



XPG Core Reactor 650W

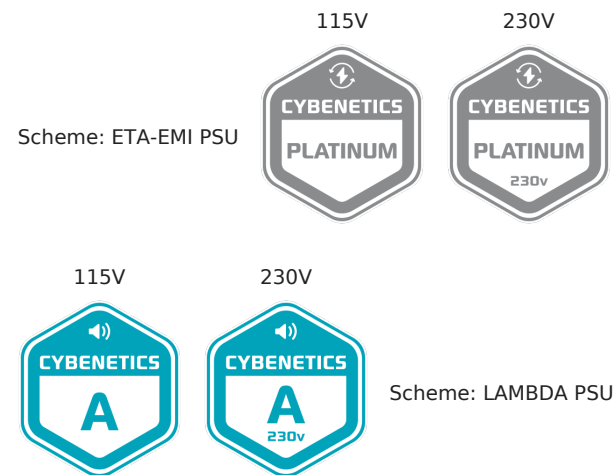
Serial Number

Lab ID AD19650116

Certification ID 25850

Test Result Report ID: 20PS850A

Certificate Issue Date: Sep 28, 2019



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Aristeidis Bitziopoulos, Certification Body General Manager

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	XPG
Model	Core Reactor 650W
OEM/ODM	Channel Well Technology
Serial Number	
Product Specifications	
Manufacturer-Provided Information	
Rated Voltage (Vrms)	100-240
Rated Current (Arms)	10-5
Rated Frequency (Hz)	47-63

Rated Power (W)	650
Operating Temperature (Continuous Full Load) (°C)	
Type	ATX12V
Cable Design	Fully Modular
Warranty	-
Cybenetics Measurements	
Dimensions (W x H x D)	
Weight	
Cooling	120mm Fluid Dynamic Bearing Fan (HA1225H12F-Z)
Semi-Passive Operation	X
Cybenetics Testing Information	
Lab ID	AD19650116
Date of receipt	Sep 9, 2019
Testing Date	Sep 26, 2019
Report Issued Date	Sep 28, 2019
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	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

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				

Parts Description

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, 0.1900hm) & 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, 0.1900hm)
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 Inte ational 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

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	✓

Performance Summary

115V

Accredited	
Average Efficiency (>1450 load combinations)	89.455%
Average Noise Output (>1450 Load Combinations)	22.65dBA
Average PF (>1450 Load Combinations)	0.987
Efficiency With 10W ($\leq$ 500W) or 2% (>500W) Load	73.209%
Standby Power Consumption	0.0362W
Non-Accredited	
12V Ripple (Full Load)	14.68mV
5V Ripple (Full Load)	8.60mV
3.3V Ripple (Full Load)	14.20mV
5VSB Ripple (Full Load)	7.41mV
12V Load Regulation	1.08%
5V Load Regulation	0.52%
3.3V Load Regulation	0.91%
5VSB Load Regulation	1.65%
Inrush Current	52.065A

230V

Accredited		
Average Efficiency (>1450 load combinations)	91.334%	
Average Noise Output (>1450 Load Combinations)	23.23dBA	
Average PF (>1450 Load Combinations)	0.951	
Efficiency With 10W (≤500W) or 2% (>500W) Load	-	
Standby Power Consumption	0.0559W	
Non-Accredited		
12V Ripple (Full Load)	15.02mV	
5V Ripple (Full Load)	10.92mV	
3.3V Ripple (Full Load)	15.31mV	
5VSB Ripple (Full Load)	9.81mV	
12V Load Regulation	1.09%	
5V Load Regulation	0.52%	
3.3V Load Regulation	0.91%	
5VSB Load Regulation	1.65%	
Inrush Current	83.377A	
Hold-Up Time & PWR_OK Signal	20.40ms	
AC Loss to PWR_OK Hold Up Time	18.80ms	
PWR_OK Inactive to DC Loss Delay	1.60ms	
PSU Timings: T1 (20% / 100%)	52.0ms	52.0ms
PSU Timings: T3 (20% / 100%)	140.0ms	142.0ms
OPP (0.00°C / 0.00°C)	129.21%	-

