EFFICIENCY AND NOISE LEVEL CERTIFICATIONS

Anex

Cougar GX-F650

Lab ID#: 294
Receipt Date: -
Test Date: -

Report:
Report Date: Feb 21, 2018

DUT INFORMATION

Brand	Cougar
Manufacturer (OEM)	HEC
Series	GX-F
Model Number	GX-F650
Serial Number	H1801006848
DUT Notes	

DUT SPECIFICATIONS

Rated Voltage (Vrms)	100-240
Rated Current (Arms)	10-5
Rated Frequency (Hz)	47-63
Rated Power (W)	650
Type	ATX12V
Cooling	135mm Hydro Dynamic Bearing Fan (RL4Z S1352512H)
Semi-Passive Operation	✗
Cable Design	Fully Modular

POWER SPECIFICATIONS

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	24	24	54	3	0.5
	Watts	130		648	15	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 (580mm)	1	1	16-18AWG	No
4+4 pin EPS12V (700mm)	1	1	16AWG	No
6+2 pin PCIe (600mm+120mm)	2	4	18AWG	No
SATA (450mm+120mm+120mm)	2	6	18AWG	No
SATA (450mm+120mm)	1	2	18AWG	No
4 pin Molex (400mm+120mm+120mm)	1	3	18AWG	No
AC Power Cord (1700mm) - C13 coupler	1	1	18AWG	-

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RESULTS	
Temperature Range (°C /°F)	30-32 / 86-89.6
Average Efficiency	88.894
Efficiency With 10W (≤500W) or 2% (>500W) Load -115V	0.000
Average Efficiency 5VSB	77.427
Standby Power Consumption (W) -115V	0.0492346
Standby Power Consumption (W) -230V	0.1040880
Average PF	0.982
ErP Lot 3/6 Ready	✓
(EU) No 617/2013 Compliance	✓
Avg Noise Output	32.58
Efficiency Rating (ETA)	PLATINUM
Noise Rating (LAMBDA)	Standard++

TEST EQUIPMENT		
Electronic Loads	Chroma 6314A x2 63123A x6 63102A 63101A	Chroma 63601-5 x2 Chroma 63600-2 63640-80-80 x10 63610-80-20
AC Sources	Chroma 6530, Chroma 61604	
Power Analyzers	N4L PPA1530, N4L PPA5530	
Oscilloscopes	Picoscope 4444 & 3424, Keysight DSOX3024A, Rigol DS2072A	
Voltmeter	Keithley 2015 THD 6.5 Digit	
Sound Analyzer	Bruel & Kjaer 2250-L G4	
Microphone	Bruel & Kjaer Type 4955-A, Bruel & Kjaer Type 4189	
Data Loggers	Picoscope TC-08 x2, Labjack U3-HV x2	

