Anex

Cougar GEX X2 850

Lab ID#: CG85002171
Receipt Date: Apr 12, 2023
Test Date: Apr 19, 2023

Report: 23PS2171A
Report Date: Apr 24, 2023

DUT INFORMATION

Brand	Cougar
Manufacturer (OEM)	XHY-Power
Series	GEX X2
Model Number	
Serial Number	12BC02GX85000091
DUT Notes	

DUT SPECIFICATIONS

Rated Voltage (Vrms)	100-240
Rated Current (Arms)	12-6
Rated Frequency (Hz)	50-60
Rated Power (W)	850
Type	ATX12V
Cooling	120mm Hydraulic Dynamic Bearing Fan (EFH-12E12H)
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	89.408%
Efficiency With 10W (≤500W) or 2% (>500W)	66.748
Average Efficiency 5VSB	81.711%
Standby Power Consumption (W)	0.0432000
Average PF	0.984
Avg Noise Output	19.01 dB(A)
Efficiency Rating (ETA)	PLATINUM
Noise Rating (LAMBDA)	A+

POWER SPECIFICATIONS

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	20	20	70.8	3	0.3
	Watts	100		850	15	3.6
Total Max. Power (W)		850				

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

Hold-Up Time (ms)	24.9
AC Loss to PWR_OK Hold Up Time (ms)	20.8
PWR_OK Inactive to DC Loss Delay (ms)	4.1

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CABLES AND CONNECTORS

Modular Cables

Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors
ATX connector 20+4 pin (660mm)	1	1	18AWG	No
4+4 pin EPS12V (650mm)	1	1	18AWG	No
8 pin EPS12V (650mm)	1	1	18AWG	No
6+2 pin PCIe (650mm+100mm)	2	4	18AWG	No
12+4 pin PCIe (650mm) (450W)	1	1	16-28AWG	No
SATA (510mm+115mm+115mm+115mm)	1	4	18AWG	No
SATA (500mm+115mm+115mm) / 4-pin Molex (+115mm)	2	6 / 2	18AWG	No
AC Power Cord (1360mm) - C13 coupler	1	1	18AWG	-

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General Data	-
Manufacturer (OEM)	HEC
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 GBU15J (600V, 15A @ 100°C)
APFC MOSFETs	2x Ncepower NCE65TF130 (650V, 28A @ 100°C, Rds(on): 140mOhm)
APFC Boost Diode	1x DS065006C3
Bulk Cap(s)	1x TK (420V, 680uF, 2000h @ 105°C, LGW)
Main Switchers	4x CS13N50FA9R (500V, 8.5A @ 100°C, Rds(on): 0.5Ohm)
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	4x CRSM016N06L2 (60V, 136A @ 100°C, Rds(on): 2.4mOhm)
5V & 3.3V	DC-DC Converters: 6x Excelliance MOS EMB07N03H (20V, 35A @ 100°C, Rds(on): 7mOhm) PWM Controller(s): uPI-Semi uP3861P
Filtering Capacitors	Electrolytic: 9x Nippon Chemi-Con (4-10,000h @ 105°C, KY), 3x Nichicon (2-8,000h @ 105°C), 2x PLH, Polymer: 21x FPCAP
Supervisor IC	Infino IN1S424I (OCP, OVP, UVP, SCP, PG)
Fan Model	DWPH EFH-12E12H (120mm, 12V, 0.5A, Hydraulic Dynamic Bearing Fan)
5VSB Circuit	-
Rectifier	1x HM69-60R10 SBR (42V, 22A)
Standby PWM Controller	Excelliance MOS EM8569C