Hold-Up Time & PWR_OK Signal

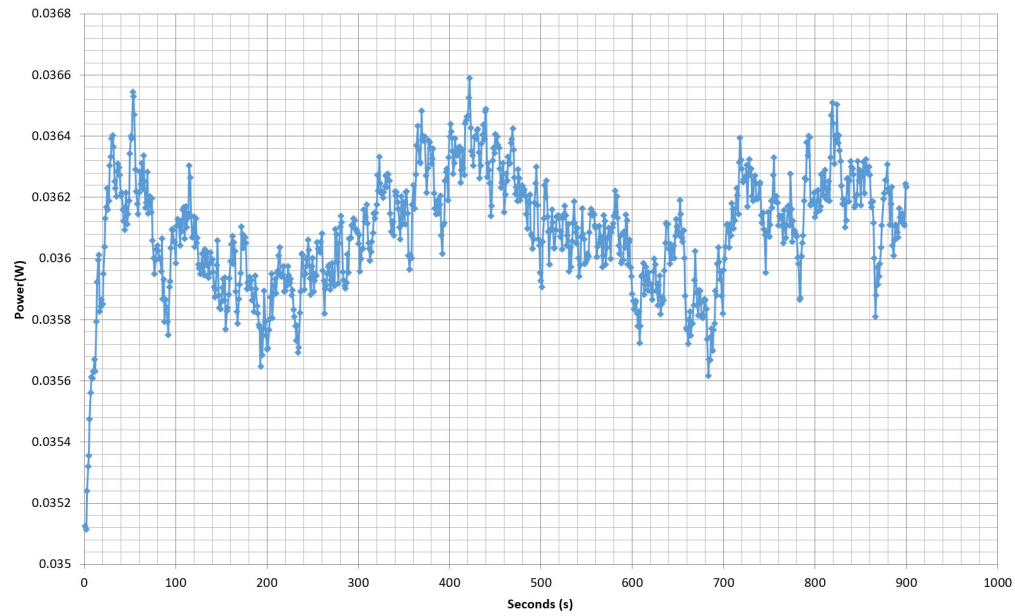
Hold-Up Time (ms)	20.4
AC Loss to PWR_OK Hold Up Time (ms)	18.8
PWR_OK Inactive to DC Loss Delay (ms)	1.6

