



Cougar Polar X2 1200W

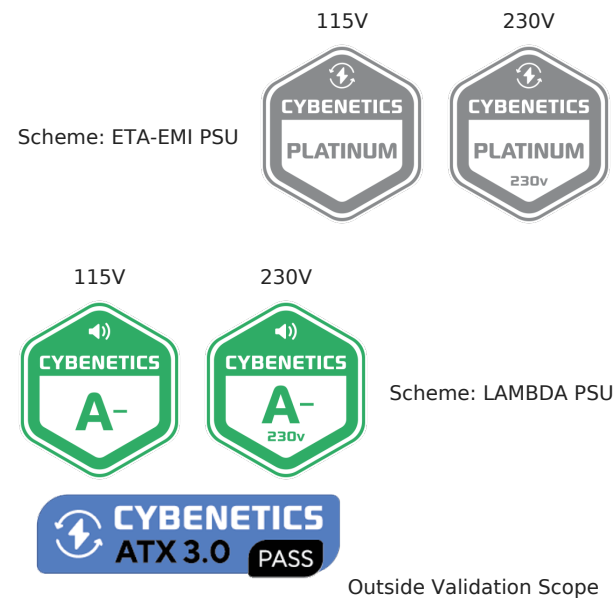
Serial Number 12BC03PX12000012

Lab ID CG12002174

Certification ID 252174

Test Result Report ID: 23PS2174A

Certificate Issue Date: May 11, 2023



General Information

Test Equipment

Electronic Loads	Chroma 63601-5 x2 Chroma 63600-2 Chroma 63640-80-80 x10 Chroma 63610-80-20
AC Sources	Chroma 6530, APM SP300VAC4000W-P, GW Instek ASR-3500
Power Analyzers	Rohde & Schwarz HMC8015 & NPA701
Oscilloscopes	Picoscope 4444, 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
EMI Analyzer	TekBox TBMR-110M-EU
Isolation Transformer	4kVA
UPS	FSP Champ Tower 3kVA, CyberPower OLS3000E 3kVA
Testing Methodology	Cybenetics PSU Test Protocol

DUT Information(Non-accredited measurements)

Product Identification Details	
Brand	Cougar
Model	Polar X2 1200W
OEM/ODM	XHY-Power
Serial Number	12BC03PX12000012
Product Specifications	
Manufacturer-Provided Information	
Rated Voltage (Vrms)	100-240
Rated Current (Arms)	15-7

Rated Frequency (Hz)	47-63
Rated Power (W)	1200
Operating Temperature (Continuous Full Load) (°C)	
Type	ATX12V
Cable Design	Fully Modular
Warranty	-
Cybenetics Measurements	
Dimensions (W x H x D)	
Weight	
Cooling	135mm Hydraulic Dynamic Bearing Fan (DWPH EFF-14E12H)
Semi-Passive Operation	✓
Cybenetics Testing Information	
Lab ID	CG12002174
Date of receipt	May 4, 2023
Testing Date	May 10, 2023
Report Issued Date	May 11, 2023
Engineer Name	-
Authorized By the Laboratory Technical Manager	Aristeidis Bitziopoulos
Signature	

Cables and Connectors(Non-accredited measurements)

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+110mm+110mm)	3	12	18AWG	No

4-pin Molex (510mm+120mm+120mm+120mm)	1	4	18AWG	No
AC Power Cord (1400mm) - C13 coupler	1	1	18AWG	-

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				

Parts Description

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

Test Results

Temperature & Compliance Info

Temperature Range (°C /°F)	28-32 / 82.4-89.6
ErP Lot 3/6 Ready	✓
(EU) No 617/2013 Compliance	✓
ALPM (Alternative Low Power Mode) compatible	✓
ATX v3.0 Compliance	✓

Performance Summary

115V

Accredited	
Average Efficiency (>1450 load combinations)	89.750%
Average Noise Output (>1450 Load Combinations)	26.18dBA
Average PF (>1450 Load Combinations)	0.981
Efficiency With 10W ($\leq$ 500W) or 2% (>500W) Load	64.642%
Standby Power Consumption	0.0093W
Non-Accredited	
12V Ripple (Full Load)	33.57mV
5V Ripple (Full Load)	13.03mV
3.3V Ripple (Full Load)	16.53mV
5VSB Ripple (Full Load)	17.84mV
12V Load Regulation	0.13%
5V Load Regulation	0.28%
3.3V Load Regulation	0.87%
5VSB Load Regulation	2.66%

