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NZXT NP-C650M

Lab ID#: NZ65001648
Receipt Date: Apr 2, 2020
Test Date: Apr 30, 2020

Report: 20PS1648A
Report Date: May 7, 2020

DUT INFORMATION

Brand	NZXT
Manufacturer (OEM)	Seasonic
Series	
Model Number	
Serial Number	31195051802704
DUT Notes	

DUT SPECIFICATIONS

Rated Voltage (Vrms)	100-240
Rated Current (Arms)	9-4.5
Rated Frequency (Hz)	50-60
Rated Power (W)	650
Type	ATX12V
Cooling	120mm Fluid Dynamic Bearing Fan (HA1225H12F-Z)
Semi-Passive Operation	✓ (selectable)
Cable Design	Fully Modular

POWER SPECIFICATIONS

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	20	20	54	3	0.3
	Watts	100		648	15	3.6
Total Max. Power (W)		650				

CABLES AND CONNECTORS

Modular Cables

Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors
ATX connector 20+4 pin (610mm)	1	1	18-20AWG	Yes
4+4 pin EPS12V (650mm)	1	1	18AWG	Yes
6+2 pin PCIe (680mm+80mm)	2	4	18AWG	Yes
SATA (500mm+100mm+100mm+100mm)	2	8	18AWG	No
4-pin Molex (500+100mm+100mm)	2	6	18AWG	No
AC Power Cord (1380mm) - C13 coupler	1	1	18AWG	-

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RESULTS

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

115V

Average Efficiency	88.572%
Efficiency With 10W (≤500W) or 2% (>500W)	61.251
Average Efficiency 5VSB	77.037%
Standby Power Consumption (W)	0.0447008
Average PF	0.975
Avg Noise Output	20.86 dB(A)
Efficiency Rating (ETA)	GOLD
Noise Rating (LAMBDA)	A

230V

Average Efficiency	90.686%
Average Efficiency 5VSB	76.422%
Standby Power Consumption (W)	0.0705775
Average PF	0.934
Avg Noise Output	19.06 dB(A)
Efficiency Rating (ETA)	GOLD
Noise Rating (LAMBDA)	A+

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

HOLD-UP TIME & POWER OK SIGNAL (230V)

Hold-Up Time (ms)	22.7
AC Loss to PWR_OK Hold Up Time (ms)	19.3
PWR_OK Inactive to DC Loss Delay (ms)	3.4

