EFFICIENCY AND NOISE LEVEL CERTIFICATIONS

Anex

Cougar Polar X2 1200W

Lab ID#: CG12002174
Receipt Date: May 4, 2023
Test Date: May 10, 2023

Report: 23PS2174A
Report Date: May 11, 2023

DUT INFORMATION

Brand	Cougar
Manufacturer (OEM)	XHY-Power
Series	Polar X2
Model Number	CGR PRX2-1200
Serial Number	12BC03PX12000012
DUT Notes	

DUT SPECIFICATIONS

Rated Voltage (Vrms)	100-240
Rated Current (Arms)	15-7
Rated Frequency (Hz)	47-63
Rated Power (W)	1200
Type	ATX12V
Cooling	135mm Hydraulic Dynamic Bearing Fan (DWPH EFF-14E12H)
Semi-Passive Operation	✓
Cable Design	Fully Modular

TEST EQUIPMENT

Electronic Loads	Chroma 63601-5 x2 Chroma 63600-2 63640-80-80 x10 63610-80-20
AC Sources	Chroma 6530, APM SP300VAC4000W-P
Power Analyzers	RS HMC8015, N4L PPA1530, N4L PPA5530
Oscilloscopes	Picoscope 4444, Rigol DS7014, 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, Keithley 2015 - THD
UPS	FSP Champ Tower 3kVA, CyberPower OLS3000E 3kVA
Isolation Transformer	4kVA

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RESULTS

Temperature Range (°C /°F)	30-32 / 86-89.6
ErP Lot 3/6 Ready	✓
(EU) No 617/2013 Compliance	✓
ALPM (Alternative Low Power Mode) compatible	✓
ATX v3.0 PSU Power Excursion	✓

115V

Average Efficiency	89.750%
Efficiency With 10W (≤500W) or 2% (>500W)	64.642
Average Efficiency 5VSB	80.947%
Standby Power Consumption (W)	0.0093000
Average PF	0.981
Avg Noise Output	26.18 dB(A)
Efficiency Rating (ETA)	PLATINUM
Noise Rating (LAMBDA)	A-

POWER SPECIFICATIONS

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	20	20	100	3	0.3
	Watts	100		1200	15	3.6
Total Max. Power (W)		1200				

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

Hold-Up Time (ms)	31.7
AC Loss to PWR_OK Hold Up Time (ms)	27.4
PWR_OK Inactive to DC Loss Delay (ms)	4.3

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CABLES AND CONNECTORS

Modular Cables

Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors
ATX connector 20+4 pin (650mm)	1	1	18-22AWG	No
4+4pin EPS12V (650mm)	1	1	16AWG	No
8 pin EPS12V (650mm)	1	1	16AWG	No
6+2 pin PCIe (650mm+100mm)	3	6	16AWG	No
6+2 pin PCIe (650mm)	1	1	16AWG	No
12+4 pin PCIe (750mm) (600W)	1	1	16-26AWG	No
SATA (500mm+110mm+110mm110mm)	3	12	18AWG	No
4-pin Molex (510mm+120mm+120mm+120mm)	1	4	18AWG	No
AC Power Cord (1400mm) - C13 coupler	1	1	18AWG	-

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General Data	-
Manufacturer (OEM)	XHY-Power
PCB Type	Double Sided
Primary Side	-
Transient Filter	4x Y caps, 2x X caps, 2x CM chokes, 1x MOV
Inrush Protection	NTC Thermistor MF72 5D15 & Relay HF46F-G
Bridge Rectifier(s)	2x ALB1560U (600V, 15A @ 100°C)
APFC MOSFETs	2x 65R078W
APFC Boost Diode	1x G3S06510A (650V, 10A @ 155°C)
Bulk Cap(s)	2x TK (420V, 680uF, 2000h @ 105°C, LGW)
Main Switchers	4x Ncepower NCE65TF130 (650V, 18A @ 100°C, Rds(on): 0.13Ohm)
APFC Controller	Champion CM6500UNX
Resonant Controller	Champion CM6901T6
Topology	Primary side: APFC, Full-Bridge & LLC converter Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	-
+12V MOSFETs	8x GR IGRO CRSM016N06L2 (60V, 136A @ 100°C, Rds(on): 1.8mOhm)
5V & 3.3V	DC-DC Converters: 6x Excelliance MOS EMB07N03V (20V, 17A @ 100°C, Rds(on): 9mOhm) PWM Controller(s): uPI-Semi uP3861P
Filtering Capacitors	Electrolytic: 5x Nippon Chemi-Con (5-6.000h @ 105°C, KZH), 9x Nippon Chemi-Con (4-10,000h @ 105°C, KY) Polymer: 17x FPCAP, 4x no info
Supervisor IC	IN1S4241-SDG
Fan Model	DWPH EFF-14E12H (140mm, 12V, 0.30A, Hydraulic Bearing Fan)
5VSB Circuit	-
Rectifier	60R10S SBR
Standby PWM Controller	Excelliance MOS EM8569C