Inrush Current	41.330A
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230V

Accredited		
Average Efficiency (>1450 load combinations)	91.744%	
Average Noise Output (>1450 Load Combinations)	25.55dBA	
Average PF (>1450 Load Combinations)	0.943	
Efficiency With 10W (≤500W) or 2% (>500W) Load	-	
Standby Power Consumption	0.0974W	
Non-Accredited		
12V Ripple (Full Load)	32.80mV	
5V Ripple (Full Load)	12.71mV	
3.3V Ripple (Full Load)	16.25mV	
5VSB Ripple (Full Load)	16.58mV	
12V Load Regulation	0.18%	
5V Load Regulation	0.28%	
3.3V Load Regulation	0.90%	
5VSB Load Regulation	2.68%	
Inrush Current	90.960A	
12V Transient Response (200%)	11.16V	
5V Transient Response (200%)	4.919V	
3.3V Transient Response (200%)	3.209V	
5VSB Transient Response (200%)	4.937V	
Hold-Up Time & PWR_OK Signal	31.70ms	
AC Loss to PWR_OK Hold Up Time	27.40ms	
PWR_OK Inactive to DC Loss Delay	4.30ms	
PSU Timings: T1 (20% / 100%)	76.0ms	75.0ms
PSU Timings: T3 (20% / 100%)	129.0ms	129.0ms
OPP (28.23°C / 36.70°C)	126.06%	126.06%

