Cougar Polar X2 1050W

Serial Number 12BC02PX10500098

Lab ID CG10502176

Certification ID 252176

Test Result Report ID: 23PS2176A

Certificate Issue Date: May 16, 2023

Scheme: ETA-EMI PSU

115V 230V

Scheme: LAMBDA PSU

115V 230V

Outside Validation Scope

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 1050W
OEM/ODM	XHY-Power
Serial Number	12BC02PX10500098
Product Specifications	
Manufacturer-Provided Information	
Rated Voltage (Vrms)	100-240

Rated Current (Arms)	15-7
Rated Frequency (Hz)	47-63
Rated Power (W)	1050
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	CG10502176
Date of receipt	May 4, 2023
Testing Date	May 15, 2023
Report Issued Date	May 16, 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	18AWG	No
4+4 pin EPS12V (650mm)	1	1	16AWG	No
8 pin EPS12V (650mm)	1	1	16AWG	No
6+2 pin PCIe (650mm)	1	1	16AWG	No

6+2 pin PCIe (650mm+100mm)	3	6	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 (500mm+120mm+120mm+120mm)	1	4	18AWG	No
AC Power Cord (1360mm) - C13 coupler	1	1	18AWG	-

Power Specifications

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	20	20	87.5	3	0.3
	Watts	100		1050	15	3.6
Total Max. Power (W)		1050				

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)	90.182%
Average Noise Output (>1450 Load Combinations)	22.37dBA
Average PF (>1450 Load Combinations)	0.979
Efficiency With 10W (≤500W) or 2% (>500W) Load	67.679%
Standby Power Consumption	0.0536W

Non-Accredited	
12V Ripple (Full Load)	43.53mV
5V Ripple (Full Load)	15.69mV
3.3V Ripple (Full Load)	14.89mV
5VSB Ripple (Full Load)	14.69mV
12V Load Regulation	0.17%
5V Load Regulation	0.26%
3.3V Load Regulation	0.85%
5VSB Load Regulation	2.13%
Inrush Current	43.650A

230V

Accredited	
Average Efficiency (>1450 load combinations)	92.142%
Average Noise Output (>1450 Load Combinations)	22.24dBA
Average PF (>1450 Load Combinations)	0.952
Efficiency With 10W (≤500W) or 2% (>500W) Load	-
Standby Power Consumption	0.0912W
Non-Accredited	
12V Ripple (Full Load)	44.27mV
5V Ripple (Full Load)	16.08mV
3.3V Ripple (Full Load)	15.27mV
5VSB Ripple (Full Load)	15.95mV
12V Load Regulation	0.27%
5V Load Regulation	0.24%
3.3V Load Regulation	0.85%
5VSB Load Regulation	2.11%
Inrush Current	101.500A
12V Transient Response (200%)	11.38V
5V Transient Response (200%)	4.939V
3.3V Transient Response (200%)	3.241V
5VSB Transient Response (200%)	4.938V

Hold-Up Time & PWR_OK Signal		27.40ms
AC Loss to PWR_OK Hold Up Time		23.00ms
PWR_OK Inactive to DC Loss Delay		4.40ms
PSU Timings: T1 (20% / 100%)	82.0ms	81.0ms
PSU Timings: T3 (20% / 100%)	129.0ms	130.0ms
OPP (28.93°C / 37.23°C)	123.50%	123.50%

Hold-Up Time & PWR_OK Signal

Hold-Up Time (ms)	27.4
AC Loss to PWR_OK Hold Up Time (ms)	23
PWR_OK Inactive to DC Loss Delay (ms)	4.4