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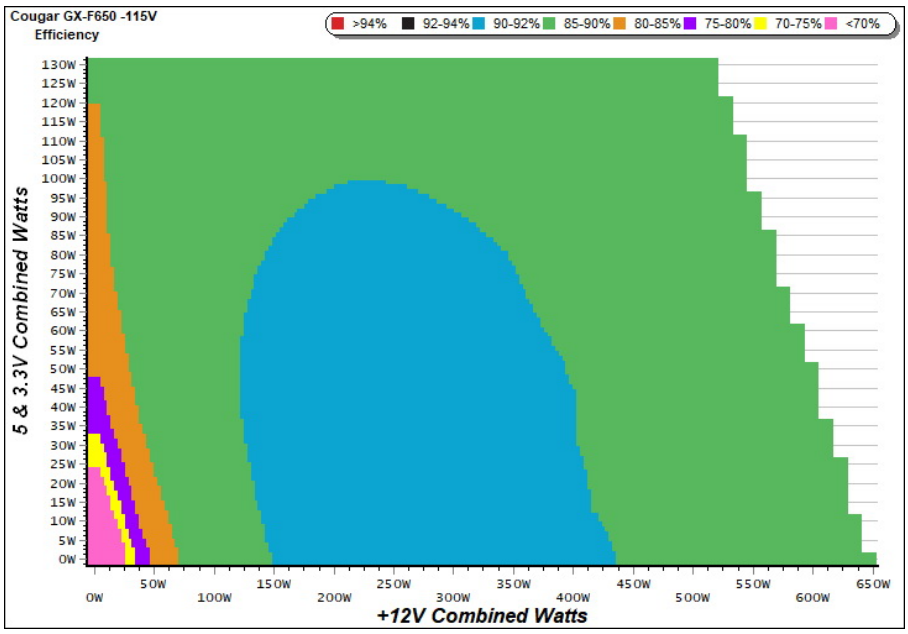
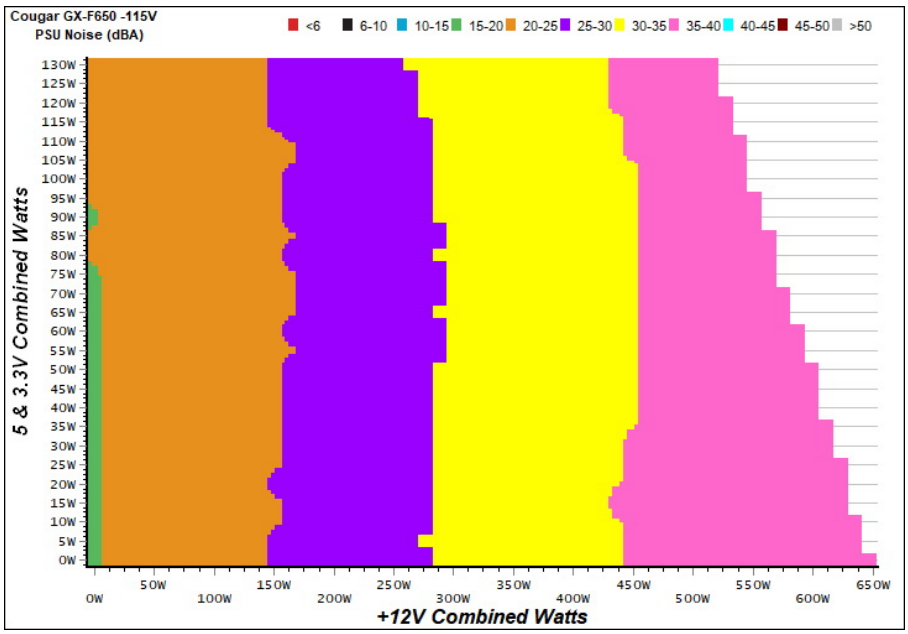
EFFICIENCY GRAPH



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



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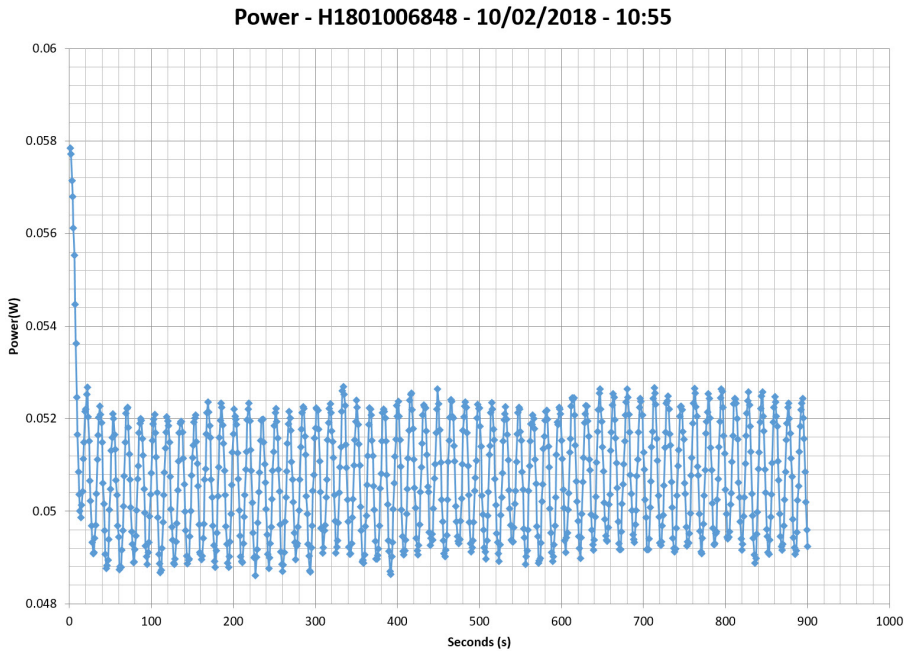
5VSB EFFICIENCY -115V (ERP LOT 3/6 & CEC)

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.230	67.647%	0.026
	5.114V	0.340		115.27V
2	0.090A	0.460	73.132%	0.047
	5.112V	0.629		115.27V
3	0.550A	2.806	78.490%	0.219
	5.103V	3.575		115.26V
4	1.000A	5.094	78.794%	0.311
	5.094V	6.465		115.26V
5	1.500A	7.627	77.298%	0.370
	5.084V	9.867		115.26V
6	3.000A	15.163	76.269%	0.443
	5.055V	19.881		115.24V

