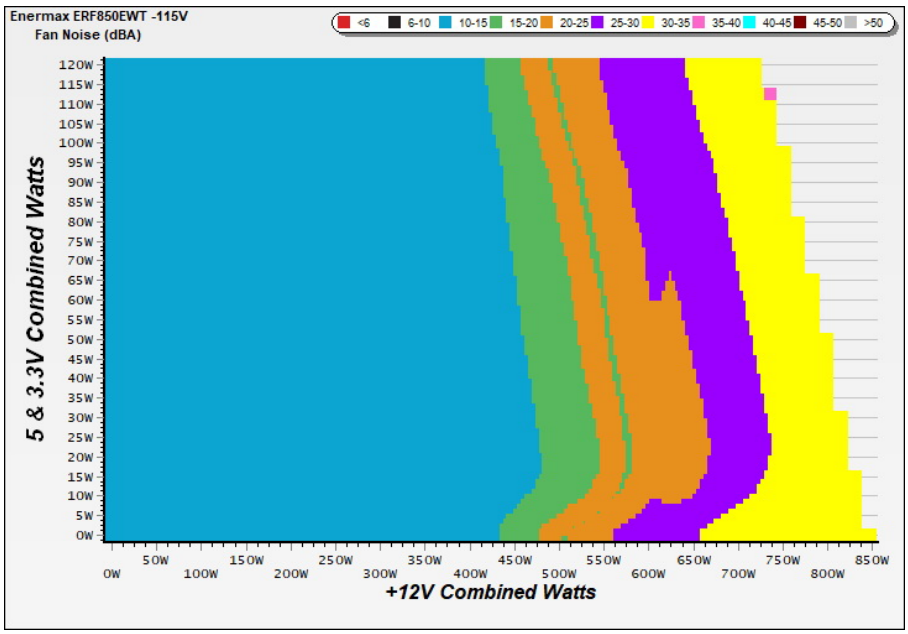
EFFICIENCY GRAPH 115V



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 (+-2 °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

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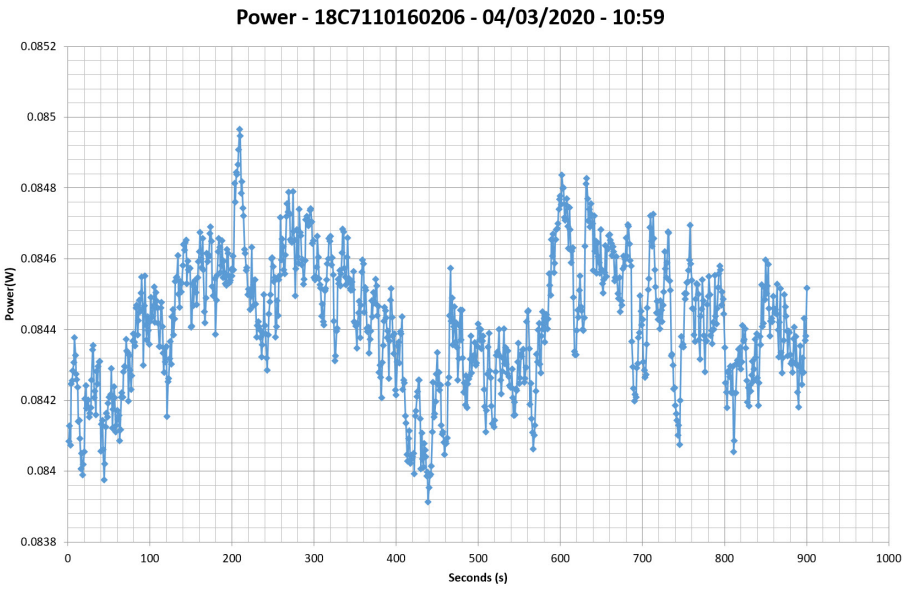
VAMPIRE POWER -115V