Stromverbrauch im Ruhezustand

Tables

115V

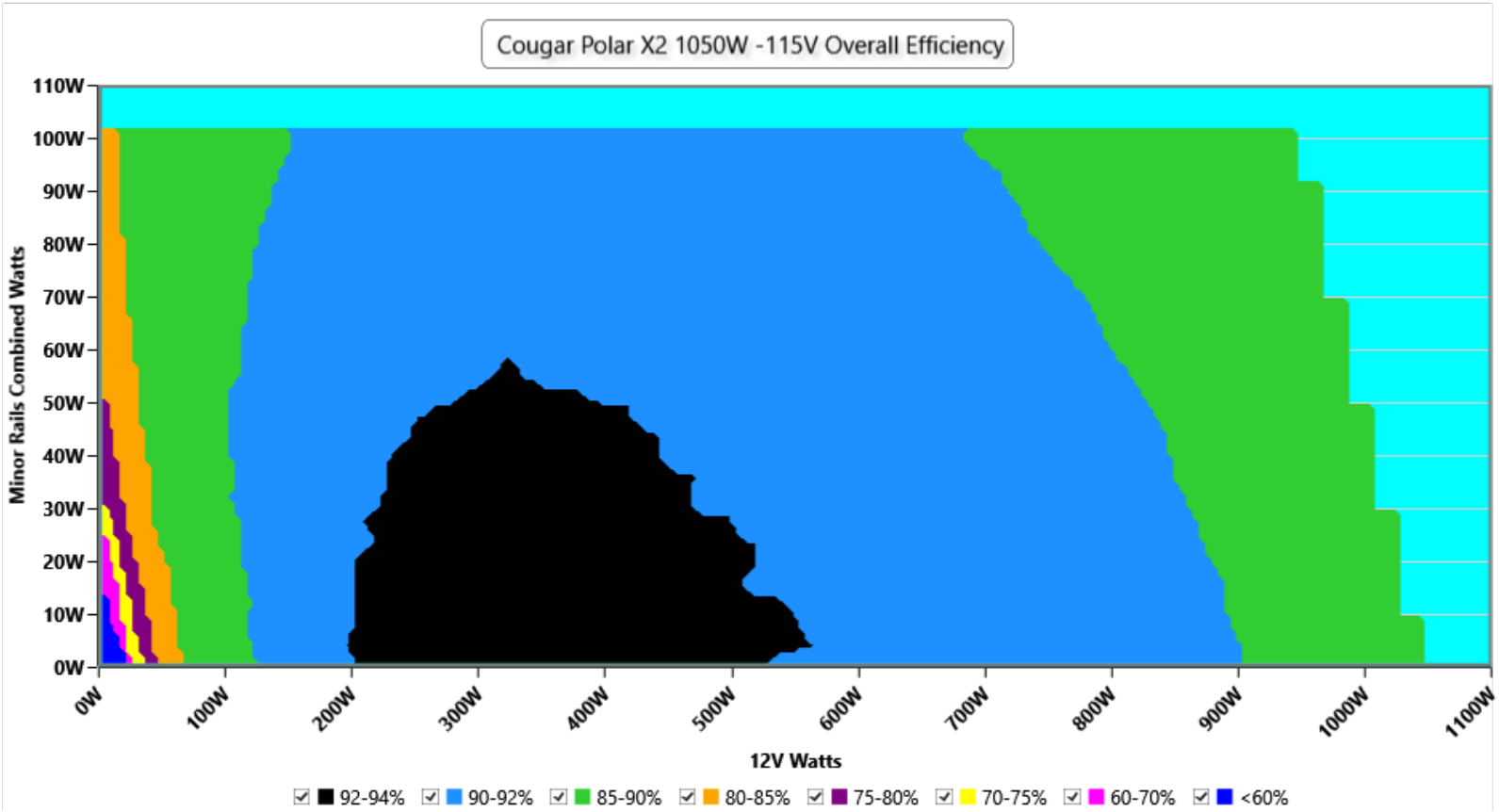
Detailed Results						
	Average	Min	Limit Min	Max	Limit Max	Result
Mains Voltage RMS:	114.88 V	114.81 V	113.85 V	114.95 V	116.15 V	PASS
Mains Frequency:	60.00 Hz	59.97 Hz	59.40 Hz	60.03 Hz	60.60 Hz	PASS
Mains Voltage CF:	1.419	1.417	1.340	1.421	1.490	PASS
Mains Voltage THD:	0.21 %	0.16 %	N/A	0.30 %	2.00 %	PASS
Real Power:	0.054 W	0.034 W	N/A	0.075 W	N/A	N/A
Apparent Power:	6.869 W	6.834 W	N/A	6.910 W	N/A	N/A
Power Factor:	0.009	N/A	N/A	N/A	N/A	N/A

230V

Detailed Results						
	Average	Min	Limit Min	Max	Limit Max	Result
Mains Voltage RMS:	229.78 V	229.72 V	227.70 V	229.87 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:	0.17 %	0.14 %	N/A	0.22 %	2.00 %	PASS
Real Power:	0.091 W	0.053 W	N/A	0.149 W	N/A	N/A
Apparent Power:	24.102 W	24.043 W	N/A	24.182 W	N/A	N/A
Power Factor:	0.004	N/A	N/A	N/A	N/A	N/A