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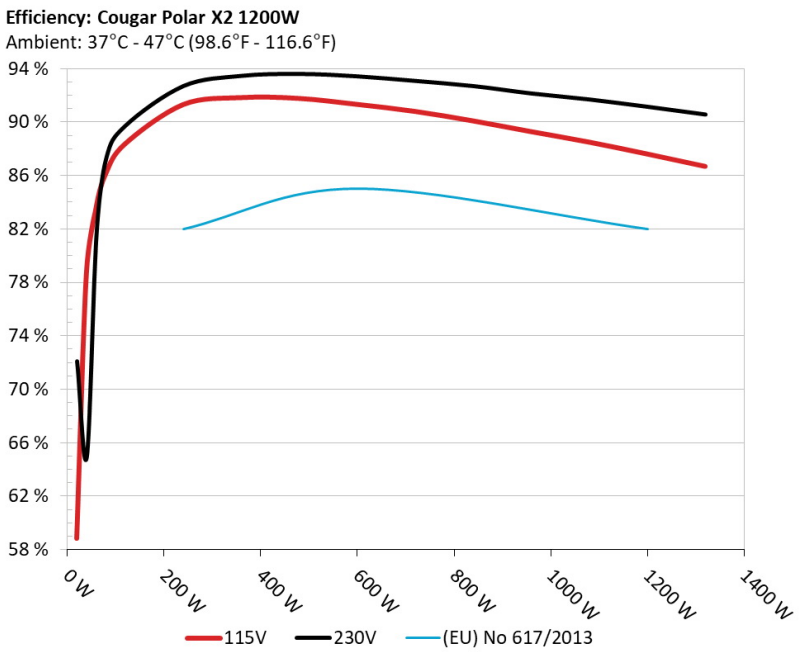
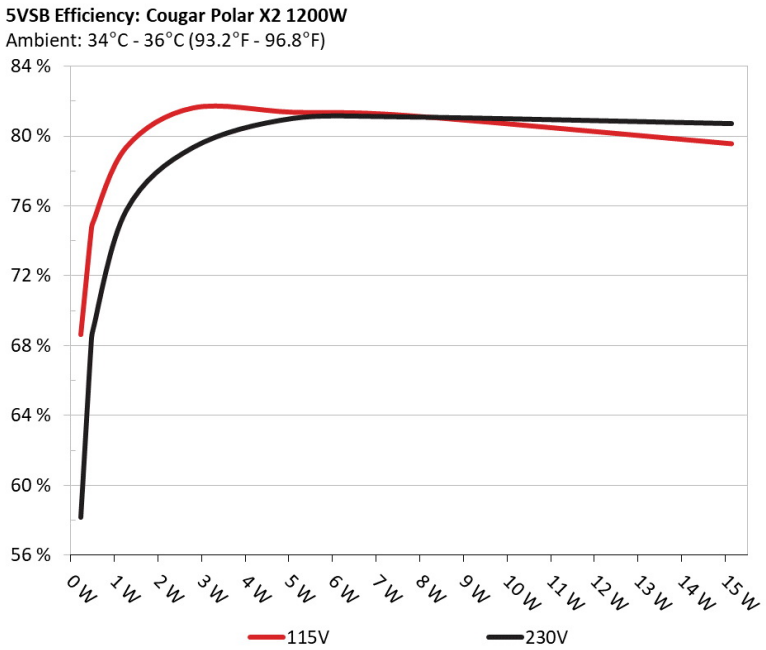
EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE



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	0.23W	69.124%	0.05
	5.106V	0.333W		114.84V
2	0.09A	0.459W	74.861%	0.089
	5.105V	0.613W		114.85V
3	0.55A	2.802W	82.102%	0.319
	5.096V	3.413W		114.85V
4	1A	5.086W	81.856%	0.387
	5.087V	6.213W		114.84V
5	1.5A	7.615W	81.684%	0.432
	5.076V	9.322W		114.85V
6	3A	15.133W	80.053%	0.49
	5.045V	18.904W		114.84V

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.23W	58.654%	0.017
	5.106V	0.393W		229.85V
2	0.09A	0.459W	68.306%	0.029
	5.105V	0.673W		229.86V
3	0.55A	2.802W	79.83%	0.139
	5.096V	3.511W		229.85V
4	1A	5.086W	81.494%	0.218
	5.087V	6.242W		229.85V
5	1.5A	7.615W	81.579%	0.273
	5.076V	9.334W		229.85V
6	3A	15.136W	81.196%	0.362
	5.046V	18.641W		229.86V