Hold-Up Time & PWR_OK Signal

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



Tables

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

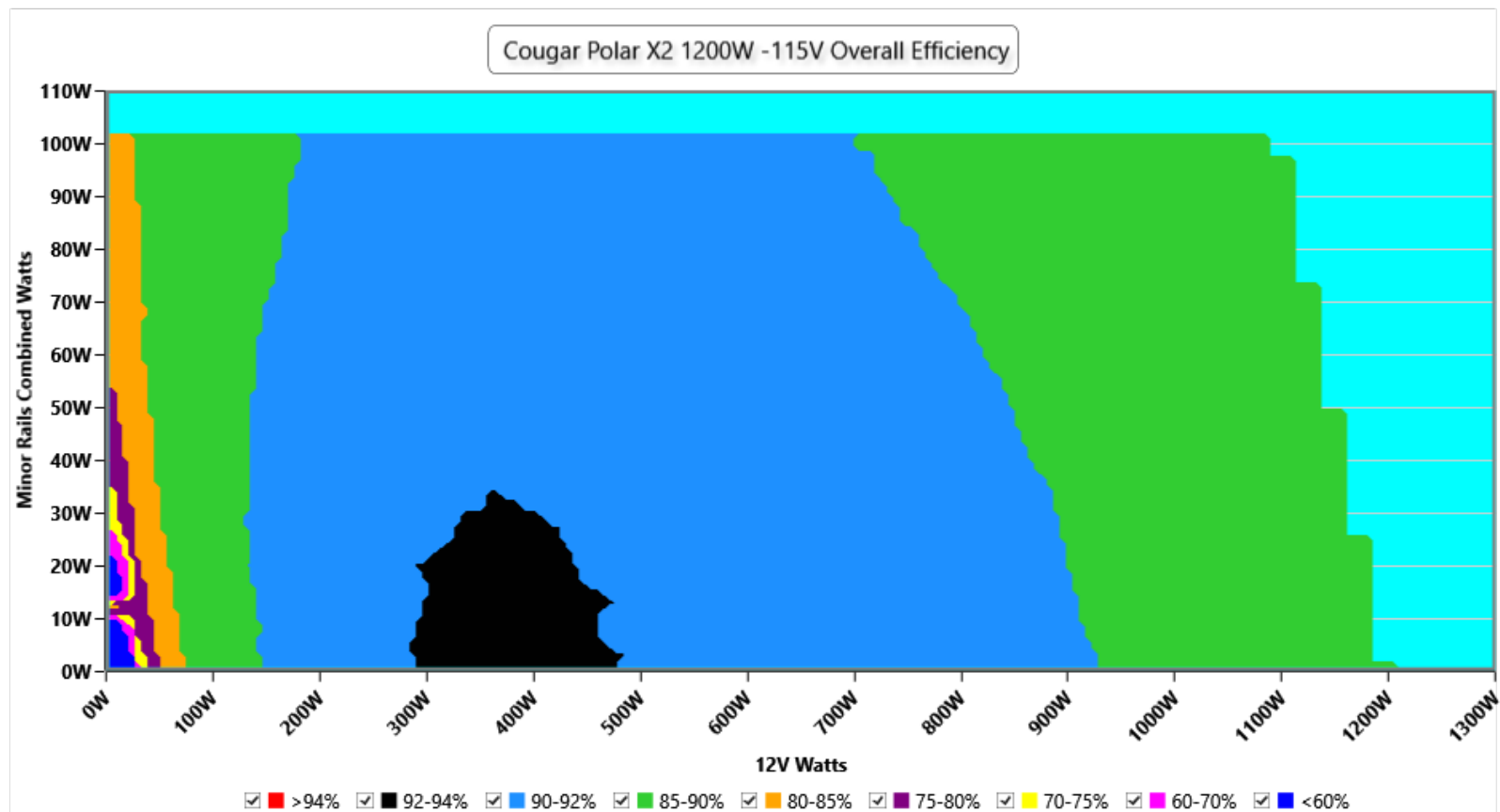
230V

Detailed Results						
	Average	Min	Limit Min	Max	Limit Max	Result
Mains Voltage RMS:	229.87 V	229.79 V	227.70 V	229.94 V	232.30 V	PASS
Mains Frequency:	50.00 Hz	49.99 Hz	49.50 Hz	50.01 Hz	50.50 Hz	PASS