INFO

This graph is generated by the PPA Standby Power Analysis software which takes full control of the power analyzer during the whole procedure. This application features all of the EN50564 & IEC62301 test limits for standby power software testing

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COMMISSION REGULATION (EU) NO 617/2013 TESTING 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	5.264A	2.006A	1.995A	0.989A	84.961	85.476%	408	13.1	40.41°C	0.964
	12.035V	4.986V	3.310V	5.059V	99.397				43.25°C	115.10V
2	11.557A	3.010A	2.993A	1.188A	170.024	89.701%	407	13.1	40.84°C	0.980
	12.038V	4.984V	3.307V	5.052V	189.546				44.23°C	115.10V
5	31.168A	5.025A	5.001A	1.789A	424.933	90.598%	423	12.6	42.42°C	0.978
	12.013V	4.977V	3.300V	5.030V	469.031				48.43°C	115.10V
10	63.707A	9.062A	9.035A	2.500A	849.773	86.744%	1448	38.0	45.49°C	0.987
	11.970V	4.966V	3.287V	5.000V	979.632				54.74°C	115.10V

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230V

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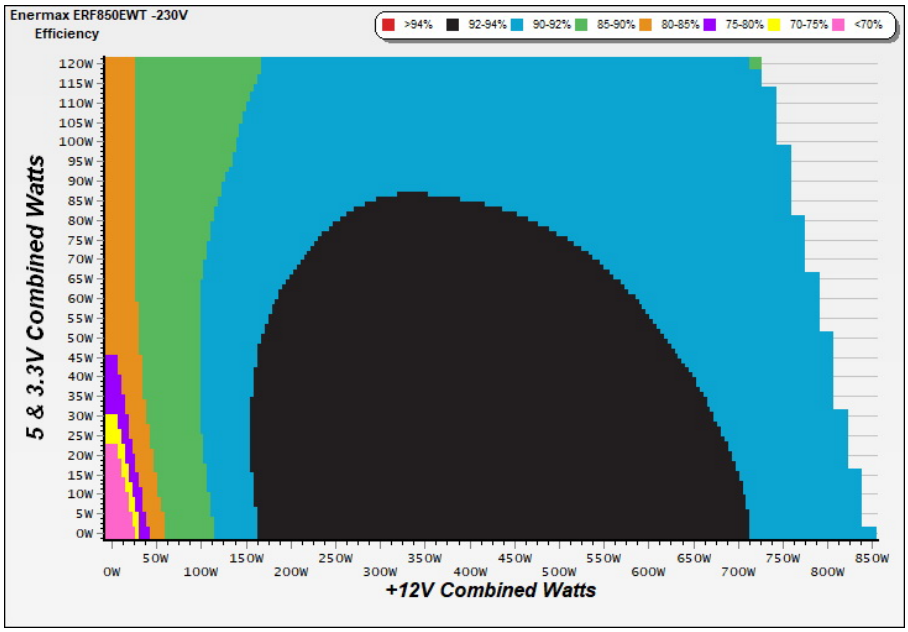
EFFICIENCY GRAPH 230V



