EFFICIENCY AND NOISE LEVEL CERTIFICATIONS

Anex

Cougar GEX X2 1000

Lab ID#: CG10002170
Receipt Date: Apr 12, 2023
Test Date: Apr 19, 2023

Report: 23PS2170A
Report Date: Apr 24, 2023

DUT INFORMATION

Brand	Cougar
Manufacturer (OEM)	XHY-Power
Series	GEX X2
Model Number	
Serial Number	12BC02GX10000097
DUT Notes	

DUT SPECIFICATIONS

Rated Voltage (Vrms)	100-240
Rated Current (Arms)	50-60
Rated Frequency (Hz)	13-7
Rated Power (W)	1000
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	89.802%
Efficiency With 10W (≤500W) or 2% (>500W)	70.530
Average Efficiency 5VSB	81.998%
Standby Power Consumption (W)	0.0510000
Average PF	0.977
Avg Noise Output	26.56 dB(A)
Efficiency Rating (ETA)	PLATINUM
Noise Rating (LAMBDA)	A-

POWER SPECIFICATIONS

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	20	20	83.3	3	0.3
	Watts	100		1000	15	3.6
Total Max. Power (W)		1000				

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

Hold-Up Time (ms)	21.1
AC Loss to PWR_OK Hold Up Time (ms)	17.2
PWR_OK Inactive to DC Loss Delay (ms)	3.9

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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)	3	6	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 ALB1560U (600V, 15A @ 100°C)
APFC MOSFETs	2x NCE65TF099 IPP50R140CP (650V, 24A @ 100°C, Rds(on): 109mOhm)
APFC Boost Diode	1x DS065008C
Bulk Cap(s)	1x TK (400V, 820uF, 2000h @ 105°C, LGW)
Main Switchers	4x IPP50R140CP (500V, 12.5A @ 100°C, Rds(on): 0.25Ohm)
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 JieJie Microelectronics DS065008C (60V, 174A @ 100°C, Rds(on): 1.2mOhm)
5V & 3.3V	DC-DC Converters: 6x Excelliance MOS EMB04N03H (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, 2x TK Polymer: 22x 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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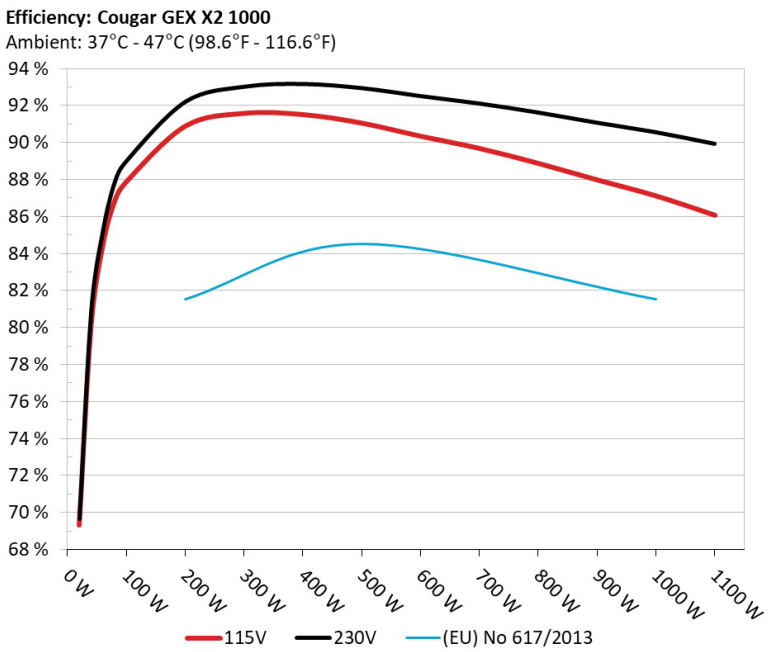
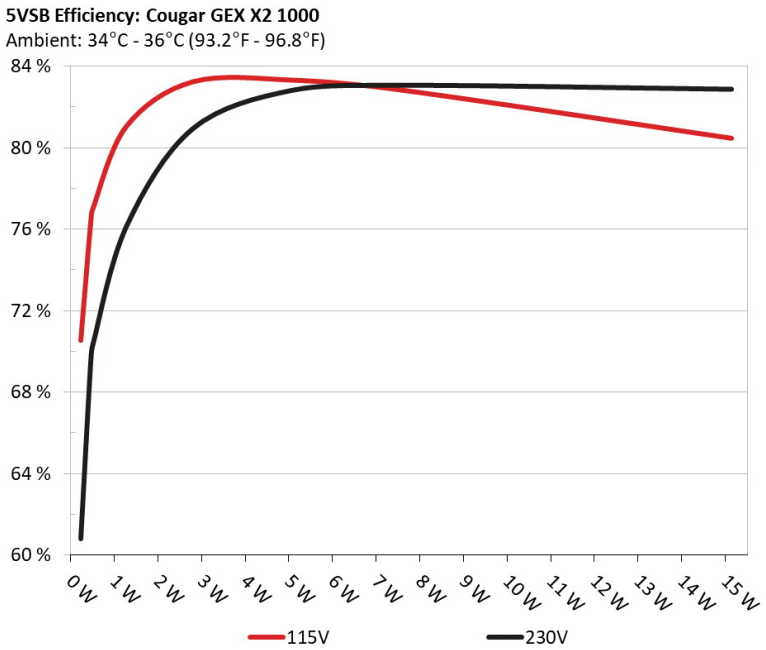
EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE



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	0.229W	70.227%	0.051
	5.096V	0.326W		114.84V
2	0.09A	0.459W	76.117%	0.092
	5.096V	0.603W		114.85V
3	0.55A	2.798W	82.943%	0.327
	5.088V	3.373W		114.85V
4	1A	5.08W	83.021%	0.407
	5.08V	6.119W		114.84V
5	1.5A	7.608W	82.526%	0.443
	5.072V	9.219W		114.85V
6	3A	15.139W	80.165%	0.498
	5.047V	18.885W		114.84V

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.229W	60.519%	0.017
	5.097V	0.379W		229.87V
2	0.09A	0.459W	69.319%	0.03
	5.096V	0.66W		229.86V
3	0.55A	2.798W	80.638%	0.144
	5.088V	3.471W		229.86V
4	1A	5.08W	82.521%	0.224
	5.08V	6.156W		229.86V
5	1.5A	7.608W	82.762%	0.286
	5.072V	9.192W		229.87V
6	3A	15.139W	82.568%	0.373
	5.046V	18.336W		229.86V

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115V

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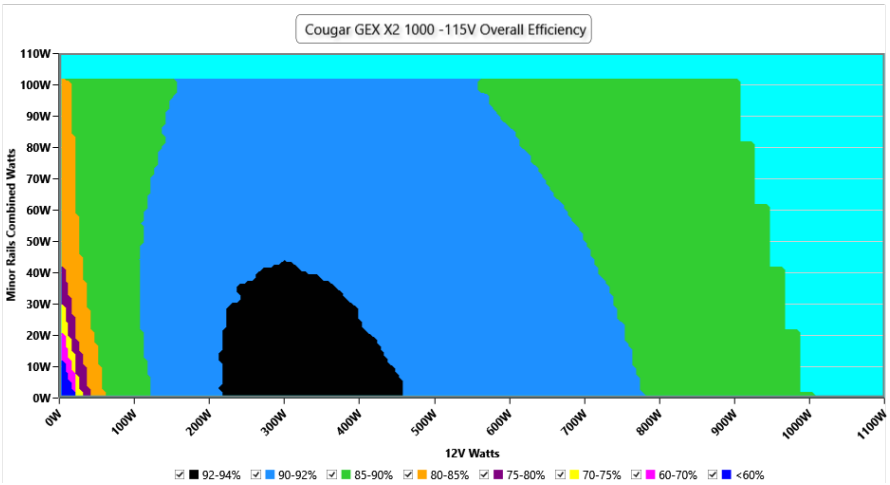
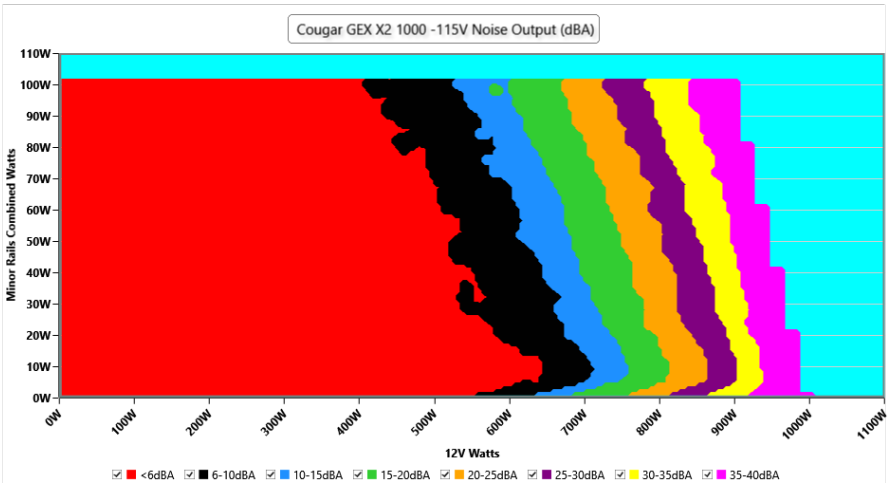
EFFICIENCY GRAPH 115V



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:	114.86 V	114.79 V	113.85 V	114.92 V	116.15 V	PASS
Mains Frequency:	60.00 Hz	59.99 Hz	59.40 Hz	60.03 Hz	60.60 Hz	PASS
Mains Voltage CF:	1.419	1.417	1.340	1.420	1.490	PASS
Mains Voltage THD:	0.15 %	0.09 %	N/A	0.24 %	2.00 %	PASS
Real Power:	0.051 W	0.031 W	N/A	0.072 W	N/A	N/A
Apparent Power:	6.553 W	6.532 W	N/A	6.586 W	N/A	N/A
Power Factor:	0.006	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%	6.480A	1.991A	1.978A	0.985A	99.973	88.379%	0	<6.0	44.33°C	0.96
	12.095V	5.021V	3.336V	5.075V	113.118				40.07°C	114.82V
20%	13.977A	2.988A	2.97A	1.185A	199.911	91.392%	0	<6.0	45.56°C	0.958
	12.093V	5.019V	3.334V	5.065V	218.743				40.85°C	114.79V