Mains Voltage CF:	1.417	1.416	1.340	1.418	1.490	PASS
Mains Voltage THD:	0.15 %	0.11 %	N/A	0.21 %	2.00 %	PASS
Real Power:	0.097 W	0.058 W	N/A	0.146 W	N/A	N/A
Apparent Power:	26.308 W	26.237 W	N/A	26.383 W	N/A	N/A

Power Factor:	0.004	N/A	N/A	N/A	N/A	N/A
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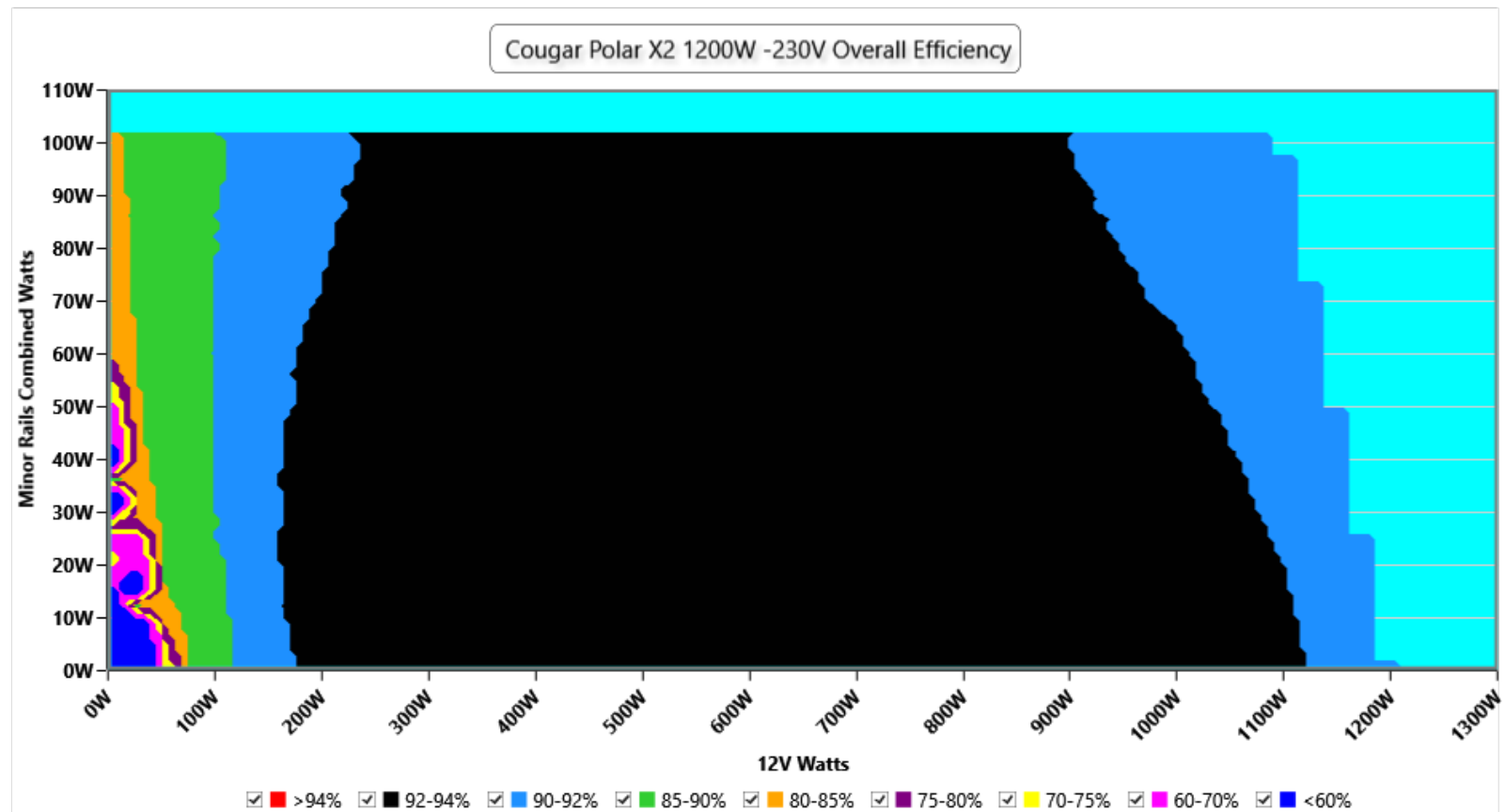
Efficiency Graph