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.230	58.081%	0.010
	5.113V	0.396		230.72V
2	0.090A	0.460	66.667%	0.018
	5.112V	0.690		230.72V
3	0.550A	2.806	76.043%	0.089
	5.103V	3.690		230.71V
4	1.000A	5.094	77.030%	0.150
	5.094V	6.613		230.71V
5	1.500A	7.626	77.793%	0.204
	5.084V	9.803		230.71V
6	3.000A	15.163	77.099%	0.308
	5.055V	19.667		230.70V

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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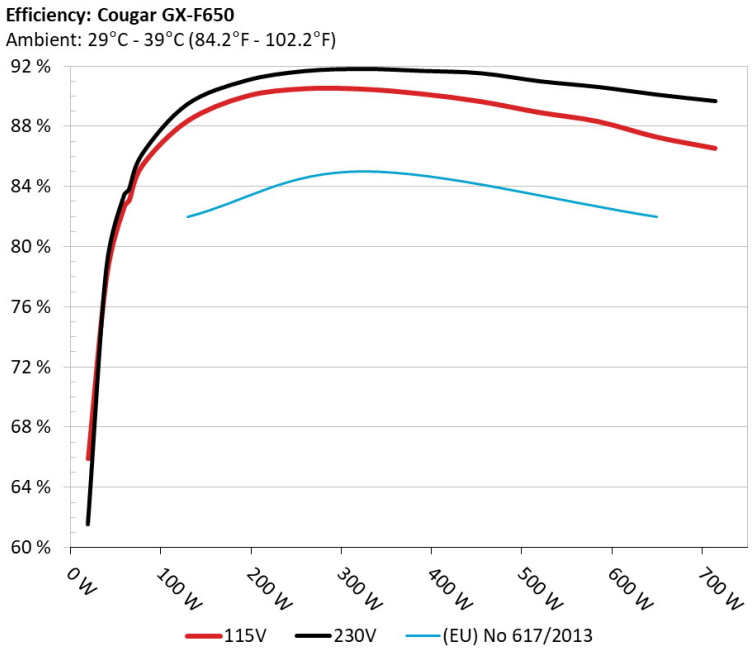
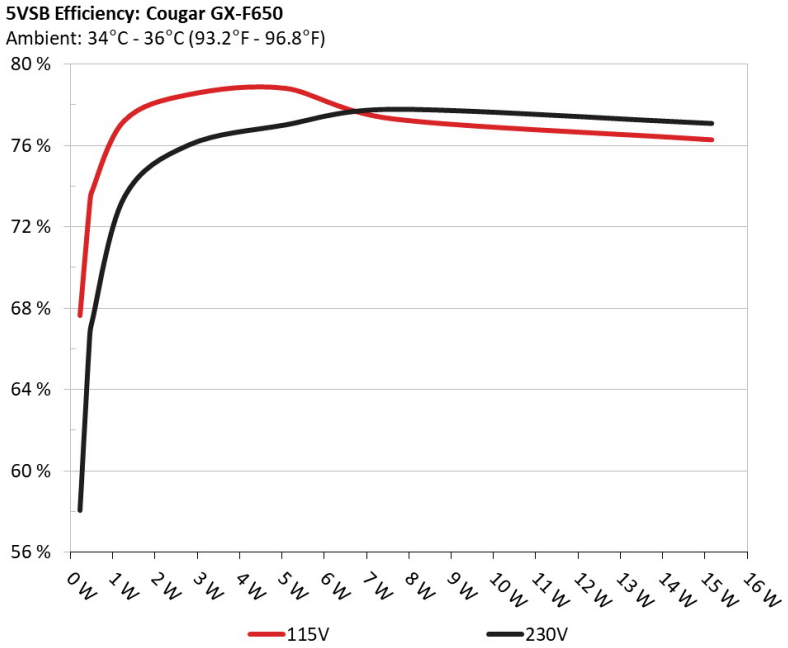
EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE



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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10-110% LOAD TESTS