30%	21.826A	3.488A	3.467A	1.385A	299.947	92.089%	0	<6.0	46.49°C	0.969
	12.091V	5.017V	3.331V	5.055V	325.714				41.38°C	114.76V
40%	29.630A	3.988A	3.965A	1.586A	399.4	92.027%	0	<6.0	47.23°C	0.977
	12.089V	5.014V	3.329V	5.046V	434.004				41.62°C	114.72V
50%	37.115A	4.988A	4.961A	1.787A	499.129	91.568%	0	<6.0	48.41°C	0.983
	12.088V	5.012V	3.326V	5.035V	545.091				42.41°C	114.69V
60%	44.669A	5.988A	5.958A	1.99A	599.668	90.855%	775	18.4	42.67°C	0.986
	12.086V	5.01V	3.323V	5.025V	660.022				49.19°C	114.65V
70%	52.166A	6.986A	6.957A	2.194A	699.409	90.196%	1239	32.6	43.16°C	0.988
	12.083V	5.01V	3.321V	5.014V	775.436				50.2°C	114.62V
80%	59.730A	7.986A	7.957A	2.297A	799.438	89.386%	1863	43.7	43.75°C	0.99
	12.080V	5.009V	3.317V	5.005V	894.375				51.84°C	114.58V
90%	67.630A	8.487A	8.446A	2.402A	899.257	88.492%	2291	48.9	44.34°C	0.991
	12.077V	5.007V	3.315V	4.996V	1016.208				53.54°C	114.54V
100%	75.331A	8.99A	8.967A	3.013A	999.278	87.626%	2309	49.1	45.28°C	0.992
	12.075V	5.005V	3.312V	4.979V	1140.398				55.29°C	114.51V
110%	82.961A	9.996A	10.063A	3.017A	1099.904	86.573%	2322	49.3	46.53°C	0.993
	12.073V	5.002V	3.309V	4.971V	1270.51				57.46°C	114.46V
CL1	0.115A	12.014A	11.912A	0A	101.291	83.444%	0	<6.0	46.99°C	0.962
	12.095V	5.011V	3.333V	5.084V	121.399				41.6°C	114.82V
CL2	0.114A	20.042A	0A	0A	101.331	81.626%	562	9.1	41.44°C	0.96
	12.098V	4.987V	3.34V	5.089V	124.141				48.53°C	114.81V
CL3	0.114A	0A	19.876A	0A	67.381	76.287%	407	<6.0	42.62°C	0.949
	12.096V	5.009V	3.321V	5.084V	88.325				51.64°C	114.83V
CL4	82.781A	0A	0A	0A	999.859	88.198%	2308	49.1	45.13°C	0.992
	12.078V	5.005V	3.318V	5.039V	1133.656				56.08°C	114.52V