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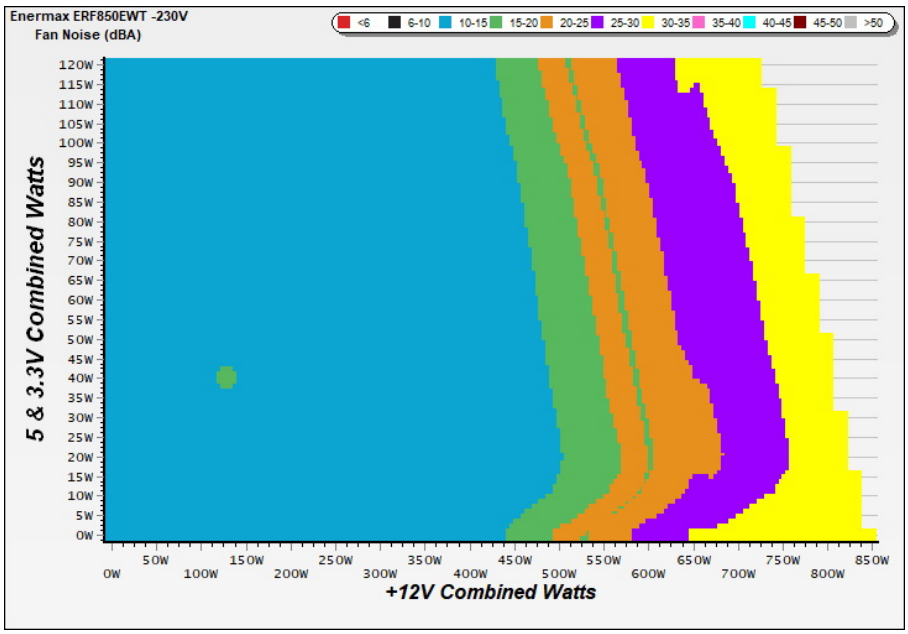
NOISE GRAPH 230V



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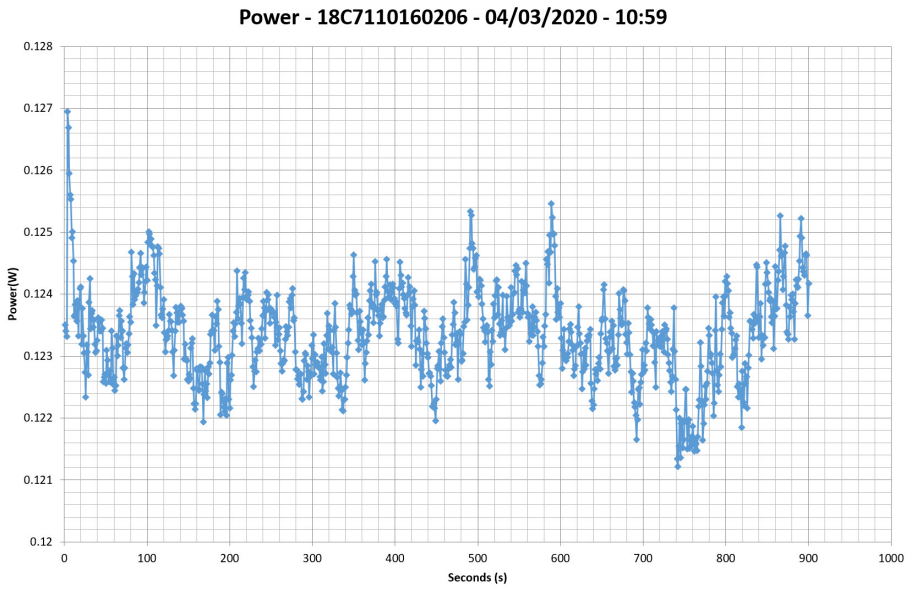
VAMPIRE POWER -230V



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COMMISSION REGULATION (EU) NO 617/2013 TESTING 230V

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
1	5.264A	2.007A	1.994A	0.989A	84.965	86.296%	410	13.1	40.44°C	0.811
	12.036V	4.986V	3.309V	5.058V	98.458				43.47°C	230.23V
2	11.558A	3.011A	2.994A	1.188A	170.039	90.900%	410	13.1	40.69°C	0.907
	12.038V	4.983V	3.306V	5.051V	187.062				44.55°C	230.23V
5	31.168A	5.024A	5.001A	1.790A	424.962	92.718%	427	12.6	42.52°C	0.955
	12.014V	4.977V	3.300V	5.029V	458.340				49.04°C	230.23V
10	63.712A	9.065A	9.036A	2.500A	849.786	90.499%	1451	38.0	45.49°C	0.968
	11.969V	4.966V	3.287V	5.000V	938.998				54.74°C	230.23V

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Top side

Power specifications label

CERTIFICATIONS 115V

CERTIFICATIONS 230V

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