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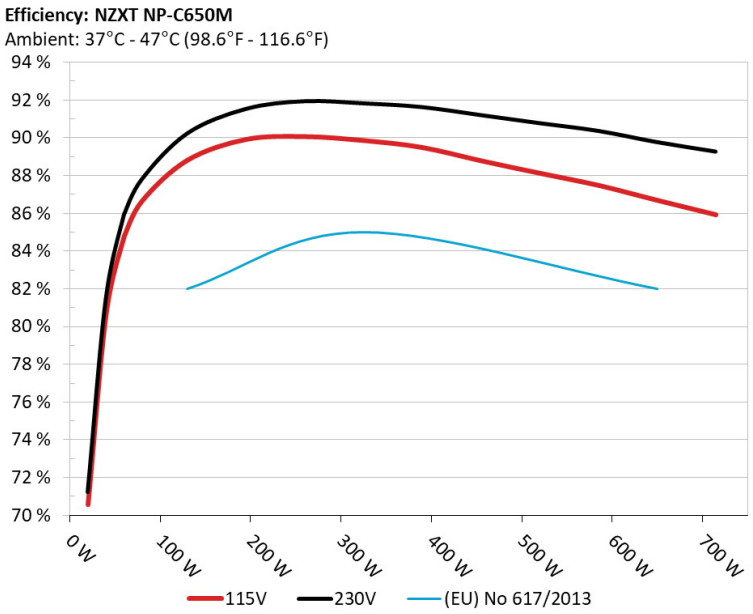
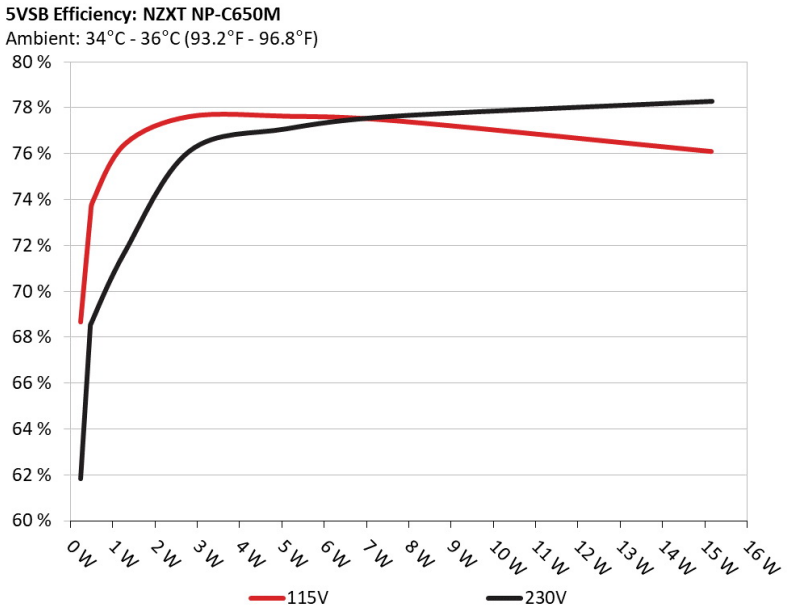
EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE



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	0.230	68.657%	0.054
	5.122V	0.335		115.15V
2	0.090A	0.461	73.291%	0.098
	5.121V	0.629		115.15V
3	0.550A	2.810	77.603%	0.329
	5.111V	3.621		115.15V
4	1.000A	5.100	77.614%	0.398
	5.101V	6.571		115.16V
5	1.500A	7.634	77.424%	0.434
	5.090V	9.860		115.16V
6	2.999A	15.148	76.079%	0.479
	5.051V	19.911		115.15V

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.230	61.828%	0.019
	5.122V	0.372		230.22V
2	0.090A	0.461	68.499%	0.033
	5.121V	0.673		230.22V
3	0.550A	2.810	76.131%	0.160
	5.111V	3.691		230.20V
4	1.000A	5.100	77.098%	0.240
	5.101V	6.615		230.20V
5	1.500A	7.634	77.644%	0.295
	5.090V	9.832		230.20V
6	2.998A	15.166	78.296%	0.371
	5.058V	19.370		230.20V

