

Anex

XPG Core Reactor 650W

Lab ID#: AD19650116
 Receipt Date: Sep 9, 2019
 Test Date: Sep 26, 2019

Report: 20PS850A

Report Date: Sep 28, 2019

DUT INFORMATION

Brand	XPG
Manufacturer (OEM)	Channel Well Technology
Series	Core Reactor Gold
Model Number	
Serial Number	
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	120mm Fluid Dynamic Bearing Fan (HA1225H12F-Z)
Semi-Passive Operation	X
Cable Design	Fully Modular

TEST EQUIPMENT

Electronic Loads	Chroma 63601-5 x4 Chroma 63600-2 x2 63640-80-80 x20 63610-80-20 x2
AC Sources	Chroma 6530, Keysight AC6804B
Power Analyzers	N4L PPA1530 x2
Sound Analyzer	Bruel & Kjaer 2270 G4
Microphone	Bruel & Kjaer Type 4955-A
Data Loggers	Picoscope TC-08 x2, Labjack U3-HV x2
Tachometer	UNI-T UT372 x2
Digital Multimeter	Keysight U1273AX, Fluke 289, Keithley 2015 - THD
UPS	CyberPower OLS3000E 3kVA x2
Transformer	3kVA x2

All data and graphs included in this test report can be used by any individual on the following conditions:

- > It should be mentioned that the test results are provided by Cybenetics
- > The link to the original test results document should be provided in any case

PAGE 1/17

Anex

XPG Core Reactor 650W

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	✓

115V

Average Efficiency	89.455%
Efficiency With 10W (≤500W) or 2% (>500W)	73.209
Average Efficiency 5VSB	79.675%
Standby Power Consumption (W)	0.0362335
Average PF	0.987
Avg Noise Output	22.65 dB(A)
Efficiency Rating (ETA)	PLATINUM
Noise Rating (LAMBDA)	A

230V

Average Efficiency	91.334%
Average Efficiency 5VSB	79.129%
Standby Power Consumption (W)	0.0558775
Average PF	0.951
Avg Noise Output	23.23 dB(A)
Efficiency Rating (ETA)	PLATINUM
Noise Rating (LAMBDA)	A

POWER SPECIFICATIONS

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	20	20	54.1	3	0.3
	Watts	110		650	15	3.6
Total Max. Power (W)		650				

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

Hold-Up Time (ms)	20.4
AC Loss to PWR_OK Hold Up Time (ms)	18.8
PWR_OK Inactive to DC Loss Delay (ms)	1.6

All data and graphs included in this test report can be used by any individual on the following conditions:

- > It should be mentioned that the test results are provided by Cybenetics
- > The link to the original test results document should be provided in any case

CABLES AND CONNECTORS

Modular Cables

Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors
ATX connector 20+4 pin (650mm)	1	1	16-20AWG	No
8 pin EPS12V (650mm) / 4+4 pin EPS12V (+150mm)	1	2	16-18AWG	No
6+2 pin PCIe (650mm+150mm)	2	4	16-18AWG	No
SATA (500mm+145mm+145mm+145mm)	3	12	18AWG	No
4-pin Molex (500mm+150mm+150mm+150mm)	1	4	18AWG	No

All data and graphs included in this test report can be used by any individual on the following conditions:

- > It should be mentioned that the test results are provided by Cybenetics
- > The link to the original test results document should be provided in any case