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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	1.228A	0.498A	0.494A	0.196A	19.993	69.792%	0	<6.0	39.58°C	0.881
	12.094V	5.023V	3.339V	5.094V	28.647				36.51°C	114.84V
40W	2.702A	0.697A	0.692A	0.295A	39.993	80.534%	0	<6.0	40.27°C	0.926
	12.095V	5.022V	3.338V	5.091V	49.661				37.02°C	114.84V
60W	4.178A	0.896A	0.89A	0.393A	59.991	84.937%	0	<6.0	41.84°C	0.928
	12.095V	5.022V	3.337V	5.088V	70.63				38.06°C	114.84V
80W	5.647A	1.095A	1.088A	0.492A	79.925	87.305%	0	<6.0	43.18°C	0.952
	12.094V	5.022V	3.337V	5.085V	91.548				39.21°C	114.83V

RIPPLE MEASUREMENTS 115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	11.92mV	8.37mV	9.13mV	10.83mV	Pass
20% Load	15.40mV	8.42mV	9.23mV	10.62mV	Pass
30% Load	18.06mV	8.42mV	9.29mV	10.47mV	Pass
40% Load	19.38mV	8.83mV	9.85mV	10.88mV	Pass
50% Load	17.39mV	8.88mV	9.75mV	12.36mV	Pass
60% Load	18.26mV	8.93mV	10.36mV	13.49mV	Pass
70% Load	18.62mV	11.34mV	11.75mV	13.96mV	Pass
80% Load	20.77mV	10.93mV	12.98mV	13.90mV	Pass
90% Load	21.23mV	10.57mV	14.06mV	15.65mV	Pass
100% Load	33.79mV	13.85mV	14.06mV	15.70mV	Pass
110% Load	35.21mV	13.15mV	14.66mV	16.42mV	Pass
Crossload1	19.31mV	11.65mV	14.56mV	17.12mV	Pass
Crossload2	17.85mV	22.48mV	12.21mV	16.78mV	Pass
Crossload3	12.38mV	10.68mV	16.62mV	16.68mV	Pass
Crossload4	33.22mV	10.34mV	9.44mV	18.40mV	Pass

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Top side

Power specifications label

CERTIFICATIONS 115V

CYBENETICS PLATINUM

CYBENETICS A-

Aristeidis Bitziopoulos
Lab Director

Cybenetics offers the ETA and Lambda voluntary certification programs, through which the efficient and silent power supplies are promoted

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