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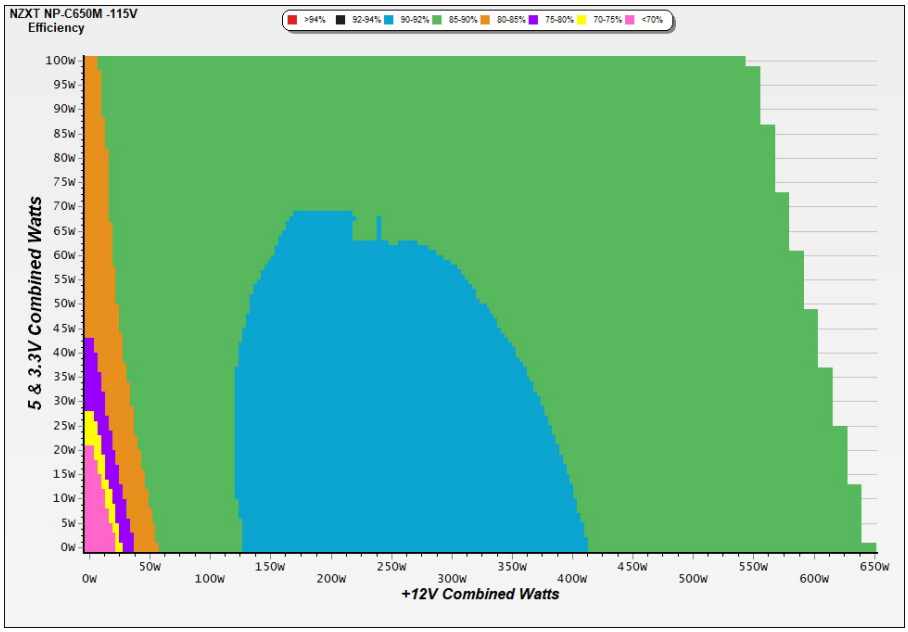
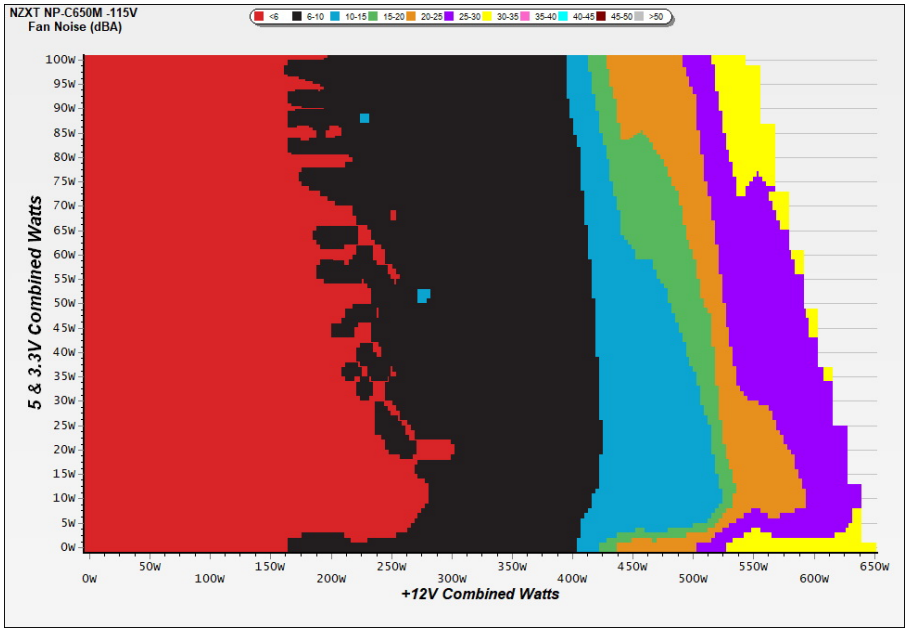
EFFICIENCY GRAPH 115V



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 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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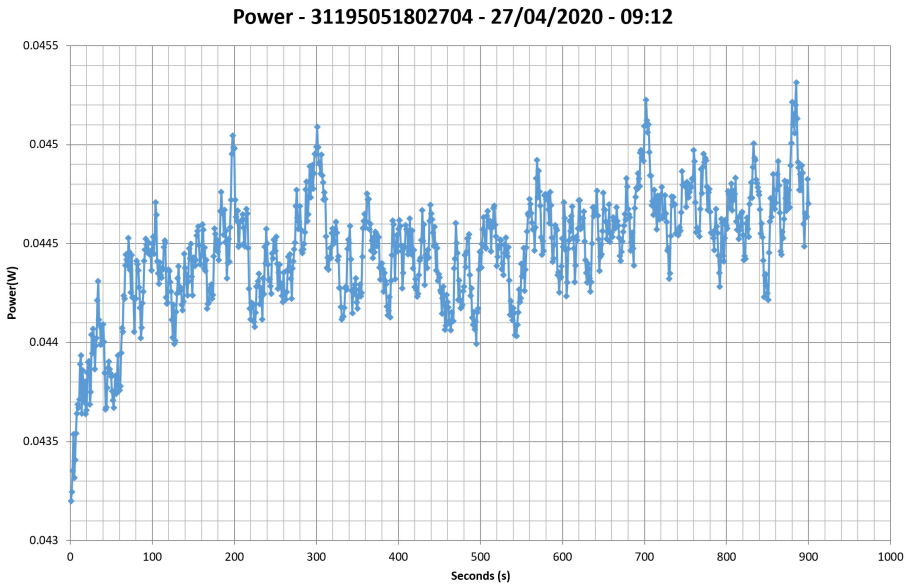
VAMPIRE POWER -115V