Anex

XPG Core Reactor 650W

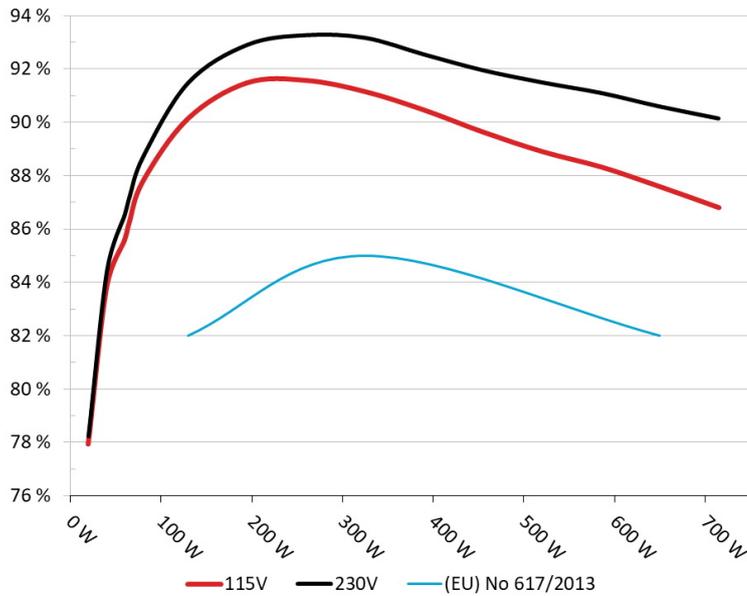
General Data	
Manufacturer (OEM)	CWT
PCB Type	Double Sided
Primary Side	
Transient Filter	4x Y caps, 2x X caps, 2x CM chokes, 1x MOV
Inrush Protection	NTC Thermistor & Relay
Bridge Rectifier(s)	1x GBU1006 (600V, 10A @ 100°C)
APFC MOSFETS	2x Infineon IPA60R190P6 (600V, 12.7A @ 100°C, 0.190Ohm) & 1x SPN5003 FET (for reduced no-load consumption)
APFC Boost Diode	1x CREE C3D06060A (600V, 6A @ 154°C)
Hold-up Cap(s)	1x Nippon Chemi-Con (420V, 470uF, 2,000h @ 105°C, KMQ)
Main Switchers	2x Infineon IPA60R190P6 (600V, 12.7A @ 100°C, 0.190Ohm)
APFC Controller	Champion CM6500UNX
Resonant Controllers	Champion CU6901V
Topology	Primary side: Half-Bridge & LLC converter Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	
+12V MOSFETS	4x Intentional Rectifier IRFH7004PBF (40V, 164A @ 100°C, 1.4mOhm)
5V & 3.3V	DC-DC Converters: 2x UBIQ QM3054M6 (30V, 61A @ 100°C, 4.8mOhm) & 2x UBIQ QN3107M6N (30V, 70A @ 100°C, 2.6mOhm) PWM Controllers: ANPEC APW7159C
Filtering Capacitors	Electrolytics: 8x Nippon Chemi-Con (4-10,000h @ 105°C, KY), 2x Nippon Chemi-Con (105°C, W), 1x Nippon Chemi-Con (1-5,000h @ 105°C, KZE), 1x Rubycon (4-10,000h @ 105°C, YXJ) Polymers: 24x FPCAP
Supervisor IC	Weltrend WT7502 (OVP, UVP, PG, SCP)
Fan Model	Hong Hua HA1225H12F-Z (120mm, 12V, 0.58A, Fluid Dynamic Bearing Fan)
5VSB Circuit	
Rectifier	1x Galaxy Microelectronics D10PS45L SBR (45V, 10A) & InPower Semiconductor ISD04N65A (650V, 4A, 2.5Ohm)
Standby PWM Controller	On-Bright OB5282CP

All data and graphs included in this test report can be used by any individual on the following conditions:

- > It should be mentioned that the test results are provided by Cybenetics
- > The link to the original test results document should be provided in any case

EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE

Efficiency: XPG Core Reactor 650
Ambient: 37°C - 47°C (98.6°F - 116.6°F)