Efficiency Graph

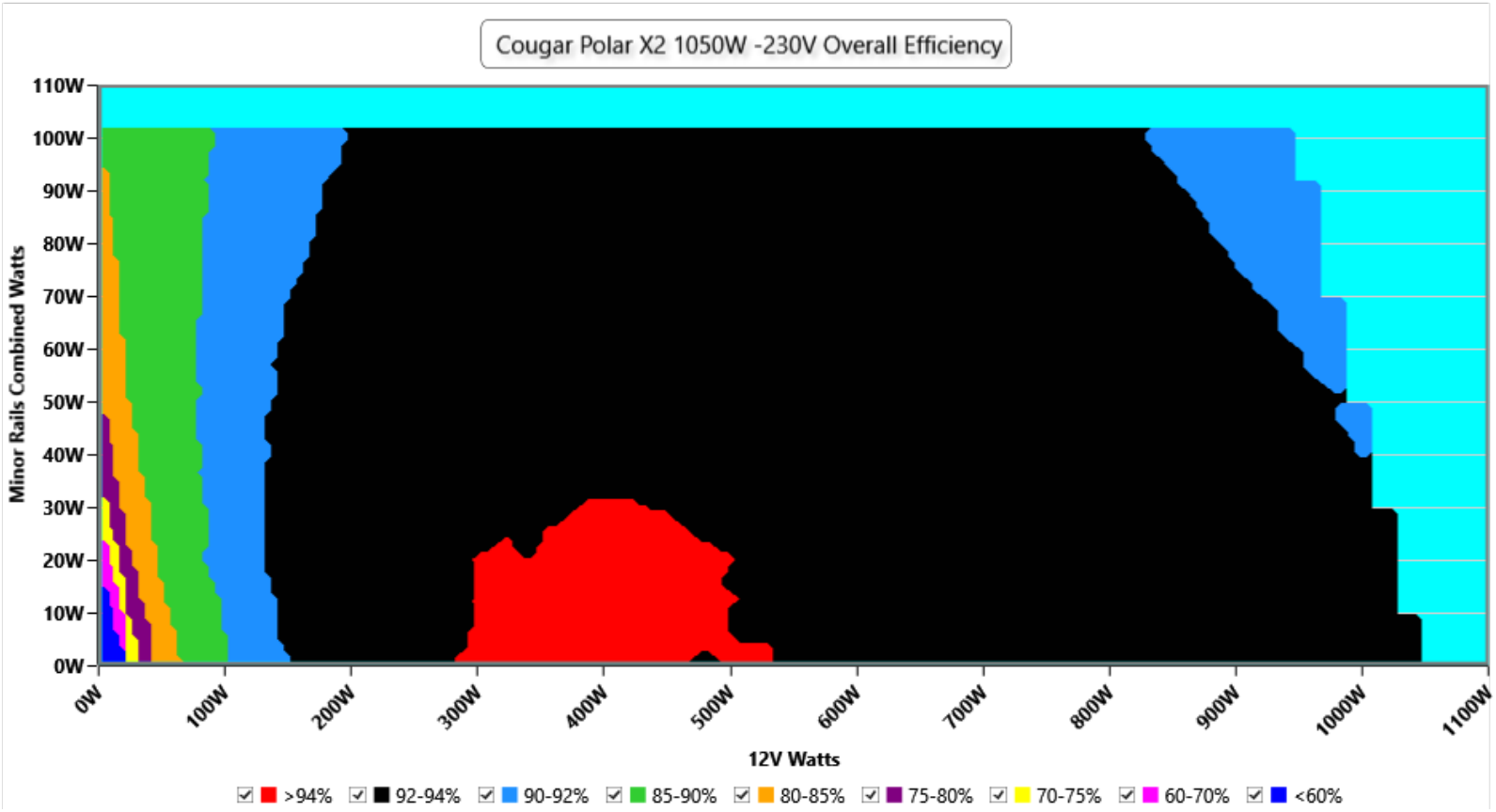
115V



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

230V



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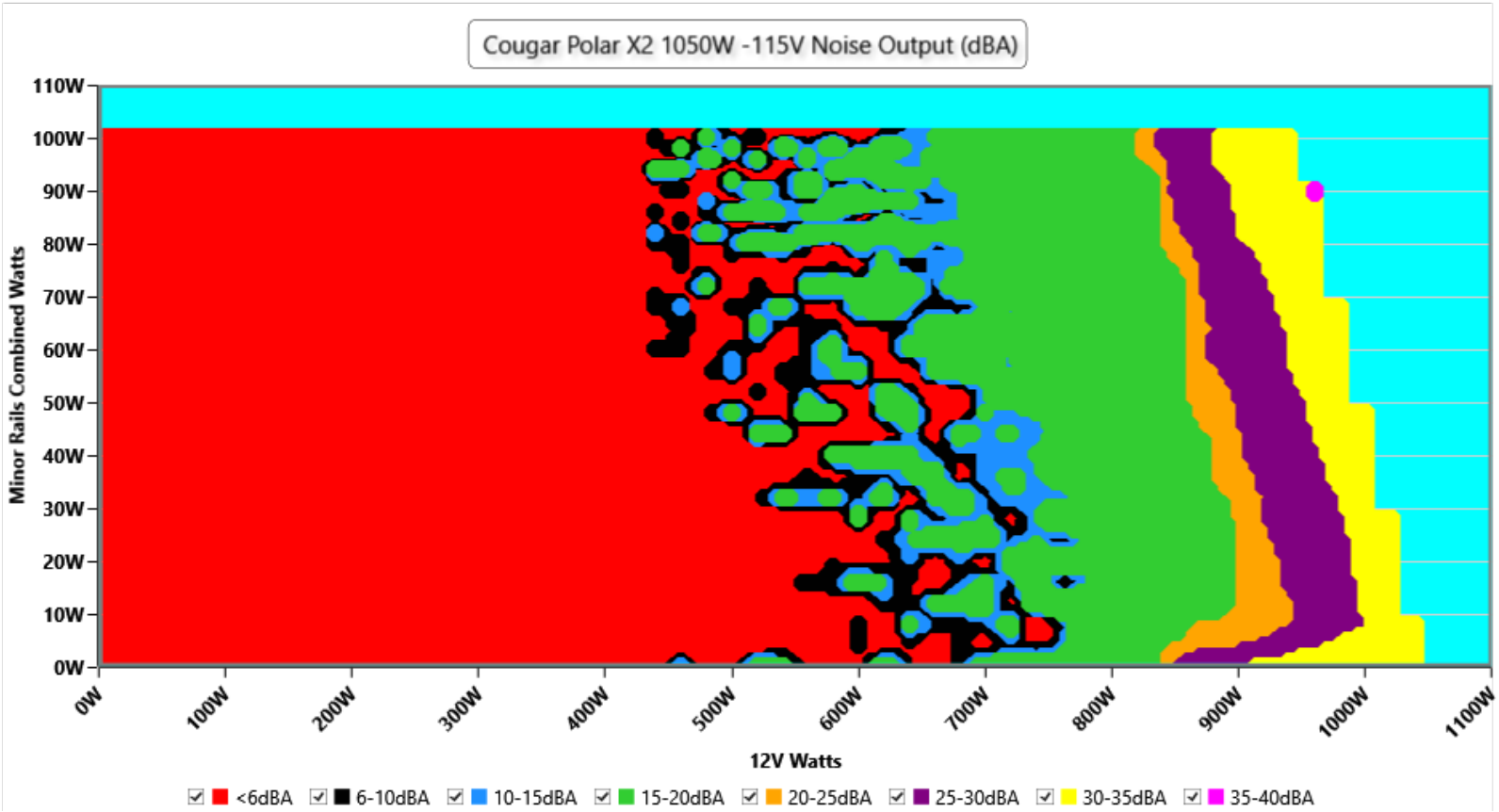
Noise Graph