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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10-110% 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	3.599A	1.987A	1.986A	0.982A	64.951	84.810%	0	<6.0	45.12°C	0.928
	12.044V	5.035V	3.324V	5.091V	76.584				40.31°C	115.13V
2	8.230A	2.980A	2.980A	1.181A	129.999	88.830%	0	<6.0	46.26°C	0.957
	12.042V	5.032V	3.322V	5.079V	146.346				40.99°C	115.13V
3	13.203A	3.481A	3.476A	1.381A	194.999	89.930%	0	<6.0	47.72°C	0.971
	12.039V	5.029V	3.321V	5.068V	216.834				41.68°C	115.13V
4	18.180A	3.978A	3.978A	1.582A	259.999	90.076%	0	<6.0	48.57°C	0.979
	12.035V	5.027V	3.320V	5.056V	288.643				41.87°C	115.12V
5	22.817A	4.974A	4.971A	1.784A	325.031	89.870%	560	10.0	42.60°C	0.984
	12.032V	5.027V	3.318V	5.044V	361.668				50.04°C	115.12V
6	27.392A	5.972A	5.969A	1.987A	389.308	89.505%	572	10.5	42.91°C	0.987
	12.029V	5.025V	3.317V	5.033V	434.959				51.00°C	115.13V
7	32.062A	6.971A	6.971A	2.191A	454.659	88.798%	811	19.0	43.16°C	0.988
	12.025V	5.022V	3.315V	5.019V	512.016				52.27°C	115.13V
8	36.731A	7.971A	7.966A	2.396A	519.956	88.135%	1197	31.4	43.75°C	0.990
	12.021V	5.021V	3.313V	5.008V	589.951				53.69°C	115.13V
9	41.803A	8.467A	8.453A	2.399A	584.878	87.493%	1540	34.4	44.42°C	0.991
	12.018V	5.020V	3.311V	5.001V	668.484				55.08°C	115.13V
10	46.612A	8.969A	8.974A	3.011A	649.704	86.704%	2076	44.4	45.49°C	0.991
	12.014V	5.018V	3.310V	4.981V	749.333				56.53°C	115.12V
11	52.025A	8.973A	8.977A	3.016A	714.527	85.940%	2128	45.4	46.66°C	0.992
	12.010V	5.016V	3.308V	4.974V	831.422				58.32°C	115.12V
CL1	0.099A	12.000A	11.999A	0.000A	101.353	84.907%	562	10.1	41.97°C	0.951
	12.040V	5.027V	3.320V	5.093V	119.370				50.54°C	115.16V
CL2	53.997A	1.000A	1.002A	1.000A	662.036	87.236%	1940	43.2	45.90°C	0.992
	12.013V	5.017V	3.312V	5.035V	758.902				56.39°C	115.13V

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20-80W LOAD TESTS 115V

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	PF/AC Volts
1	1.231A	0.496A	0.495A	0.196A	19.976	70.587%	0	<6.0	0.802
	12.047V	5.037V	3.323V	5.115V	28.300				115.12V
2	2.463A	0.993A	0.992A	0.391A	39.966	80.684%	0	<6.0	0.892
	12.047V	5.037V	3.323V	5.108V	49.534				115.12V
3	3.699A	1.488A	1.490A	0.588A	59.999	84.702%	0	<6.0	0.922
	12.045V	5.036V	3.323V	5.101V	70.835				115.12V
4	4.928A	1.986A	1.986A	0.785A	79.951	86.680%	0	<6.0	0.937
	12.044V	5.035V	3.323V	5.094V	92.237				115.13V