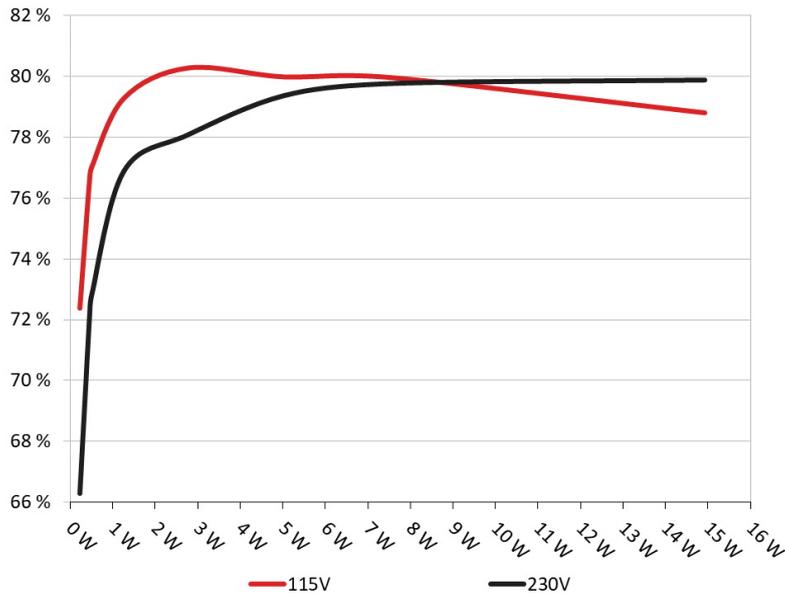


INFO

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: XPG Core Reactor 650
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

All data and graphs included in this test report can be used by any individual on the following conditions:

- > It should be mentioned that the test results are provided by Cybenetics
- > The link to the original test results document should be provided in any case

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.228	72.381%	0.032
	5.053V	0.315		115.13V
2	0.090A	0.455	76.599%	0.059
	5.053V	0.594		115.13V
3	0.550A	2.773	80.284%	0.255
	5.040V	3.454		115.13V
4	1.000A	5.029	79.990%	0.341
	5.028V	6.287		115.13V
5	1.500A	7.522	79.970%	0.389
	5.014V	9.406		115.13V
6	3.000A	14.917	78.809%	0.452
	4.972V	18.928		115.13V

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.228	66.279%	0.010
	5.054V	0.344		230.27V
2	0.090A	0.455	72.108%	0.019
	5.053V	0.631		230.27V
3	0.550A	2.773	78.069%	0.099
	5.040V	3.552		230.27V
4	1.000A	5.028	79.356%	0.163
	5.027V	6.336		230.27V
5	1.500A	7.522	79.750%	0.217
	5.014V	9.432		230.27V
6	3.000A	14.916	79.867%	0.314
	4.972V	18.676		230.27V

All data and graphs included in this test report can be used by any individual on the following conditions:

- > It should be mentioned that the test results are provided by Cybenetics
- > The link to the original test results document should be provided in any case

Anex

XPG Core Reactor 650W

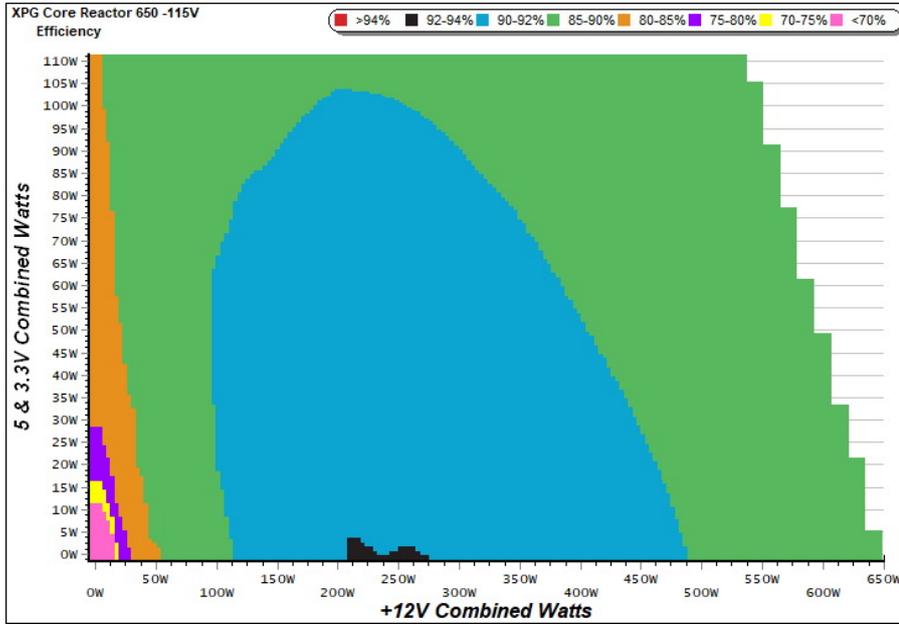
115V

All data and graphs included in this test report can be used by any individual on the following conditions:

- > It should be mentioned that the test results are provided by Cybenetics
- > The link to the original test results document should be provided in any case