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115V

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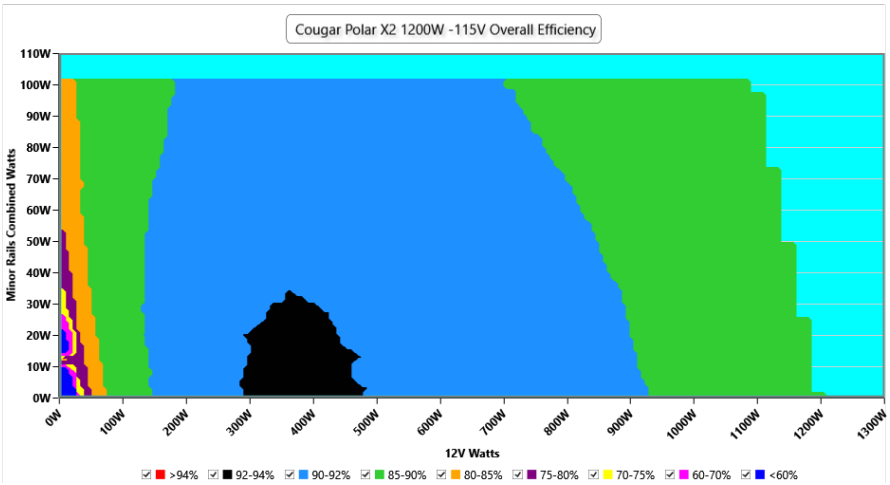
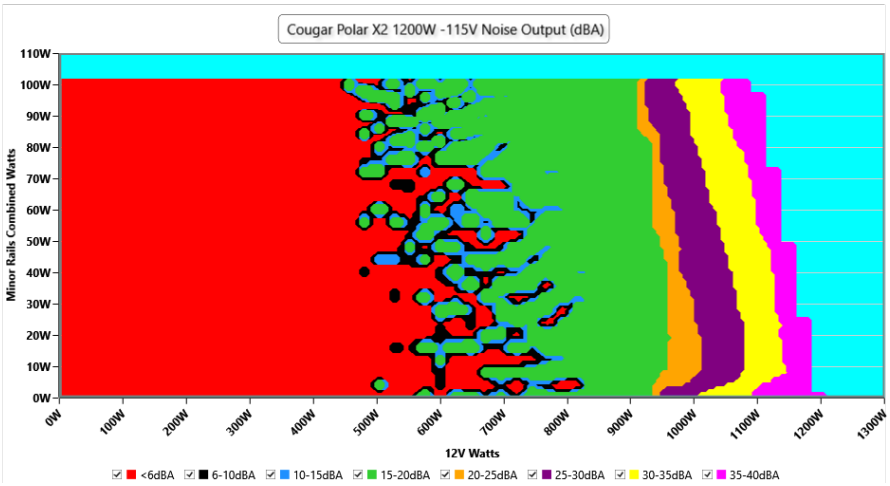
EFFICIENCY GRAPH 115V



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 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

Detailed Results

	Average	Min	Limit Min	Max	Limit Max	Result
Mains Voltage RMS:	114.87 V	114.82 V	113.85 V	114.90 V	116.15 V	PASS
Mains Frequency:	60.00 Hz	59.98 Hz	59.40 Hz	60.02 Hz	60.60 Hz	PASS
Mains Voltage CF:	1.417	1.416	1.340	1.419	1.490	PASS
Mains Voltage THD:	0.14 %	0.11 %	N/A	0.19 %	2.00 %	PASS
Real Power:	0.009 W	-0.006 W	N/A	0.024 W	N/A	N/A
Apparent Power:	7.378 W	7.348 W	N/A	7.416 W	N/A	N/A
Power Factor:	0.003	N/A	N/A	N/A	N/A	N/A