RIPPLE MEASUREMENTS 115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	14.10mV	10.30mV	10.20mV	6.70mV	Pass
20% Load	19.20mV	10.80mV	11.10mV	7.10mV	Pass
30% Load	21.80mV	11.30mV	11.10mV	7.80mV	Pass
40% Load	23.90mV	12.20mV	11.90mV	7.40mV	Pass
50% Load	21.70mV	12.50mV	12.80mV	7.90mV	Pass
60% Load	15.20mV	13.10mV	12.60mV	8.40mV	Pass
70% Load	14.20mV	13.20mV	12.90mV	8.50mV	Pass
80% Load	15.10mV	14.70mV	14.20mV	10.10mV	Pass
90% Load	15.90mV	15.60mV	14.30mV	10.80mV	Pass
100% Load	19.90mV	17.10mV	15.50mV	11.20mV	Pass
110% Load	22.60mV	17.00mV	15.70mV	11.60mV	Pass
Crossload1	20.50mV	17.30mV	15.10mV	7.30mV	Pass
Crossload2	19.70mV	13.60mV	12.20mV	10.10mV	Pass

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230V

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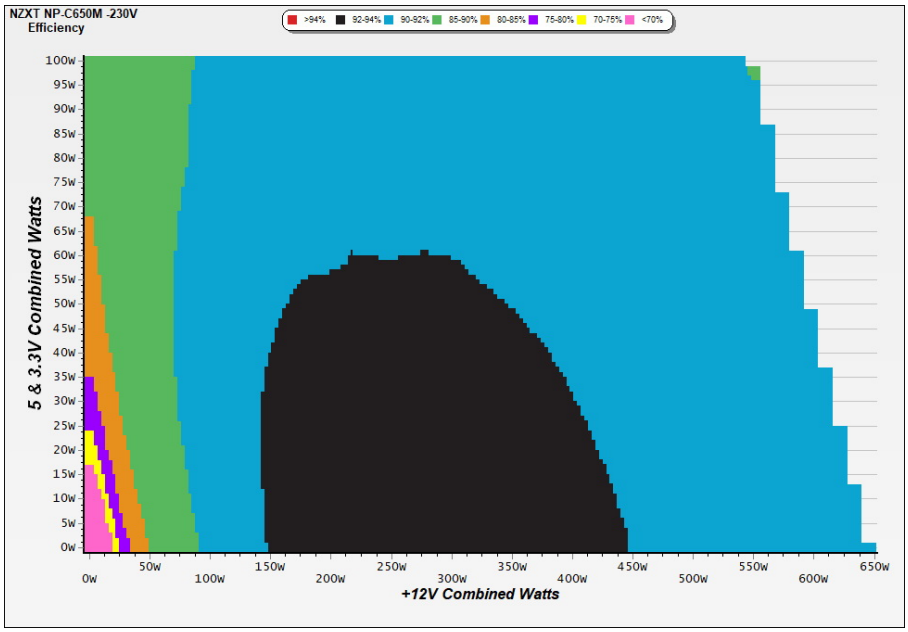
EFFICIENCY GRAPH 230V