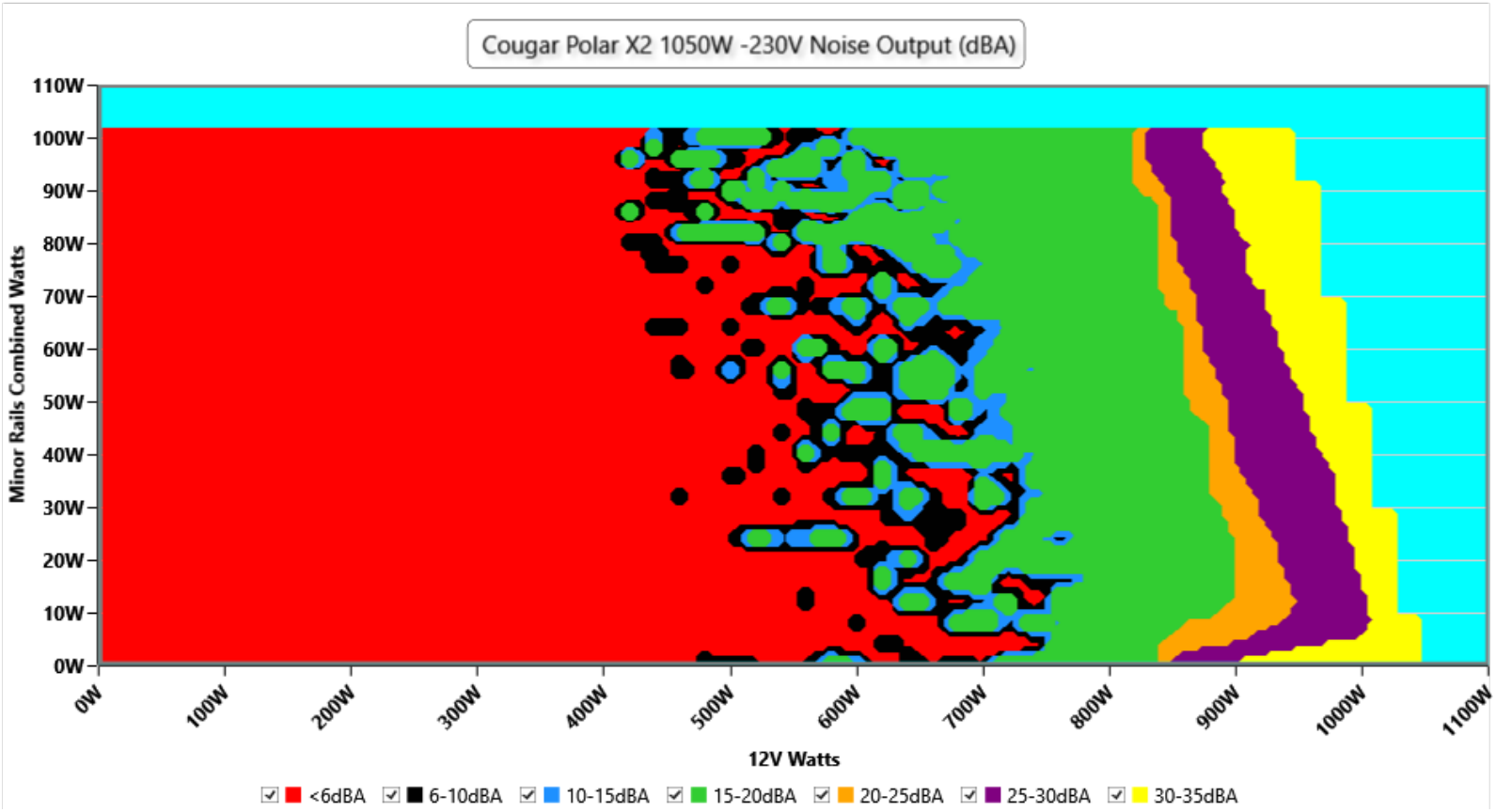
115V



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

230V



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

Noise under high ambient temperature (indicative)