PAGE 7/17

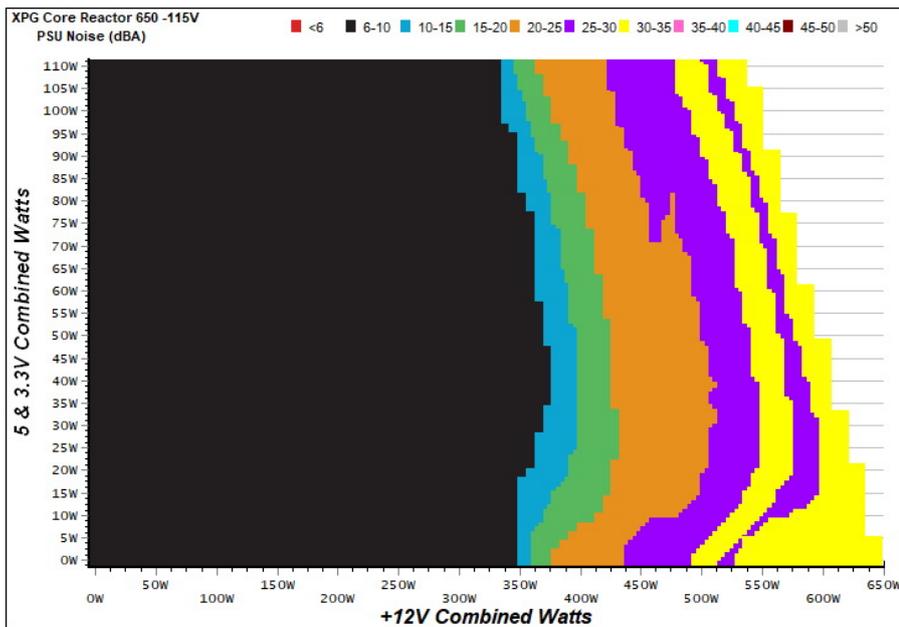
EFFICIENCY GRAPH 115V



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

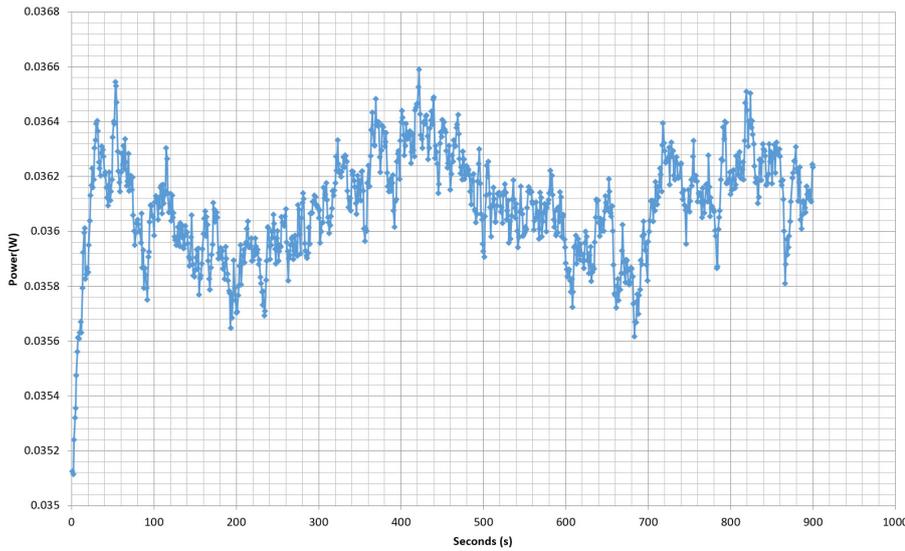
The PSU's noise in its entire operational range and under 30-32 °C ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails

All data and graphs included in this test report can be used by any individual on the following conditions:

- > It should be mentioned that the test results are provided by Cybenetics
- > The link to the original test results document should be provided in any case

VAMPIRE POWER -115V

Power - 25/09/2019 - 10:49



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

All data and graphs included in this test report can be used by any individual on the following conditions:

- > It should be mentioned that the test results are provided by Cybenetics
- > The link to the original test results document should be provided in any case