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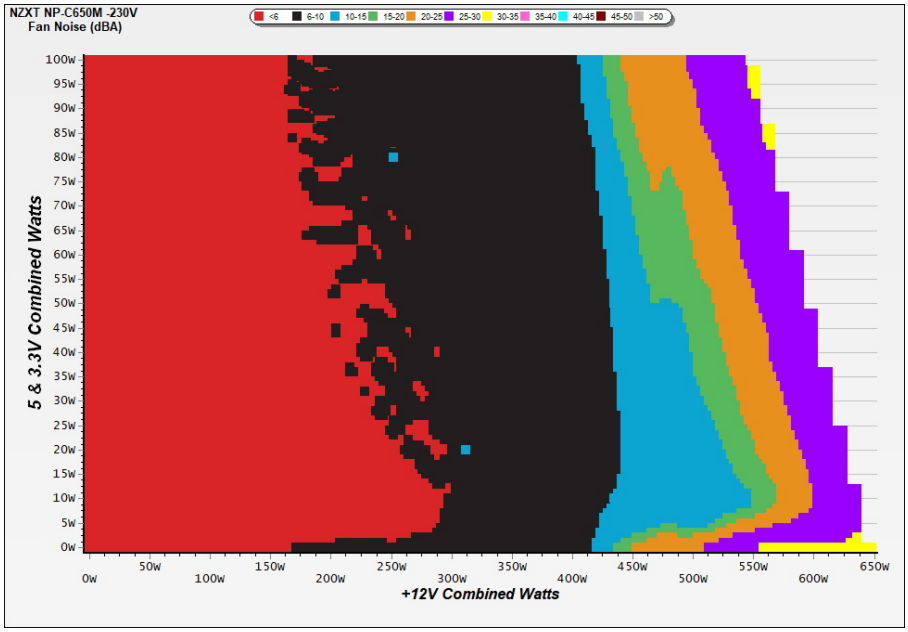
NOISE GRAPH 230V



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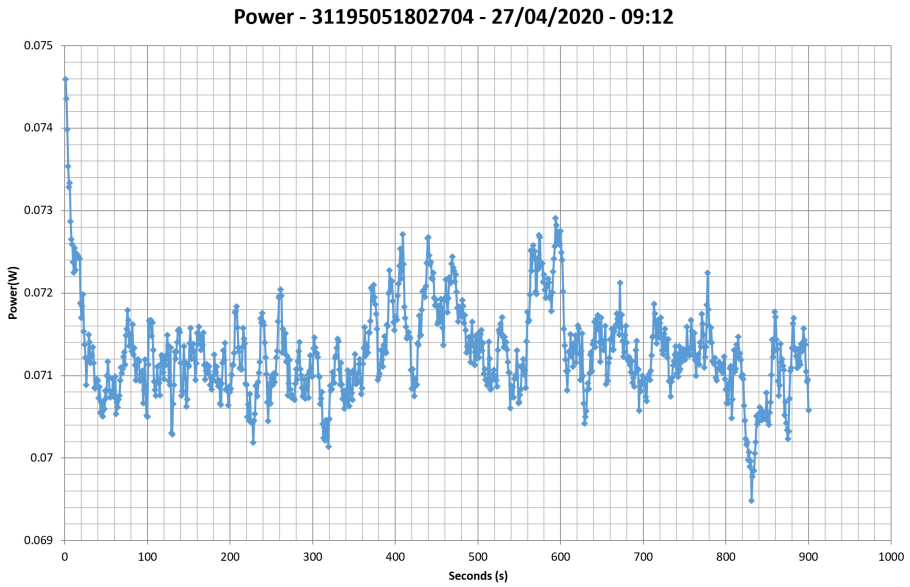
VAMPIRE POWER -230V