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
10%	8.050A	1.981A	1.973A	0.984A	119.972	88.361%	0	<6.0	44.49°C	0.958
	12.220V	5.046V	3.345V	5.08V	135.777				40.05°C	114.81V
20%	17.109A	2.973A	2.962A	1.184A	239.919	91.299%	0	<6.0	45.69°C	0.968
	12.218V	5.045V	3.342V	5.069V	262.787				40.84°C	114.77V
30%	26.443A	3.471A	3.459A	1.384A	359.156	91.824%	0	<6.0	46.69°C	0.977
	12.219V	5.042V	3.339V	5.058V	391.14				41.44°C	114.75V
40%	35.876A	3.968A	3.957A	1.585A	479.519	91.766%	0	<6.0	47.5°C	0.984
	12.218V	5.04V	3.336V	5.046V	522.544				41.83°C	114.71V
50%	44.919A	4.962A	4.95A	1.788A	599.256	91.32%	703	19.5	42.42°C	0.988
	12.216V	5.039V	3.333V	5.035V	656.217				48.51°C	114.66V
60%	54.033A	5.954A	5.944A	1.991A	719.794	90.792%	719	20.4	42.74°C	0.99
	12.214V	5.039V	3.331V	5.023V	792.795				49.23°C	114.62V
70%	63.088A	6.948A	6.94A	2.195A	839.536	90.085%	1123	33.2	43.37°C	0.992
	12.212V	5.038V	3.329V	5.011V	931.942				50.42°C	114.58V
80%	72.214A	7.943A	7.937A	2.299A	959.514	89.278%	1602	43.3	43.63°C	0.992
	12.209V	5.037V	3.326V	5.001V	1074.738				51.65°C	114.53V
90%	81.667A	8.441A	8.425A	2.404A	1079.36	88.493%	1702	45.3	44.36°C	0.993
	12.206V	5.035V	3.323V	4.991V	1219.714				53.48°C	114.49V
100%	90.924A	8.942A	8.946A	3.018A	1199.391	87.607%	1713	45.9	45.49°C	0.993
	12.205V	5.033V	3.32V	4.971V	1369.061				55.59°C	114.43V
110%	100.113A	9.941A	10.04A	3.023A	1320.039	86.673%	1727	46.1	46.57°C	0.993
	12.203V	5.03V	3.316V	4.962V	1523.005				57.51°C	114.39V
CL1	0.115A	11.947A	11.88A	0A	101.301	82.43%	464	7.6	42.28°C	0.955
	12.226V	5.039V	3.342V	5.094V	122.899				47.78°C	114.81V
CL2	0.113A	19.927A	0A	0A	101.339	81.224%	549	11.8	40.52°C	0.955
	12.229V	5.016V	3.347V	5.098V	124.779				47.53°C	114.81V
CL3	0.113A	0A	19.835A	0A	67.384	75.758%	0	<6.0	51.28°C	0.933
	12.226V	5.039V	3.327V	5.093V	88.947				42.23°C	114.83V
CL4	98.291A	0A	0A	0A	1199.954	88.141%	1716	46.0	46.21°C	0.993
	12.208V	5.029V	3.322V	5.041V	1361.411				57.14°C	114.44V

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Cougar Polar X2 1200W

20-80W 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
20W	1.214A	0.495A	0.493A	0.196A	19.989	58.817%	0	<6.0	39.65°C	0.723
	12.220V	5.046V	3.349V	5.103V	28.949				36.59°C	114.84V
40W	2.674A	0.694A	0.69A	0.294A	39.99	78.655%	0	<6.0	40.37°C	0.867
	12.220V	5.046V	3.348V	5.1V	50.84				37.06°C	114.83V
60W	4.134A	0.891A	0.887A	0.392A	59.99	83.547%	0	<6.0	42.48°C	0.913
	12.220V	5.046V	3.347V	5.096V	71.806				38.73°C	114.83V
80W	5.589A	1.089A	1.084A	0.491A	79.923	86.124%	0	<6.0	43.61°C	0.936
	12.220V	5.047V	3.347V	5.093V	92.801				39.64°C	114.82V

RIPPLE MEASUREMENTS 115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	14.53mV	6.93mV	7.64mV	8.93mV	Pass
20% Load	19.79mV	8.11mV	8.72mV	10.06mV	Pass
30% Load	18.31mV	7.90mV	9.90mV	10.78mV	Pass
40% Load	18.77mV	7.80mV	9.64mV	12.21mV	Pass
50% Load	15.70mV	8.52mV	10.26mV	11.85mV	Pass
60% Load	16.63mV	8.88mV	11.08mV	13.34mV	Pass
70% Load	17.44mV	9.80mV	12.57mV	14.42mV	Pass
80% Load	18.62mV	10.83mV	16.21mV	14.67mV	Pass
90% Load	19.38mV	12.27mV	16.47mV	14.83mV	Pass
100% Load	33.57mV	13.03mV	16.53mV	17.84mV	Pass
110% Load	34.72mV	14.95mV	18.25mV	18.54mV	Pass
Crossload1	18.61mV	9.60mV	13.39mV	11.96mV	Pass
Crossload2	13.14mV	20.79mV	12.00mV	14.16mV	Pass
Crossload3	10.33mV	7.39mV	14.21mV	12.06mV	Pass
Crossload4	32.63mV	11.65mV	13.96mV	19.11mV	Pass

Anex

Cougar Polar X2 1200W

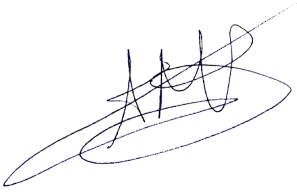
Top side

Power specifications label

CERTIFICATIONS 115V

CYBENETICS PLATINUM

CYBENETICS A-



Aristeidis Bitziopoulos
Lab Director