115V

Load	Normal ambient fan · noise · intake	High ambient fan · noise · intake	Noise change
10%	0 RPM · <6.0 dB(A) · 44.3 °C	0 RPM · <6.0 dB(A) · 44.3 °C	fan off in both
20%	0 RPM · <6.0 dB(A) · 45.3 °C	0 RPM · <6.0 dB(A) · 45.3 °C	fan off in both
50%	0 RPM · <6.0 dB(A) · 48.4 °C	0 RPM · <6.0 dB(A) · 48.4 °C	fan off in both
100%	1711 RPM · 45.3 dB(A) · 45.2 °C	1711 RPM · 45.3 dB(A) · 45.2 °C	**+0.0 dB(A)**

230V

Load	Normal ambient fan · noise · intake	High ambient fan · noise · intake	Noise change
10%	0 RPM · <6.0 dB(A) · 44.4 °C	0 RPM · <6.0 dB(A) · 44.4 °C	fan off in both
20%	0 RPM · <6.0 dB(A) · 45.4 °C	0 RPM · <6.0 dB(A) · 45.4 °C	fan off in both
50%	0 RPM · <6.0 dB(A) · 48.4 °C	0 RPM · <6.0 dB(A) · 48.4 °C	fan off in both
100%	1712 RPM · 45.4 dB(A) · 45.0 °C	1712 RPM · 45.4 dB(A) · 45.0 °C	**+0.0 dB(A)**

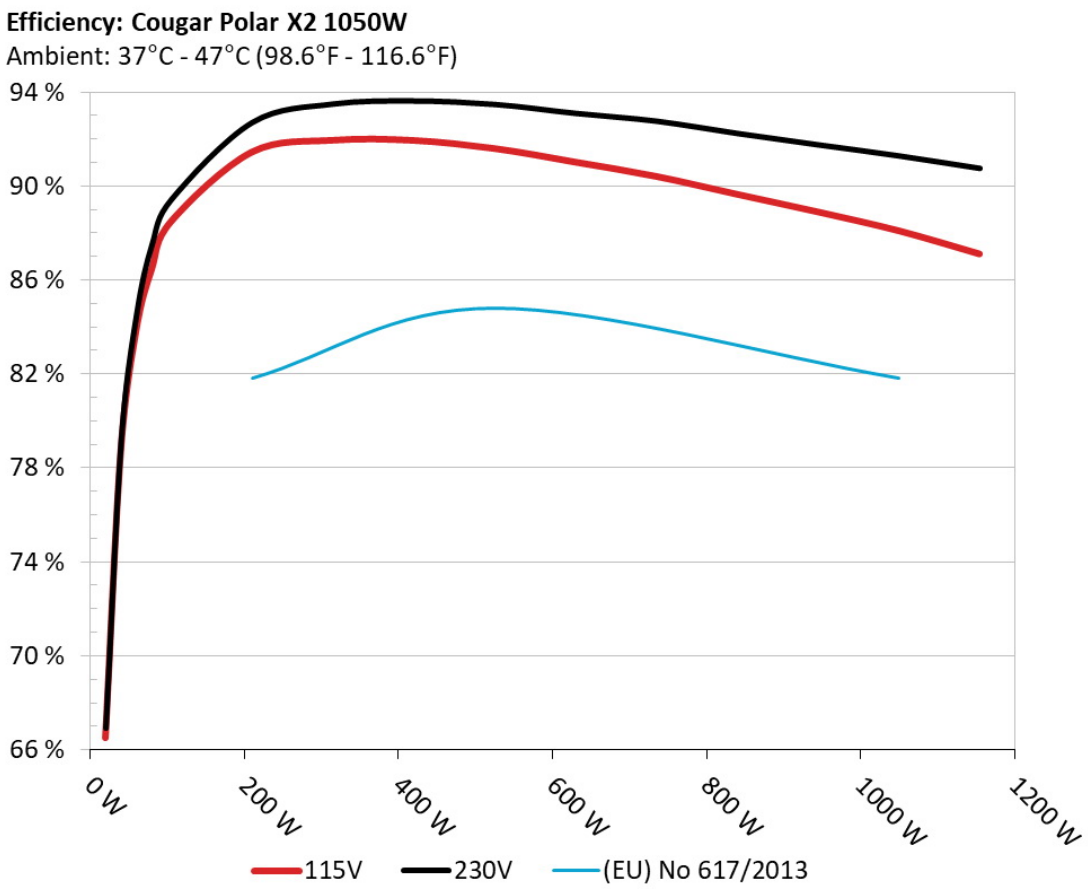
INFO

Fan speed, noise and the measured intake temperature at 10, 20, 50 and 100 % load, from the two load regulation tests: at normal ambient (about 30-32 °C) and at high ambient (about 40-47 °C). These are stabilized readings at fixed loads, not averages over the certification sweep, so they are indicative of how the fan behaves when it is hot. "<6.0" is the floor of our sound meter: the fan is stopped or too quiet to measure (the fan speed column says which); with the fan stopped, the intake sensor can read higher than the chamber air.