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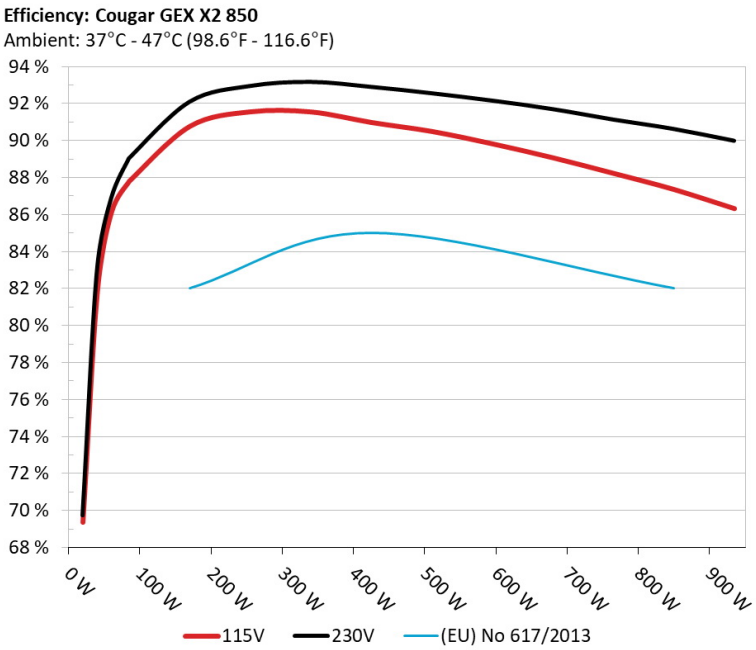
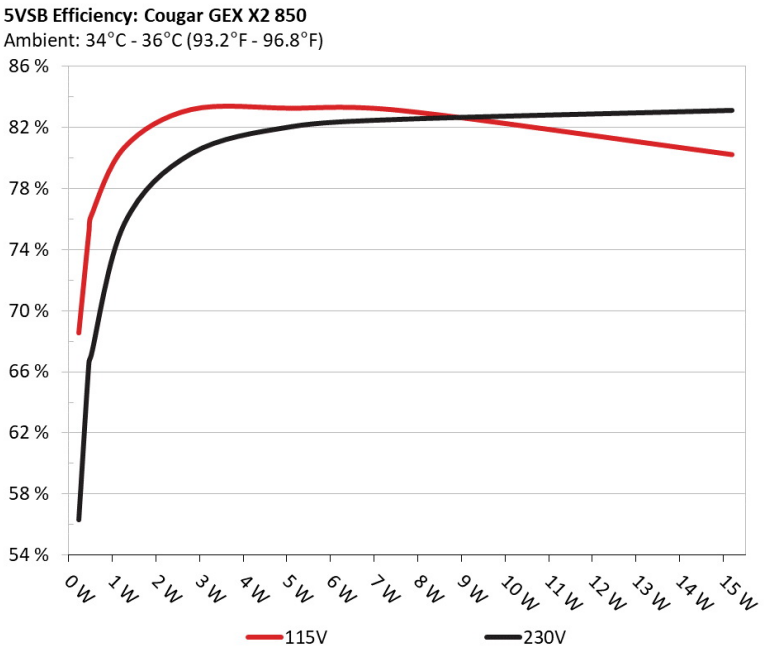
EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE



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	68.056%	0.053
	5.115V	0.338W		114.88V
2	0.09A	0.46W	74.635%	0.094
	5.114V	0.616W		114.88V
3	0.55A	2.808W	82.655%	0.325
	5.106V	3.398W		114.88V
4	1A	5.098W	82.739%	0.396
	5.098V	6.162W		114.88V
5	1.5A	7.635W	82.578%	0.438
	5.09V	9.245W		114.87V
6	3A	15.188W	79.707%	0.493
	5.063V	19.055W		114.87V

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.23W	55.822%	0.019
	5.115V	0.412W		229.77V
2	0.09A	0.46W	66.084%	0.032
	5.114V	0.696W		229.77V
3	0.55A	2.808W	79.797%	0.146
	5.106V	3.519W		229.77V
4	1A	5.098W	81.558%	0.225
	5.099V	6.25W		229.77V
5	1.5A	7.635W	82.041%	0.286
	5.09V	9.306W		229.77V
6	3A	15.189W	82.621%	0.37
	5.064V	18.384W		229.77V