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
1	3.561A	1.988A	1.991A	0.998A	64.949	86.256%	658	10.0	40.02°C	0.963
	12.173V	5.032V	3.312V	5.012V	75.298				44.79°C	115.13V
2	8.152A	2.983A	2.990A	1.199A	129.460	90.137%	661	10.1	40.31°C	0.987
	12.090V	5.030V	3.309V	5.007V	143.626				45.52°C	115.13V
3	13.133A	3.482A	3.477A	1.400A	194.559	91.484%	663	10.2	41.03°C	0.989
	12.073V	5.028V	3.306V	5.001V	212.671				46.72°C	115.13V
4	18.121A	3.980A	3.996A	1.602A	259.782	91.577%	666	10.3	41.87°C	0.991
	12.062V	5.026V	3.304V	4.994V	283.676				48.30°C	115.13V
5	22.777A	4.980A	4.999A	1.805A	325.069	91.154%	948	19.3	42.13°C	0.992
	12.054V	5.023V	3.300V	4.988V	356.614				49.56°C	115.13V
6	27.379A	5.979A	6.006A	2.008A	389.586	90.469%	1177	26.4	42.65°C	0.991
	12.045V	5.019V	3.296V	4.981V	430.627				50.67°C	115.13V
7	32.037A	6.982A	7.017A	2.212A	454.917	89.639%	1439	32.2	43.03°C	0.991
	12.042V	5.015V	3.293V	4.975V	507.498				51.44°C	115.12V
8	36.535A	7.984A	8.026A	2.417A	520.247	88.908%	1816	38.8	43.64°C	0.992
	12.093V	5.012V	3.290V	4.968V	585.152				52.69°C	115.12V
9	41.608A	8.489A	8.523A	2.417A	585.156	88.330%	1953	41.1	44.64°C	0.993
	12.080V	5.009V	3.286V	4.966V	662.466				54.80°C	115.12V
10	46.425A	8.994A	9.048A	3.032A	649.988	87.592%	2088	42.5	45.38°C	0.993
	12.068V	5.006V	3.283V	4.948V	742.066				56.41°C	115.12V
11	51.823A	8.994A	9.054A	3.033A	714.814	86.809%	2312	46.0	46.52°C	0.993
	12.062V	5.005V	3.281V	4.947V	823.434				58.09°C	115.12V
CL1	0.152A	13.004A	13.001A	0.000A	109.974	84.493%	1014	21.6	42.38°C	0.984
	12.118V	5.019V	3.297V	5.051V	130.158				49.46°C	115.14V
CL2	54.186A	1.004A	1.001A	1.000A	667.196	88.092%	2155	43.3	45.66°C	0.993
	12.067V	5.020V	3.296V	4.994V	757.382				56.51°C	115.12V

All data and graphs included in this test report can be used by any individual on the following conditions:

- > It should be mentioned that the test results are provided by Cybenetics
- > The link to the original test results document should be provided in any case

20-80W LOAD TESTS 115V

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	PF/AC Volts
1	1.205A	0.497A	0.483A	0.199A	19.641	77.947%	649	9.6	0.835
	12.064V	5.036V	3.315V	5.031V	25.198				115.13V
2	2.466A	0.993A	0.997A	0.398A	40.049	83.842%	649	9.6	0.932
	12.064V	5.032V	3.313V	5.024V	47.767				115.13V
3	3.627A	1.492A	1.480A	0.598A	59.552	85.579%	653	9.8	0.961
	12.170V	5.032V	3.312V	5.020V	69.587				115.13V
4	4.902A	1.988A	1.993A	0.798A	79.973	87.798%	655	9.9	0.976
	12.111V	5.032V	3.311V	5.016V	91.088				115.13V

RIPPLE MEASUREMENTS 115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	5.9 mV	5.3 mV	8.8 mV	3.7 mV	Pass
20% Load	15.8 mV	5.1 mV	8.9 mV	3.4 mV	Pass
30% Load	9.7 mV	8.1 mV	16.4 mV	5.5 mV	Pass
40% Load	9.0 mV	7.1 mV	15.2 mV	5.0 mV	Pass
50% Load	9.4 mV	6.9 mV	12.4 mV	4.9 mV	Pass
60% Load	10.0 mV	7.4 mV	12.9 mV	5.7 mV	Pass
70% Load	11.1 mV	10.0 mV	20.9 mV	7.7 mV	Pass
80% Load	11.4 mV	9.9 mV	18.6 mV	7.9 mV	Pass
90% Load	11.8 mV	10.3 mV	18.2 mV	8.1 mV	Pass
100% Load	14.7 mV	8.6 mV	14.2 mV	7.4 mV	Pass
110% Load	15.5 mV	9.3 mV	14.5 mV	7.8 mV	Pass
Crossload 1	14.4 mV	7.3 mV	11.5 mV	4.9 mV	Pass
Crossload 2	14.2 mV	8.0 mV	12.0 mV	7.2 mV	Pass