Informational. Not part of the ETA or LAMBDA rating.

Indicative Performance

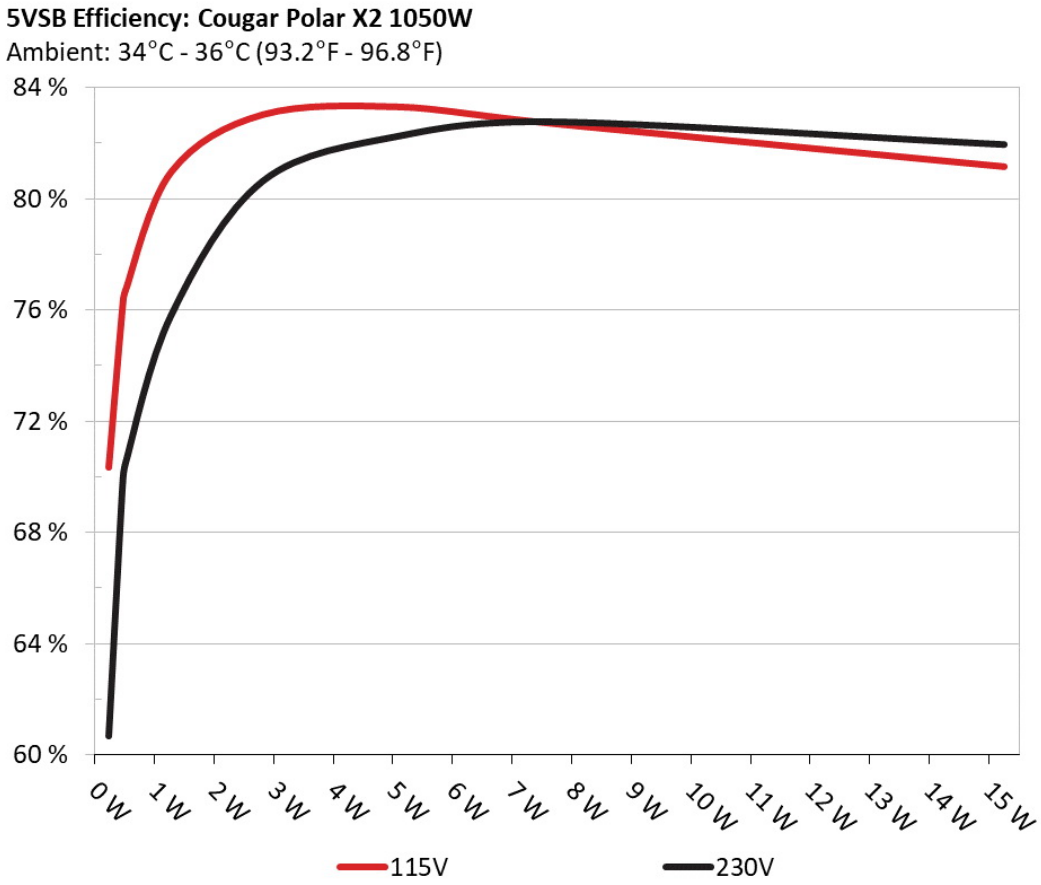
Efficiency under high ambient temperature



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

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

115V

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.231W	69.858%	0.05
	5.135V	0.331W		114.89V
2	0.09A	0.462W	75.616%	0.09
	5.134V	0.611W		114.88V
3	0.55A	2.819W	82.525%	0.324
	5.126V	3.416W		114.88V
4	1A	5.118W	82.799%	0.395
	5.118V	6.181W		114.88V
5	1.5A	7.664W	82.207%	0.439
	5.11V	9.323W		114.87V
6	3A	15.244W	80.657%	0.492
	5.082V	18.9W		114.88V

230V

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.231W	60.168%	0.017
	5.135V	0.385W		229.77V
2	0.09A	0.462W	69.2%	0.029
	5.134V	0.668W		229.78V
3	0.55A	2.819W	80.152%	0.141
	5.126V	3.517W		229.77V
4	1A	5.118W	81.772%	0.221
	5.118V	6.259W		229.78V
5	1.5A	7.664W	82.279%	0.274
	5.109V	9.315W		229.78V
6	3A	15.246W	81.462%	0.369
	5.083V	18.715W		229.77V