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

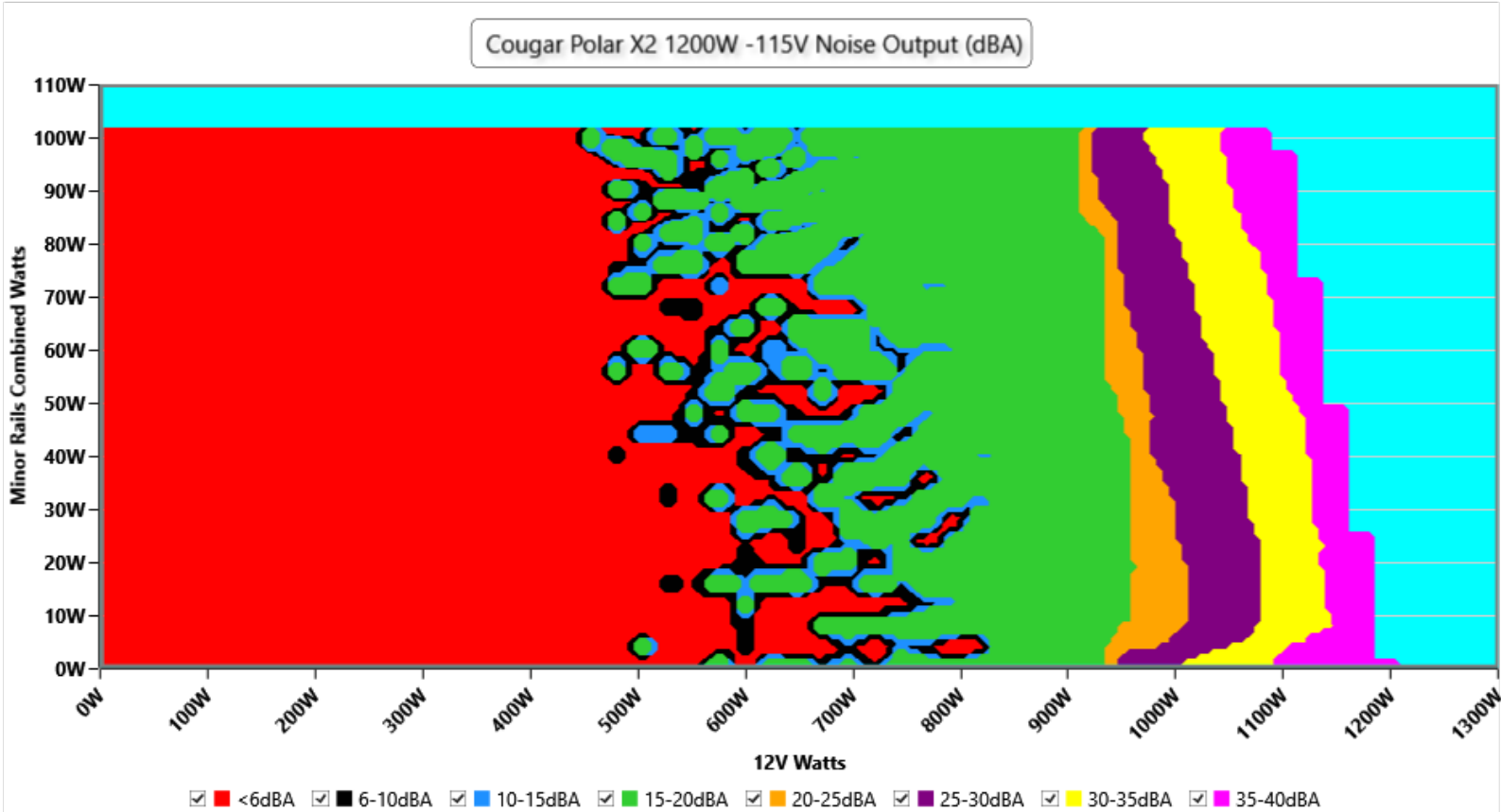


INFO

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

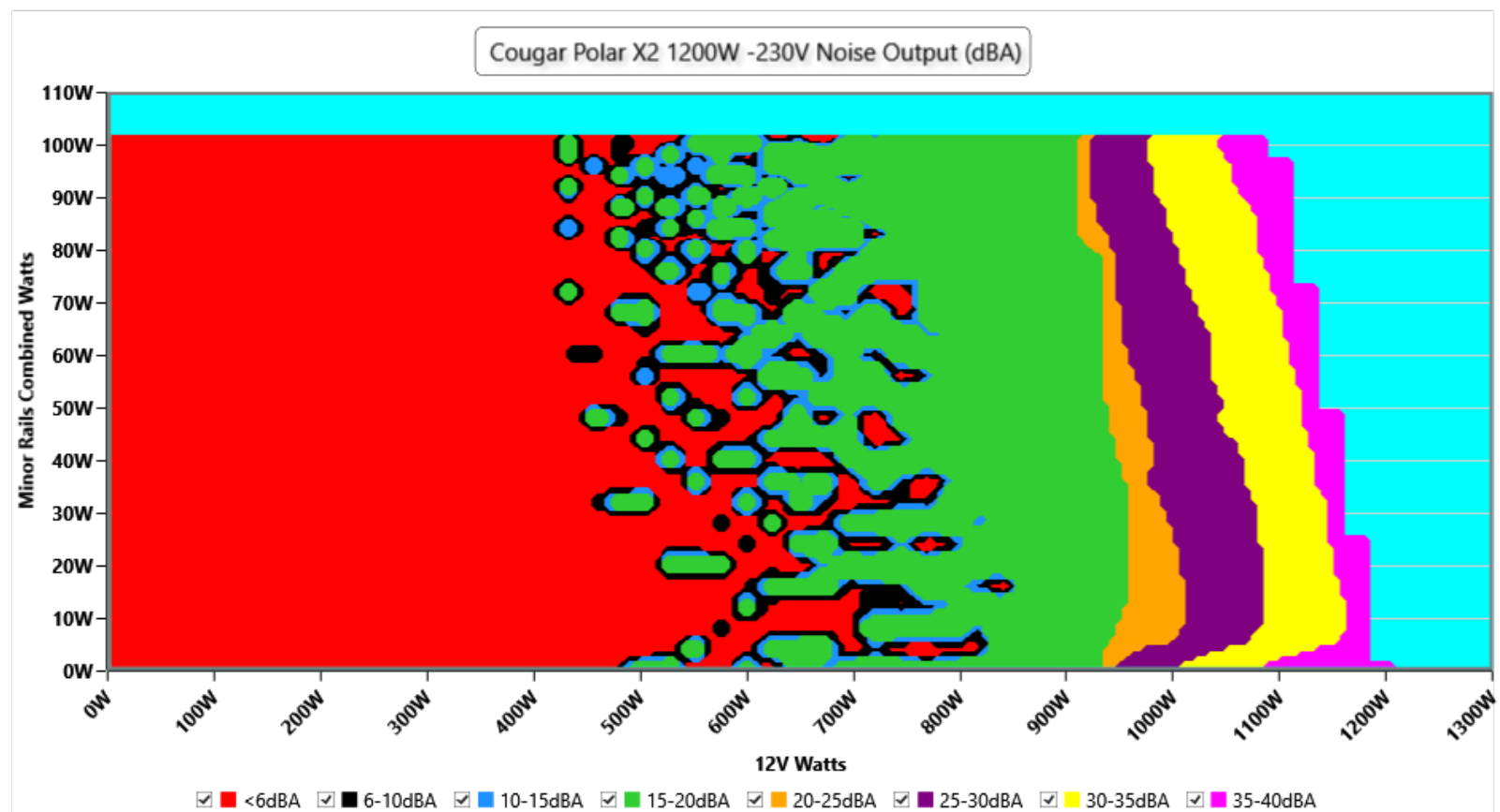
Noise Graph

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



INFO