All data and graphs included in this test report can be used by any individual on the following conditions:

- > It should be mentioned that the test results are provided by Cybenetics
- > The link to the original test results document should be provided in any case

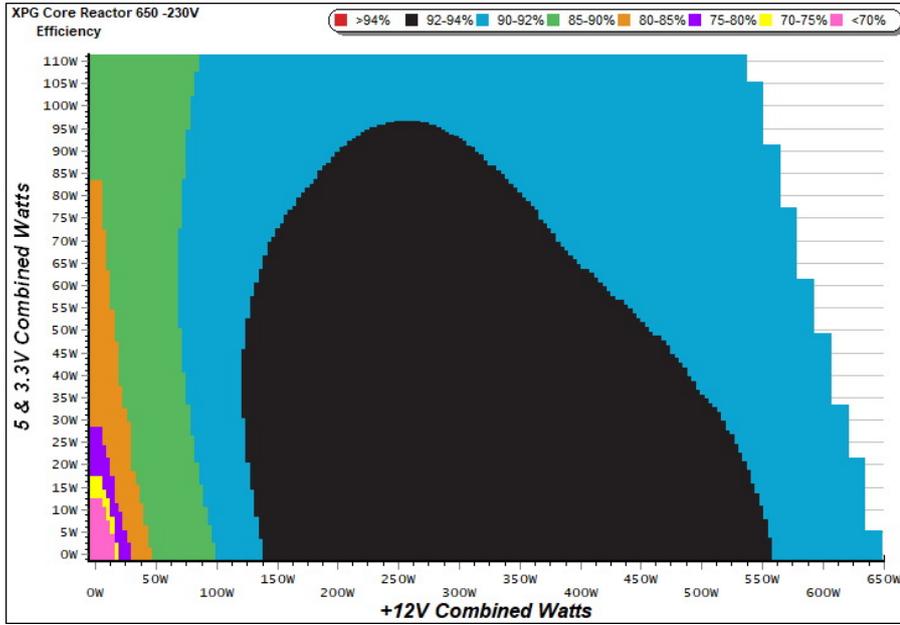
230V

All data and graphs included in this test report can be used by any individual on the following conditions:

- > It should be mentioned that the test results are provided by Cybenetics
- > The link to the original test results document should be provided in any case