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%	6.838A	1.99A	1.98A	0.978A	104.926	88.69%	0	<6.0	44.32°C	0.957
	12.186V	5.025V	3.332V	5.114V	118.306				40.1°C	114.83V
20%	14.680A	2.985A	2.973A	1.175A	209.908	91.654%	0	<6.0	45.31°C	0.973
	12.194V	5.024V	3.33V	5.105V	229.02				40.68°C	114.78V
30%	22.872A	3.484A	3.471A	1.374A	314.905	92.159%	0	<6.0	46.29°C	0.977
	12.192V	5.022V	3.327V	5.096V	341.702				41.29°C	114.74V
40%	31.022A	3.983A	3.97A	1.573A	419.401	92.152%	0	<6.0	47.39°C	0.977
	12.191V	5.021V	3.324V	5.087V	455.119				41.99°C	114.71V
50%	38.902A	4.981A	4.967A	1.773A	524.753	91.808%	0	<6.0	48.41°C	0.981
	12.191V	5.019V	3.322V	5.078V	571.572				42.4°C	114.67V
60%	46.711A	5.979A	5.966A	1.973A	629.297	91.232%	586	14.1	42.6°C	0.984
	12.192V	5.018V	3.319V	5.068V	689.781				49.21°C	114.64V
70%	54.595A	6.976A	6.965A	2.175A	734.64	90.621%	849	25.0	43.33°C	0.986
	12.190V	5.017V	3.317V	5.058V	810.666				50.43°C	114.6V
80%	62.489A	7.975A	7.965A	2.277A	839.474	89.862%	1233	35.8	43.65°C	0.988
	12.187V	5.016V	3.314V	5.05V	934.182				51.73°C	114.56V
90%	70.784A	8.474A	8.455A	2.38A	944.862	89.107%	1695	45.0	44.23°C	0.989
	12.184V	5.015V	3.311V	5.042V	1060.368				53.26°C	114.53V
100%	78.811A	8.976A	8.976A	2.984A	1049.707	88.304%	1711	45.3	45.16°C	0.99
	12.182V	5.013V	3.309V	5.026V	1188.746				55.25°C	114.48V
110%	86.693A	9.98A	10.074A	2.989A	1154.338	87.318%	1725	45.7	46.6°C	0.99
	12.181V	5.01V	3.305V	5.019V	1322				57.52°C	114.45V
CL1	0.114A	11.996A	11.931A	0A	101.292	83.865%	0	<6.0	45.39°C	0.959
	12.197V	5.019V	3.327V	5.123V	120.791				39.9°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	20.006A	0A	0A	101.326	82.216%	465	7.9	41.15°C	0.96
	12.200V	4.996V	3.335V	5.127V	123.24				48.16°C	114.81V
CL3	0.113A	0A	19.922A	0A	67.381	76.169%	0	<6.0	51.65°C	0.944
	12.200V	5.019V	3.313V	5.122V	88.463				42.63°C	114.83V
CL4	86.117A	0A	0A	0A	1049.469	88.889%	1706	45.2	45°C	0.99
	12.186V	5.01V	3.313V	5.082V	1180.656				55.98°C	114.49V

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%	6.836A	1.99A	1.98A	0.978A	104.926	89.637%	0	<6.0	44.36°C	0.87
	12.190V	5.024V	3.333V	5.114V	117.059				40.13°C	229.84V
20%	14.677A	2.986A	2.973A	1.175A	209.908	92.917%	0	<6.0	45.39°C	0.928
	12.197V	5.023V	3.33V	5.105V	225.912				40.67°C	229.82V
30%	22.866A	3.484A	3.471A	1.374A	314.911	93.704%	0	<6.0	46.51°C	0.952
	12.195V	5.022V	3.327V	5.096V	336.078				41.42°C	229.81V
40%	31.016A	3.984A	3.97A	1.573A	419.403	93.833%	0	<6.0	47.35°C	0.961
	12.194V	5.02V	3.324V	5.087V	446.969				41.82°C	229.78V
50%	38.897A	4.981A	4.968A	1.773A	524.76	93.687%	0	<6.0	48.36°C	0.967
	12.193V	5.019V	3.321V	5.077V	560.124				42.44°C	229.77V
60%	46.712A	5.978A	5.965A	1.974A	629.322	93.31%	627	16.3	42.57°C	0.971
	12.192V	5.019V	3.32V	5.067V	674.451				49.14°C	229.76V
70%	54.600A	6.976A	6.965A	2.175A	734.657	92.974%	898	26.7	43.27°C	0.974
	12.189V	5.017V	3.317V	5.058V	790.177				50.3°C	229.74V
80%	62.497A	7.975A	7.965A	2.277A	839.503	92.453%	1348	38.5	43.69°C	0.976
	12.186V	5.016V	3.314V	5.05V	908.034				51.77°C	229.72V
90%	70.787A	8.474A	8.454A	2.38A	944.892	91.965%	1696	45.0	44.4°C	0.979
	12.183V	5.015V	3.312V	5.042V	1027.445				53.47°C	229.7V