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10-110% 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
1	3.600A	1.984A	1.985A	0.982A	64.950	85.933%	0	<6.0	46.20°C	0.767
	12.044V	5.037V	3.324V	5.091V	75.582				40.70°C	230.31V
2	8.230A	2.978A	2.979A	1.181A	129.998	90.243%	0	<6.0	46.84°C	0.885
	12.042V	5.035V	3.323V	5.080V	144.053				40.79°C	230.31V
3	13.202A	3.478A	3.478A	1.381A	194.994	91.544%	0	<6.0	48.33°C	0.925
	12.039V	5.033V	3.321V	5.069V	213.005				41.68°C	230.31V
4	18.178A	3.977A	3.975A	1.581A	259.989	91.953%	0	<6.0	49.03°C	0.946
	12.036V	5.030V	3.320V	5.058V	282.742				41.86°C	230.31V
5	22.814A	4.972A	4.971A	1.783A	325.021	91.840%	559	10.0	42.20°C	0.958
	12.033V	5.029V	3.319V	5.046V	353.898				50.17°C	230.30V
6	27.386A	5.968A	5.970A	1.986A	389.235	91.644%	571	10.5	42.84°C	0.966
	12.029V	5.028V	3.317V	5.035V	424.726				51.68°C	230.31V
7	32.056A	6.967A	6.967A	2.189A	454.572	91.218%	718	15.3	43.68°C	0.971
	12.025V	5.025V	3.315V	5.022V	498.337				52.84°C	230.31V
8	36.722A	7.967A	7.966A	2.393A	519.875	90.787%	1149	29.7	44.24°C	0.975
	12.022V	5.023V	3.313V	5.012V	572.631				53.82°C	230.31V
9	41.791A	8.461A	8.453A	2.397A	584.780	90.377%	1462	35.1	44.31°C	0.978
	12.019V	5.023V	3.312V	5.005V	647.043				54.48°C	230.30V
10	46.601A	8.962A	8.969A	3.008A	649.602	89.784%	2024	44.0	46.14°C	0.981
	12.015V	5.021V	3.311V	4.986V	723.518				57.26°C	230.30V
11	52.009A	8.965A	8.975A	3.011A	714.429	89.281%	2130	45.5	47.14°C	0.983
	12.012V	5.020V	3.309V	4.980V	800.207				58.79°C	230.30V
CL1	0.100A	11.998A	11.996A	0.000A	101.381	86.257%	552	9.7	42.34°C	0.857
	12.040V	5.030V	3.320V	5.094V	117.534				49.97°C	230.32V
CL2	53.991A	1.000A	1.001A	1.000A	662.025	90.333%	1923	43.0	45.97°C	0.981
	12.014V	5.023V	3.312V	5.039V	732.868				57.32°C	230.30V

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20-80W LOAD TESTS 230V

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	PF/AC Volts
1	1.231A	0.496A	0.496A	0.196A	19.979	71.216%	0	<6.0	0.502
	12.047V	5.039V	3.323V	5.115V	28.054				230.32V
2	2.464A	0.992A	0.991A	0.391A	39.968	81.454%	0	<6.0	0.654
	12.045V	5.039V	3.323V	5.108V	49.068				230.31V
3	3.699A	1.489A	1.489A	0.588A	60.000	85.687%	0	<6.0	0.748
	12.044V	5.038V	3.323V	5.101V	70.022				230.31V
4	4.928A	1.986A	1.986A	0.785A	79.952	87.819%	0	<6.0	0.810
	12.043V	5.038V	3.323V	5.095V	91.042				230.30V

RIPPLE MEASUREMENTS 230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	13.30mV	10.40mV	10.30mV	7.00mV	Pass
20% Load	19.00mV	10.80mV	10.70mV	7.30mV	Pass
30% Load	22.20mV	11.10mV	11.30mV	7.40mV	Pass
40% Load	23.90mV	11.50mV	12.40mV	7.50mV	Pass
50% Load	21.80mV	12.80mV	12.80mV	8.00mV	Pass
60% Load	15.50mV	12.70mV	13.70mV	8.40mV	Pass
70% Load	14.60mV	13.50mV	13.20mV	8.50mV	Pass
80% Load	14.90mV	14.30mV	14.80mV	9.30mV	Pass
90% Load	15.40mV	15.70mV	15.20mV	9.60mV	Pass
100% Load	20.60mV	17.50mV	16.00mV	10.50mV	Pass
110% Load	25.50mV	17.60mV	15.80mV	10.70mV	Pass
Crossload1	20.10mV	16.30mV	14.60mV	7.20mV	Pass
Crossload2	20.70mV	13.70mV	13.60mV	9.50mV	Pass

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Top side

Power specifications label

CERTIFICATIONS 115V

CERTIFICATIONS 230V