PAGE 12/17

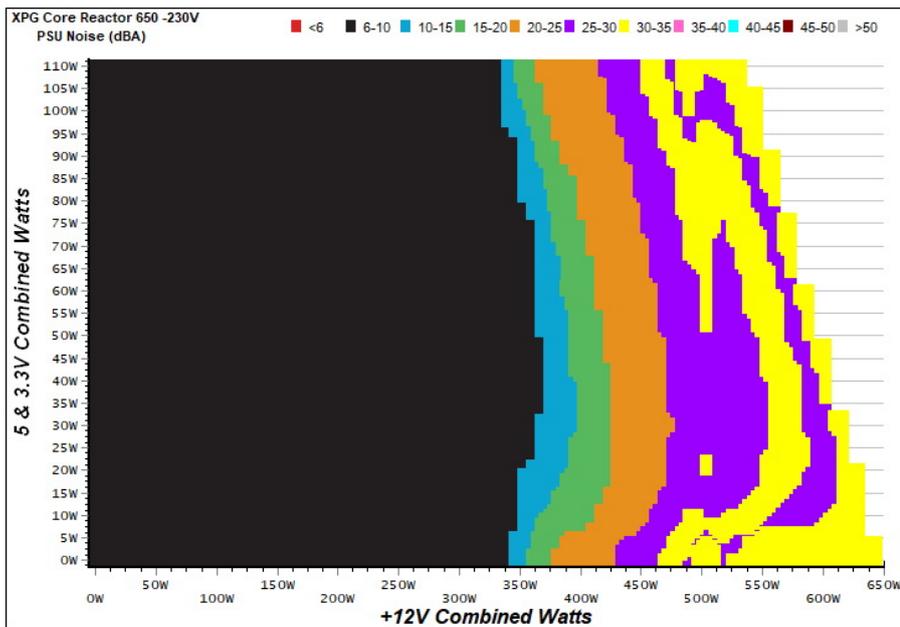
EFFICIENCY GRAPH 230V



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 230V



INFO

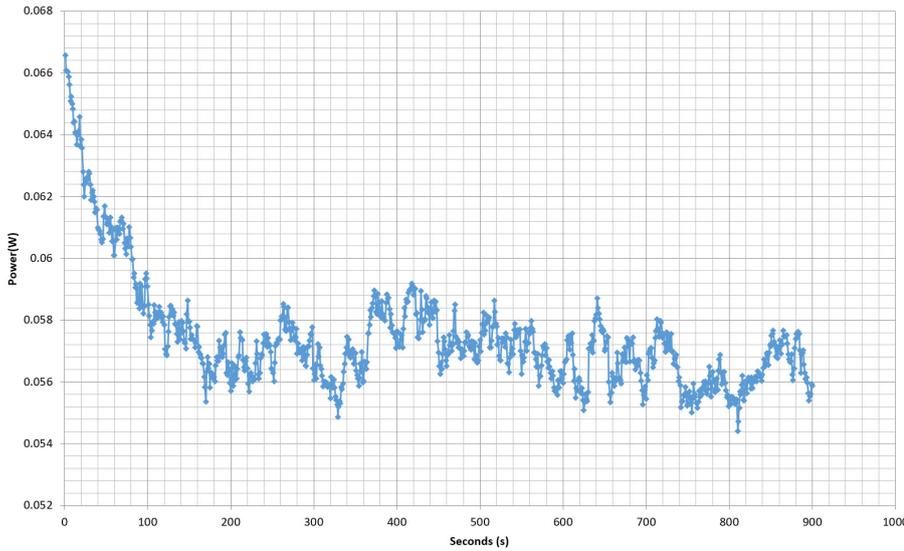
The PSU's noise in its entire operational range and under 30-32 °C ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails

All data and graphs included in this test report can be used by any individual on the following conditions:

- > It should be mentioned that the test results are provided by Cybenetics
- > The link to the original test results document should be provided in any case

VAMPIRE POWER -230V

Power - 25/09/2019 - 10:49



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

All data and graphs included in this test report can be used by any individual on the following conditions:

- > It should be mentioned that the test results are provided by Cybenetics
- > The link to the original test results document should be provided in any case

10-110% LOAD TESTS 230V

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
1	3.566A	1.989A	1.994A	0.998A	65.021	87.207%	659	10.1	40.03°C	0.796
	12.173V	5.032V	3.311V	5.011V	74.559				44.80°C	230.27V
2	8.155A	2.984A	2.993A	1.199A	129.526	91.463%	663	10.2	40.79°C	0.910
	12.092V	5.030V	3.309V	5.006V	141.616				45.90°C	230.27V
3	13.137A	3.482A	3.480A	1.400A	194.615	92.887%	666	10.3	41.23°C	0.946
	12.073V	5.028V	3.306V	5.000V	209.518				46.83°C	230.27V
4	18.124A	3.980A	3.997A	1.602A	259.836	93.252%	669	10.4	41.89°C	0.963
	12.063V	5.026V	3.303V	4.994V	278.638				48.01°C	230.27V
5	22.782A	4.980A	5.001A	1.805A	325.112	93.151%	752	12.9	42.55°C	0.971
	12.053V	5.023V	3.300V	4.988V	349.015				49.14°C	230.27V
6	27.384A	5.980A	6.009A	2.009A	389.639	92.531%	1159	25.9	42.63°C	0.977
	12.044V	5.019V	3.296V	4.981V	421.091				50.18°C	230.27V
7	32.046A	6.982A	7.017A	2.212A	454.950	91.938%	1421	31.8	43.00°C	0.980
	12.040V	5.015V	3.292V	4.974V	494.847				51.27°C	230.27V
8	36.552A	7.985A	8.028A	2.417A	520.264	91.481%	1747	38.2	43.46°C	0.982
	12.088V	5.011V	3.289V	4.967V	568.710				52.59°C	230.27V
9	41.616A	8.490A	8.522A	2.418A	585.164	91.089%	1918	40.4	44.55°C	0.984
	12.078V	5.008V	3.286V	4.965V	642.406				54.32°C	230.27V
10	46.421A	8.993A	9.049A	3.033A	649.989	90.580%	2134	43.0	45.60°C	0.985
	12.069V	5.006V	3.283V	4.948V	717.589				56.20°C	230.27V
11	51.823A	8.995A	9.053A	3.034A	714.821	90.133%	2306	46.0	46.78°C	0.986
	12.062V	5.005V	3.281V	4.947V	793.072				58.30°C	230.27V
CL1	0.152A	13.005A	13.001A	0.000A	109.977	85.482%	987	20.8	42.53°C	0.899
	12.117V	5.019V	3.297V	5.050V	128.655				49.30°C	230.27V
CL2	54.185A	1.003A	1.004A	1.000A	667.138	91.145%	2138	43.1	45.22°C	0.985
	12.066V	5.022V	3.296V	4.995V	731.952				56.21°C	230.26V