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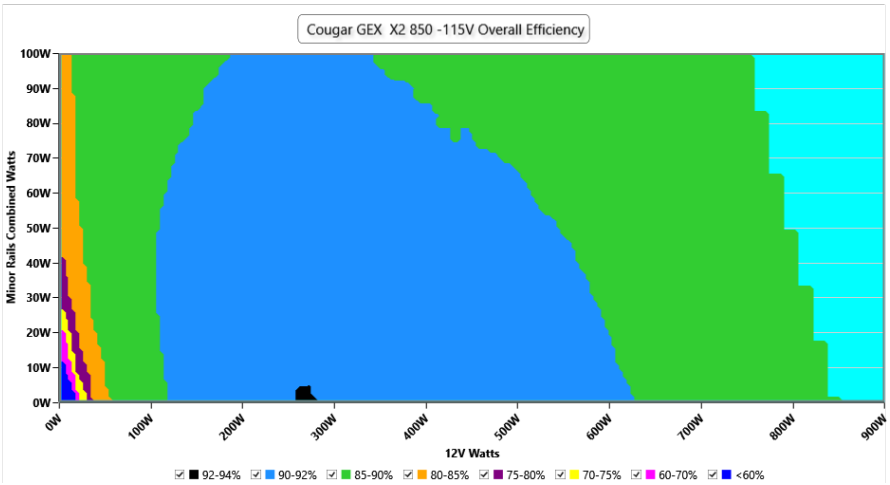
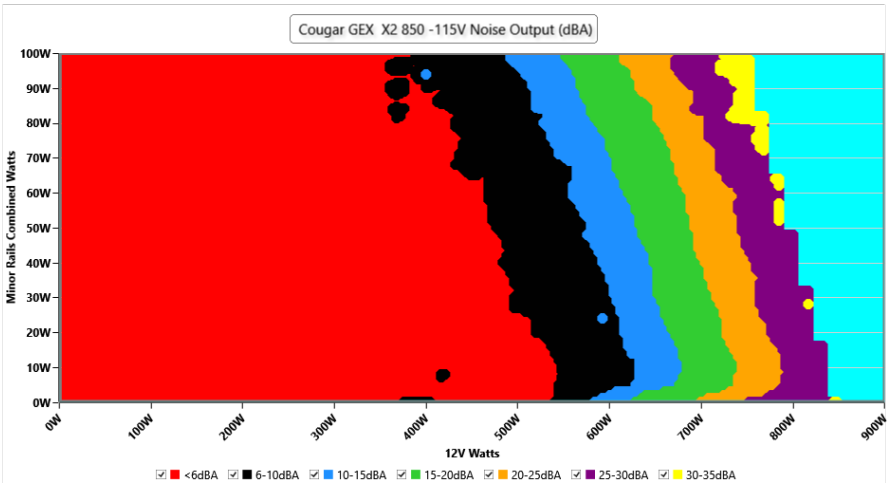
EFFICIENCY GRAPH 115V



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:	114.88 V	114.80 V	113.85 V	114.95 V	116.15 V	PASS
Mains Frequency:	60.00 Hz	59.99 Hz	59.40 Hz	60.02 Hz	60.60 Hz	PASS
Mains Voltage CF:	1.419	1.417	1.340	1.422	1.490	PASS
Mains Voltage THD:	0.21 %	0.17 %	N/A	0.30 %	2.00 %	PASS
Real Power:	0.043 W	-0.001 W	N/A	0.081 W	N/A	N/A
Apparent Power:	6.488 W	6.451 W	N/A	6.531 W	N/A	N/A
Power Factor:	0.007	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%	5.332A	1.986A	1.979A	0.982A	84.992	87.776%	0	<6.0	44.54°C	0.961
	11.888V	5.033V	3.334V	5.09V	96.831				40.14°C	114.85V
20%	11.691A	2.982A	2.971A	1.181A	169.92	90.779%	0	<6.0	45.68°C	0.973
	11.892V	5.03V	3.332V	5.079V	187.179				40.89°C	114.82V
30%	18.409A	3.48A	3.467A	1.381A	254.916	91.566%	0	<6.0	46.39°C	0.98
	11.890V	5.029V	3.331V	5.07V	278.398				41.29°C	114.79V
40%	25.131A	3.979A	3.964A	1.581A	339.998	91.56%	0	<6.0	47.26°C	0.986
	11.890V	5.027V	3.33V	5.06V	371.335				41.72°C	114.77V
50%	31.475A	4.975A	4.958A	1.782A	424.783	90.99%	396	<6.0	42.04°C	0.989
	11.891V	5.025V	3.328V	5.05V	466.843				48.24°C	114.73V
60%	37.808A	5.969A	5.953A	1.984A	509.299	90.506%	745	17.4	42.6°C	0.991
	11.889V	5.026V	3.326V	5.04V	562.729				49.31°C	114.7V
70%	44.225A	6.965A	6.949A	2.187A	594.647	89.835%	1187	31.4	43.12°C	0.992
	11.884V	5.025V	3.324V	5.03V	661.93				50.17°C	114.67V
80%	50.649A	7.961A	7.946A	2.29A	679.487	89.079%	1717	41.8	43.56°C	0.993
	11.878V	5.025V	3.322V	5.022V	762.793				51.57°C	114.63V
90%	57.481A	8.458A	8.431A	2.393A	764.892	88.233%	2249	48.5	44.62°C	0.994
	11.872V	5.024V	3.321V	5.014V	866.899				53.69°C	114.6V
100%	64.027A	8.96A	8.948A	3.002A	849.719	87.361%	2266	48.5	45.12°C	0.994
	11.870V	5.022V	3.319V	4.997V	972.648				55.22°C	114.56V
110%	70.426A	9.962A	10.038A	3.006A	934.322	86.326%	2283	48.8	46.88°C	0.995
	11.871V	5.019V	3.317V	4.99V	1082.315				57.82°C	114.53V
CL1	0.116A	11.986A	11.946A	0A	101.293	83.486%	0	<6.0	46.21°C	0.974
	11.908V	5.022V	3.324V	5.098V	121.327				40.73°C	114.83V
CL2	0.116A	19.972A	0A	0A	101.342	81.808%	462	7.3	40.68°C	0.973
	11.910V	5.005V	3.329V	5.101V	123.875				47.73°C	114.83V
CL3	0.116A	0A	19.907A	0A	67.396	75.835%	0	<6.0	49.68°C	0.956
	11.912V	5.013V	3.316V	5.1V	88.871				40.58°C	114.85V
CL4	71.576A	0A	0A	0A	849.53	87.907%	2270	48.6	45.2°C	0.994
	11.869V	5.026V	3.329V	5.057V	966.403				56.01°C	114.57V