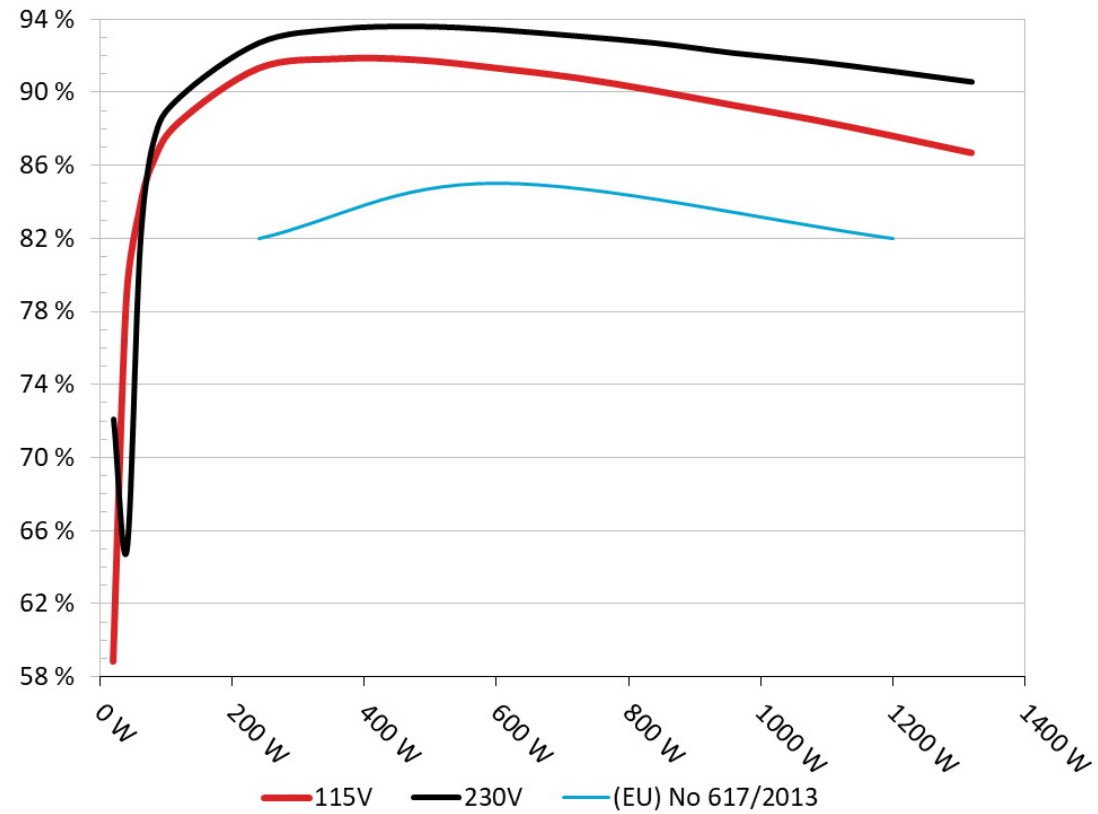
The PSU's noise in its entire operational range and under 30-32 °C ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails

Indicative Performance

Efficiency under high ambient temperature

Efficiency: Cougar Polar X2 1200W

Ambient: 37°C - 47°C (98.6°F - 116.6°F)