All data and graphs included in this test report can be used by any individual on the following conditions:

- > It should be mentioned that the test results are provided by Cybenetics
- > The link to the original test results document should be provided in any case

20-80W LOAD TESTS 230V

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	PF/AC Volts
1	1.212A	0.498A	0.484A	0.199A	19.732	78.236%	640	9.4	0.461
	12.063V	5.034V	3.314V	5.030V	25.221				230.27V
2	2.472A	0.995A	0.996A	0.398A	40.133	84.439%	648	9.6	0.670
	12.066V	5.032V	3.313V	5.024V	47.529				230.27V
3	3.634A	1.491A	1.480A	0.598A	59.633	86.527%	653	9.8	0.773
	12.170V	5.032V	3.312V	5.020V	68.918				230.28V
4	4.908A	1.988A	1.996A	0.798A	80.054	88.702%	657	9.9	0.844
	12.111V	5.031V	3.311V	5.016V	90.250				230.28V

RIPPLE MEASUREMENTS 230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	4.90mV	4.60mV	5.60mV	3.10mV	Pass
20% Load	17.20mV	5.00mV	6.40mV	3.00mV	Pass
30% Load	9.90mV	4.60mV	6.80mV	3.10mV	Pass
40% Load	9.00mV	6.70mV	16.30mV	5.60mV	Pass
50% Load	8.40mV	5.80mV	9.00mV	4.50mV	Pass
60% Load	9.70mV	7.30mV	15.40mV	6.70mV	Pass
70% Load	11.30mV	10.30mV	20.10mV	8.30mV	Pass
80% Load	12.20mV	11.40mV	22.50mV	9.30mV	Pass
90% Load	9.50mV	9.00mV	13.80mV	7.60mV	Pass
100% Load	15.00mV	10.90mV	15.30mV	9.80mV	Pass
110% Load	16.00mV	9.40mV	16.10mV	7.70mV	Pass
Crossload1	11.70mV	6.70mV	9.20mV	4.40mV	Pass
Crossload2	15.10mV	8.20mV	13.20mV	7.00mV	Pass

All data and graphs included in this test report can be used by any individual on the following conditions:

- > It should be mentioned that the test results are provided by Cybenetics
- > The link to the original test results document should be provided in any case

Anex

XPG Core Reactor 650W



Top side

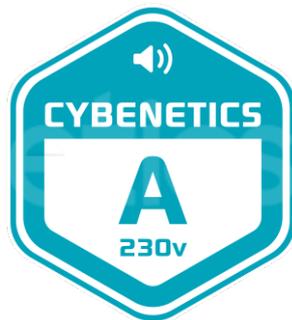


Power specifications label

CERTIFICATIONS 115V



CERTIFICATIONS 230V



All data and graphs included in this test report can be used by any individual on the following conditions:

- > It should be mentioned that the test results are provided by Cybenetics
- > The link to the original test results document should be provided in any case