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
1	3.575A	2.010A	1.971A	0.983A	64.631	83.096%	810	23.3	30.63°C	0.965
	12.043V	4.970V	3.341V	5.089V	77.779				34.74°C	115.17V
2	8.167A	3.021A	2.966A	1.181A	129.124	88.368%	830	24.4	31.08°C	0.983
	12.029V	4.963V	3.335V	5.080V	146.120				35.56°C	115.18V
3	13.167A	3.531A	3.452A	1.380A	194.239	90.023%	885	26.3	31.54°C	0.976
	12.018V	4.958V	3.329V	5.072V	215.765				36.19°C	115.10V
4	18.176A	4.037A	3.969A	1.580A	259.461	90.528%	945	28.6	32.37°C	0.978
	12.009V	4.952V	3.324V	5.064V	286.609				37.30°C	115.01V
5	22.858A	5.054A	4.970A	1.780A	324.759	90.497%	1020	30.2	32.89°C	0.981
	11.999V	4.946V	3.318V	5.055V	358.863				38.88°C	114.92V
6	27.479A	6.073A	5.975A	1.982A	389.292	90.184%	1110	32.8	33.33°C	0.985
	11.991V	4.940V	3.312V	5.046V	431.664				40.04°C	114.93V
7	32.174A	7.095A	6.987A	2.184A	454.609	89.673%	1210	35.3	34.08°C	0.988
	11.982V	4.933V	3.306V	5.037V	506.965				41.35°C	114.83V
8	36.843A	8.119A	7.998A	2.386A	519.922	88.946%	1300	37.3	35.67°C	0.989
	11.984V	4.927V	3.300V	5.029V	584.539				43.82°C	114.72V
9	41.947A	8.635A	8.496A	2.389A	584.847	88.345%	1400	38.8	36.21°C	0.990
	11.976V	4.922V	3.294V	5.024V	662.001				45.27°C	114.72V
10	46.782A	9.154A	9.028A	2.996A	649.679	87.311%	1510	40.7	37.06°C	0.992
	11.970V	4.916V	3.289V	5.008V	744.100				46.44°C	114.62V
11	52.222A	9.162A	9.045A	2.998A	714.490	86.563%	1535	41.8	38.51°C	0.993
	11.964V	4.912V	3.284V	5.003V	825.403				49.44°C	114.51V
CL1	0.128A	16.000A	16.000A	0.000A	133.634	84.705%	1140	33.6	35.68°C	0.982
	12.021V	4.937V	3.319V	5.092V	157.764				44.09°C	115.16V
CL2	53.994A	0.999A	0.998A	1.000A	659.960	87.725%	1470	40.4	36.38°C	0.992
	11.977V	4.934V	3.299V	5.053V	752.308				46.57°C	114.62V

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20-80W LOAD TESTS

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	PF/AC Volts
1	1.176A	0.500A	0.475A	0.196A	19.256	65.914%	725	20.2	0.847
	12.055V	4.975V	3.346V	5.108V	29.214				115.23V
2	2.444A	1.004A	0.985A	0.392A	39.734	78.064%	735	20.7	0.931
	12.049V	4.973V	3.344V	5.102V	50.899				115.21V
3	3.638A	1.507A	1.462A	0.589A	59.193	82.678%	750	21.3	0.961
	12.043V	4.971V	3.342V	5.097V	71.595				115.18V
4	4.904A	2.010A	1.973A	0.786A	79.619	85.454%	770	22.4	0.976
	12.039V	4.969V	3.340V	5.092V	93.172				115.15V

RIPPLE MEASUREMENTS

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	5.3 mV	6.9 mV	9.2 mV	5.7 mV	Pass
20% Load	7.3 mV	7.6 mV	10.3 mV	6.1 mV	Pass
30% Load	8.4 mV	8.1 mV	12.1 mV	6.6 mV	Pass
40% Load	11.2 mV	8.5 mV	13.8 mV	7.8 mV	Pass
50% Load	12.7 mV	8.9 mV	16.7 mV	9.1 mV	Pass
60% Load	14.2 mV	10.2 mV	19.5 mV	10.5 mV	Pass
70% Load	15.7 mV	10.8 mV	21.7 mV	14.7 mV	Pass
80% Load	13.9 mV	12.2 mV	23.3 mV	16.3 mV	Pass
90% Load	16.0 mV	14.2 mV	26.2 mV	16.6 mV	Pass
100% Load	17.0 mV	15.3 mV	29.6 mV	33.0 mV	Pass
110% Load	18.1 mV	16.5 mV	34.1 mV	34.0 mV	Pass
Crossload 1	8.2 mV	12.1 mV	20.7 mV	4.7 mV	Pass
Crossload 2	17.2 mV	13.3 mV	28.8 mV	21.2 mV	Pass

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HOLD-UP TIME & POWER OK SIGNAL (230V)	
Hold-Up Time (ms)	20.5
AC Loss to PWR_OK Hold Up Time (ms)	17.5
PWR_OK Inactive to DC Loss Delay (ms)	3.0

Top side

Power specifications label

CERTIFICATIONS

CYBENETICS PLATINUM

CYBENETICS STANDARD++