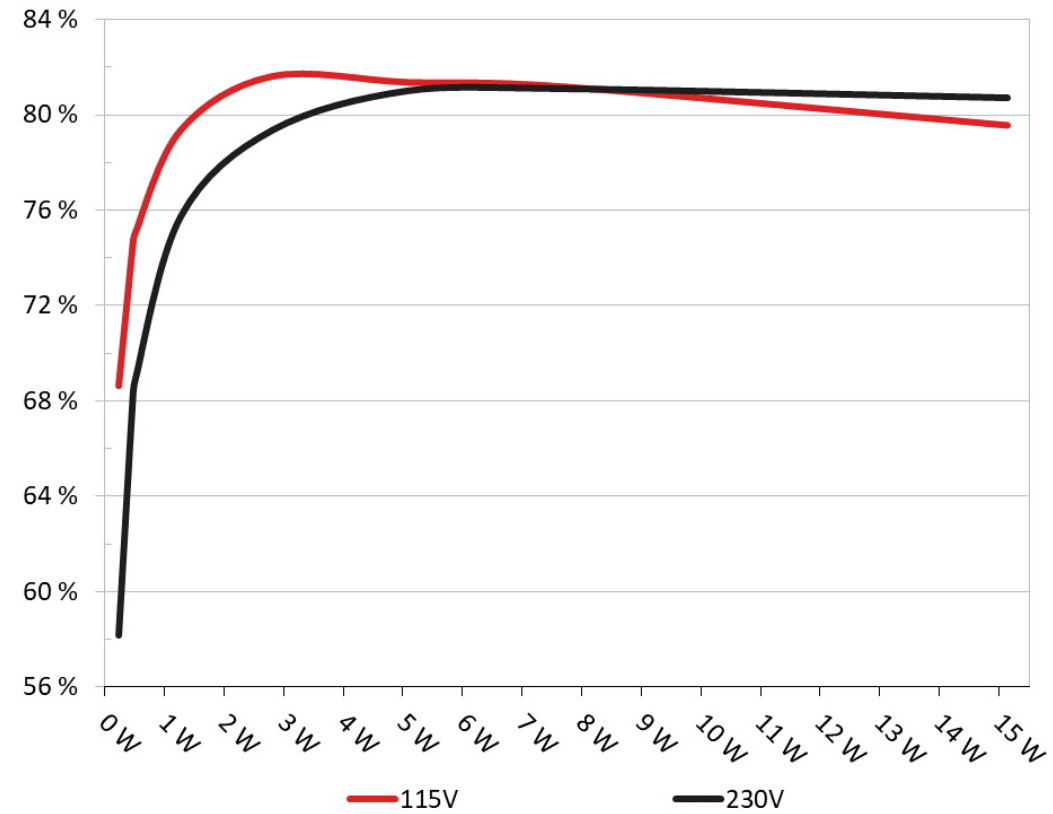
INFO

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

5VSB Efficiency: Cougar Polar X2 1200W

Ambient: 34°C - 36°C (93.2°F - 96.8°F)



INFO

This graph depicts the efficiency levels of the 5VSB rail with 115V and 230V input

5VSB Efficiency (ERP LOT 3/6 & CEC)

115V

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

230V

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

Supplementary Tests (For Reference)

Typical 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

Test	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
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

The results above are not used in the certification process

230V

Test	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
10%	8.048A	1.982A	1.973A	0.984A	119.981	89.721%	0	<6.0	44.44°C	0.827
	12.223V	5.044V	3.345V	5.08V	133.729				40.04°C	229.84V
20%	17.105A	2.974A	2.962A	1.184A	239.928	92.692%	0	<6.0	45.55°C	0.924
	12.221V	5.042V	3.342V	5.069V	258.851				40.85°C	229.82V
30%	26.441A	3.471A	3.459A	1.384A	359.118	93.456%	0	<6.0	46.27°C	0.948
	12.219V	5.041V	3.339V	5.058V	384.269				41.11°C	229.8V
40%	35.877A	3.969A	3.957A	1.585A	479.501	93.603%	0	<6.0	47.41°C	0.961
	12.217V	5.039V	3.336V	5.046V	512.273				41.88°C	229.79V
50%	44.922A	4.963A	4.951A	1.788A	599.253	93.423%	701	19.4	42.04°C	0.967
	12.216V	5.038V	3.333V	5.035V	641.441				48.21°C	229.77V
60%	54.036A	5.955A	5.944A	1.991A	719.801	93.08%	713	19.9	42.56°C	0.972
	12.214V	5.038V	3.331V	5.023V	773.312				49.25°C	229.74V
70%	63.090A	6.95A	6.941A	2.195A	839.549	92.695%	1073	32.4	43.08°C	0.975
	12.211V	5.037V	3.328V	5.011V	905.706				50.15°C	229.73V
80%	72.217A	7.945A	7.939A	2.3A	959.537	92.14%	1630	44.0	43.68°C	0.977
	12.209V	5.035V	3.325V	5.001V	1041.402				52.04°C	229.7V
90%	81.669A	8.444A	8.427A	2.404A	1079.369	91.692%	1696	45.0	44.09°C	0.979
	12.206V	5.033V	3.323V	4.991V	1177.176				53.15°C	229.68V