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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])	Temps (In/Out)	PF/AC Volts
20W	1.232A	0.496A	0.494A	0.196A	19.989	69.344%	0	<6.0	39.72°C	0.859
	12.048V	5.036V	3.336V	5.109V	28.824				36.65°C	114.87V
40W	2.748A	0.695A	0.693A	0.294A	39.989	81.73%	0	<6.0	41.01°C	0.925
	11.890V	5.034V	3.335V	5.106V	48.932				37.57°C	114.86V
60W	4.250A	0.893A	0.89A	0.392A	59.989	86.126%	0	<6.0	42.24°C	0.945
	11.888V	5.035V	3.335V	5.103V	69.652				38.43°C	114.86V
80W	5.746A	1.092A	1.088A	0.49A	79.926	87.807%	0	<6.0	43.33°C	0.956
	11.888V	5.034V	3.335V	5.099V	91.022				39.37°C	114.85V

RIPPLE MEASUREMENTS 115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	17.14mV	13.69mV	15.19mV	9.26mV	Pass
20% Load	18.96mV	13.64mV	14.88mV	8.49mV	Pass
30% Load	15.74mV	14.31mV	16.42mV	9.00mV	Pass
40% Load	15.54mV	14.61mV	14.78mV	9.77mV	Pass
50% Load	16.41mV	16.30mV	16.63mV	10.54mV	Pass
60% Load	15.23mV	15.63mV	16.63mV	10.43mV	Pass
70% Load	14.69mV	16.04mV	16.98mV	11.30mV	Pass
80% Load	16.22mV	17.58mV	17.90mV	11.92mV	Pass
90% Load	16.68mV	18.65mV	18.57mV	11.15mV	Pass
100% Load	27.86mV	18.79mV	19.84mV	12.82mV	Pass
110% Load	27.79mV	19.39mV	17.99mV	12.06mV	Pass
Crossload1	29.95mV	21.54mV	20.35mV	15.99mV	Pass
Crossload2	17.58mV	31.27mV	22.81mV	15.70mV	Pass
Crossload3	14.46mV	20.18mV	20.98mV	15.60mV	Pass
Crossload4	26.29mV	15.83mV	15.42mV	17.42mV	Pass

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Top side

Power specifications label

CERTIFICATIONS 115V

CYBENETICS PLATINUM

CYBENETICS A+

Aristeidis Bitziopoulos
Lab Director

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