Test	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
100%	78.813A	8.976A	8.976A	2.984A	1049.734	91.496%	1712	45.4	45.02°C	0.98
	12.181V	5.013V	3.309V	5.026V	1147.305				55.04°C	229.68V
110%	86.699A	9.98A	10.074A	2.989A	1154.352	90.965%	1724	45.6	46.52°C	0.981
	12.180V	5.01V	3.305V	5.019V	1269.012				57.42°C	229.66V
CL1	0.114A	11.997A	11.931A	0A	101.295	85.104%	379	<6.0	40.42°C	0.872
	12.196V	5.018V	3.327V	5.123V	119.024				45.96°C	229.83V
CL2	0.113A	20.009A	0A	0A	101.329	83.061%	0	<6.0	47.78°C	0.874
	12.200V	4.995V	3.335V	5.127V	121.993				40.7°C	229.83V
CL3	0.113A	0A	19.923A	0A	67.382	77%	375	<6.0	41.6°C	0.841
	12.199V	5.019V	3.313V	5.122V	87.507				50.62°C	229.85V
CL4	86.140A	0A	0A	0A	1049.525	92%	1707	45.3	44.41°C	0.98
	12.184V	5.012V	3.314V	5.082V	1140.785				55.37°C	229.68V

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	1.216A	0.497A	0.494A	0.195A	19.988	66.717%	0	<6.0	39.61°C	0.881
	12.202V	5.025V	3.337V	5.133V	29.96				36.53°C	114.85V
40W	2.681A	0.696A	0.692A	0.292A	39.989	78.955%	0	<6.0	40.31°C	0.921
	12.189V	5.025V	3.336V	5.13V	50.646				37.03°C	114.85V
60W	4.146A	0.895A	0.89A	0.39A	59.988	84.108%	0	<6.0	42.69°C	0.938
	12.186V	5.025V	3.335V	5.127V	71.331				38.95°C	114.84V
80W	5.604A	1.094A	1.089A	0.488A	79.918	86.66%	0	<6.0	43.22°C	0.946
	12.186V	5.026V	3.334V	5.124V	92.228				39.31°C	114.83V

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	1.215A	0.497A	0.494A	0.195A	19.987	67.141%	0	<6.0	39.92°C	0.625
	12.214V	5.025V	3.337V	5.132V	29.772				36.85°C	229.85V
40W	2.680A	0.697A	0.692A	0.292A	39.989	79.4%	0	<6.0	34.67°C	0.75
	12.196V	5.025V	3.336V	5.13V	50.366				37.99°C	229.85V
60W	4.144A	0.895A	0.89A	0.39A	59.989	84.771%	0	<6.0	41.82°C	0.811
	12.190V	5.024V	3.335V	5.127V	70.767				38.36°C	229.84V
80W	5.602A	1.094A	1.088A	0.488A	79.918	87.729%	0	<6.0	42.87°C	0.845
	12.189V	5.025V	3.334V	5.124V	91.097				39.03°C	229.84V

The results above are not used in the certification process

Ripple Measurements

115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	15.09mV	9.14mV	9.13mV	9.29mV	Pass
20% Load	35.70mV	10.98mV	9.54mV	9.23mV	Pass
30% Load	34.83mV	9.60mV	9.80mV	9.44mV	Pass
40% Load	32.02mV	9.70mV	9.54mV	10.37mV	Pass
50% Load	32.38mV	11.08mV	10.00mV	10.32mV	Pass
60% Load	31.10mV	11.44mV	10.82mV	11.19mV	Pass
70% Load	26.75mV	11.29mV	10.67mV	11.49mV	Pass
80% Load	27.93mV	12.83mV	13.64mV	11.80mV	Pass
90% Load	28.28mV	14.16mV	13.75mV	12.27mV	Pass
100% Load	43.53mV	15.69mV	14.89mV	14.69mV	Pass
110% Load	46.21mV	16.90mV	15.89mV	14.35mV	Pass
Crossload1	13.87mV	12.24mV	14.25mV	12.92mV	Pass
Crossload2	11.51mV	21.35mV	14.83mV	11.91mV	Pass

Test	12V	5V	3.3V	5VSB	Pass/Fail
Crossload3	9.72mV	9.45mV	16.21mV	11.90mV	Pass
Crossload4	43.09mV	13.42mV	11.30mV	16.18mV	Pass

The results above are not used in the certification process

230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	9.16mV	9.39mV	8.98mV	8.77mV	Pass
20% Load	41.89mV	9.19mV	9.39mV	9.03mV	Pass
30% Load	36.01mV	9.44mV	9.13mV	9.34mV	Pass
40% Load	33.91mV	9.80mV	9.90mV	10.57mV	Pass
50% Load	33.86mV	10.52mV	10.57mV	11.39mV	Pass
60% Load	33.20mV	11.24mV	9.90mV	11.60mV	Pass
70% Load	29.26mV	11.60mV	11.39mV	12.01mV	Pass
80% Load	29.16mV	12.11mV	14.00mV	11.70mV	Pass
90% Load	44.40mV	33.87mV	40.74mV	35.40mV	Pass
100% Load	44.27mV	16.08mV	15.27mV	15.95mV	Pass
110% Load	46.04mV	16.51mV	15.49mV	14.73mV	Pass
Crossload1	14.17mV	12.83mV	15.17mV	12.34mV	Pass
Crossload2	12.22mV	20.94mV	14.93mV	12.21mV	Pass
Crossload3	9.26mV	9.34mV	15.70mV	12.06mV	Pass
Crossload4	43.81mV	14.21mV	11.05mV	16.24mV	Pass

The results above are not used in the certification process

Cougar Polar X2 1050W



Top side



Power specifications label

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