Test	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
100%	90.928A	8.944A	8.947A	3.018A	1199.403	91.146%	1712	45.8	45.19°C	0.981
	12.204V	5.031V	3.319V	4.97V	1315.92				55.28°C	229.66V
110%	100.117A	9.944A	10.042A	3.023A	1320.058	90.562%	1721	46.0	46.51°C	0.983
	12.203V	5.029V	3.316V	4.962V	1457.621				57.42°C	229.64V
CL1	0.114A	11.95A	11.88A	0A	101.298	84.194%	478	8.1	40.23°C	0.807
	12.226V	5.038V	3.341V	5.094V	120.324				45.73°C	229.85V
CL2	0.113A	19.931A	0A	0A	101.336	82.582%	318	<6.0	40.69°C	0.811
	12.229V	5.015V	3.347V	5.098V	122.718				48.01°C	229.84V
CL3	0.113A	0A	19.837A	0A	67.383	76.793%	0	<6.0	51.15°C	0.738
	12.226V	5.038V	3.327V	5.093V	87.752				42.09°C	229.85V
CL4	98.293A	0A	0A	0A	1199.935	91.675%	1710	45.7	45.68°C	0.981
	12.208V	5.03V	3.323V	5.041V	1308.898				56.62°C	229.66V

The results above are not used in the certification process

Light 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

The results above are not used in the certification process

230V

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	0.496A	0.493A	0.196A	19.995	72.072%	0	<6.0	39.65°C	0.425
	12.225V	5.045V	3.349V	5.103V	27.817				36.54°C	229.86V
40W	2.674A	0.694A	0.69A	0.294A	39.994	64.919%	0	<6.0	40.31°C	0.567
	12.224V	5.044V	3.348V	5.099V	49.197				37.01°C	229.86V
60W	4.134A	0.892A	0.887A	0.392A	59.993	81.461%	0	<6.0	41.99°C	0.674
	12.224V	5.044V	3.347V	5.096V	70.595				38.51°C	229.85V
80W	5.588A	1.09A	1.085A	0.491A	79.93	87.235%	0	<6.0	42.85°C	0.745
	12.224V	5.045V	3.346V	5.093V	91.627				39.02°C	229.85V

The results above are not used in the certification process

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

Test	12V	5V	3.3V	5VSB	Pass/Fail
Crossload3	10.33mV	7.39mV	14.21mV	12.06mV	Pass
Crossload4	32.63mV	11.65mV	13.96mV	19.11mV	Pass

The results above are not used in the certification process

230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	14.58mV	7.65mV	7.39mV	8.83mV	Pass
20% Load	19.23mV	7.65mV	8.72mV	10.11mV	Pass
30% Load	17.80mV	8.16mV	9.18mV	11.44mV	Pass
40% Load	18.52mV	7.85mV	9.29mV	11.60mV	Pass
50% Load	16.88mV	8.67mV	10.57mV	12.11mV	Pass
60% Load	17.19mV	9.49mV	12.16mV	12.88mV	Pass
70% Load	17.80mV	9.80mV	11.75mV	14.47mV	Pass
80% Load	18.67mV	11.14mV	15.80mV	14.78mV	Pass
90% Load	20.20mV	13.14mV	16.52mV	15.44mV	Pass
100% Load	32.80mV	12.71mV	16.25mV	16.58mV	Pass
110% Load	34.65mV	13.84mV	17.08mV	17.24mV	Pass
Crossload1	20.24mV	9.81mV	13.46mV	12.66mV	Pass
Crossload2	13.45mV	20.99mV	12.62mV	13.70mV	Pass
Crossload3	10.64mV	8.88mV	14.21mV	12.31mV	Pass
Crossload4	32.89mV	10.90mV	12.60mV	18.34mV	Pass

The results above are not used in the certification process

Cougar Polar X2 1200W



Top side



Power specifications label

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