Vampire Power

Graphs

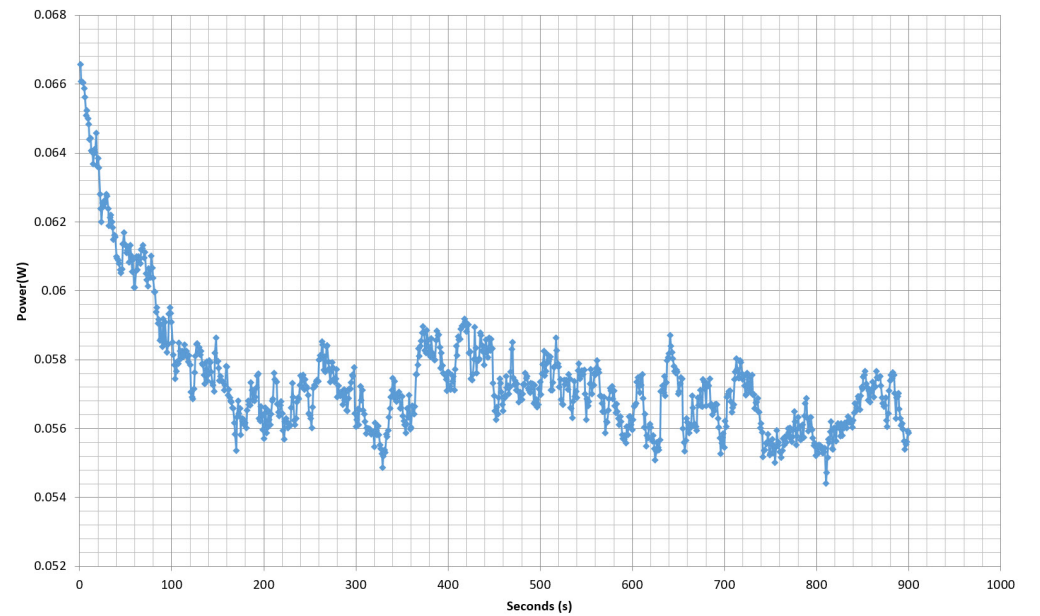
115V

Power - 25/09/2019 - 10:49



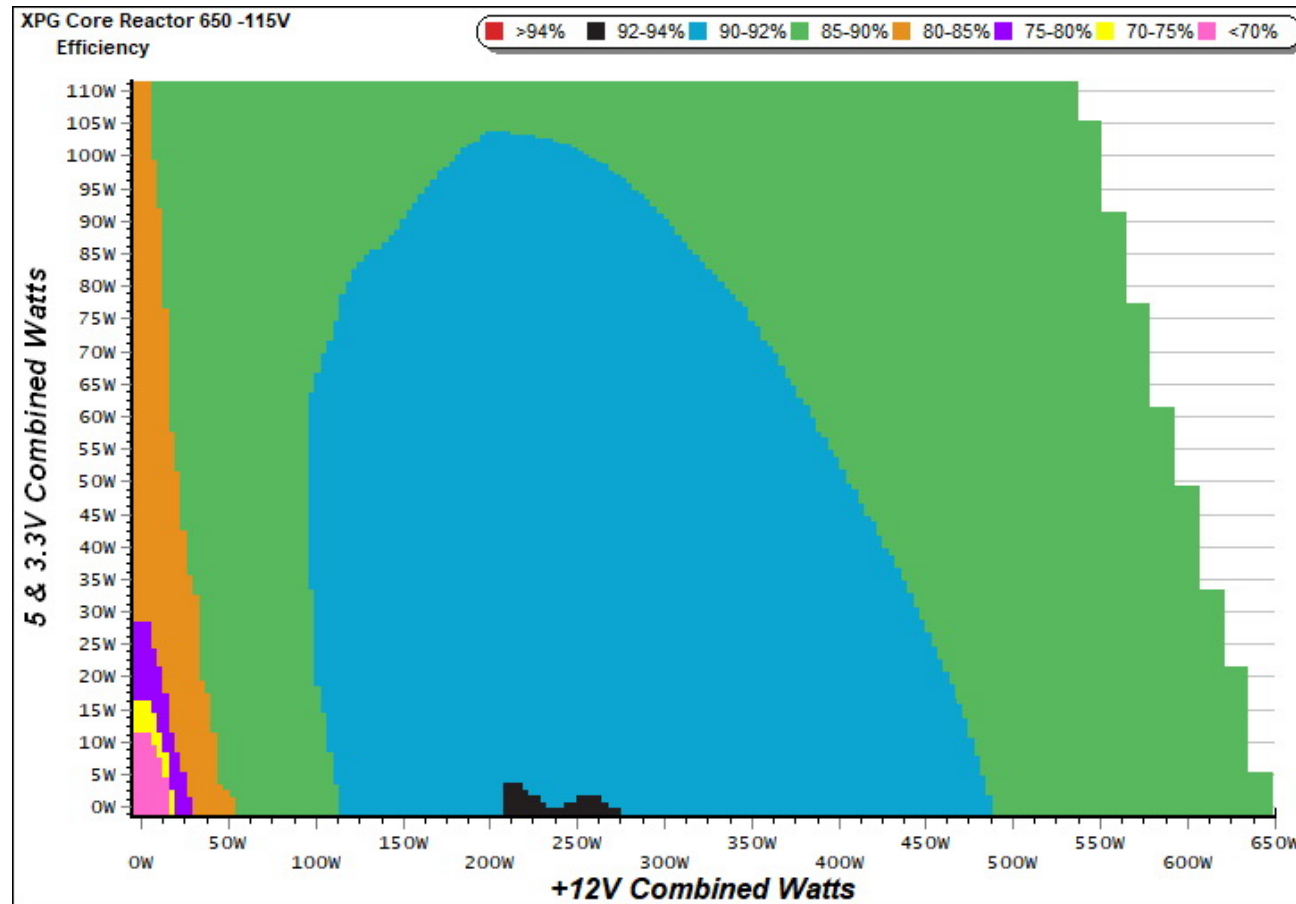
230V

Power - 25/09/2019 - 10:49



Efficiency Graph

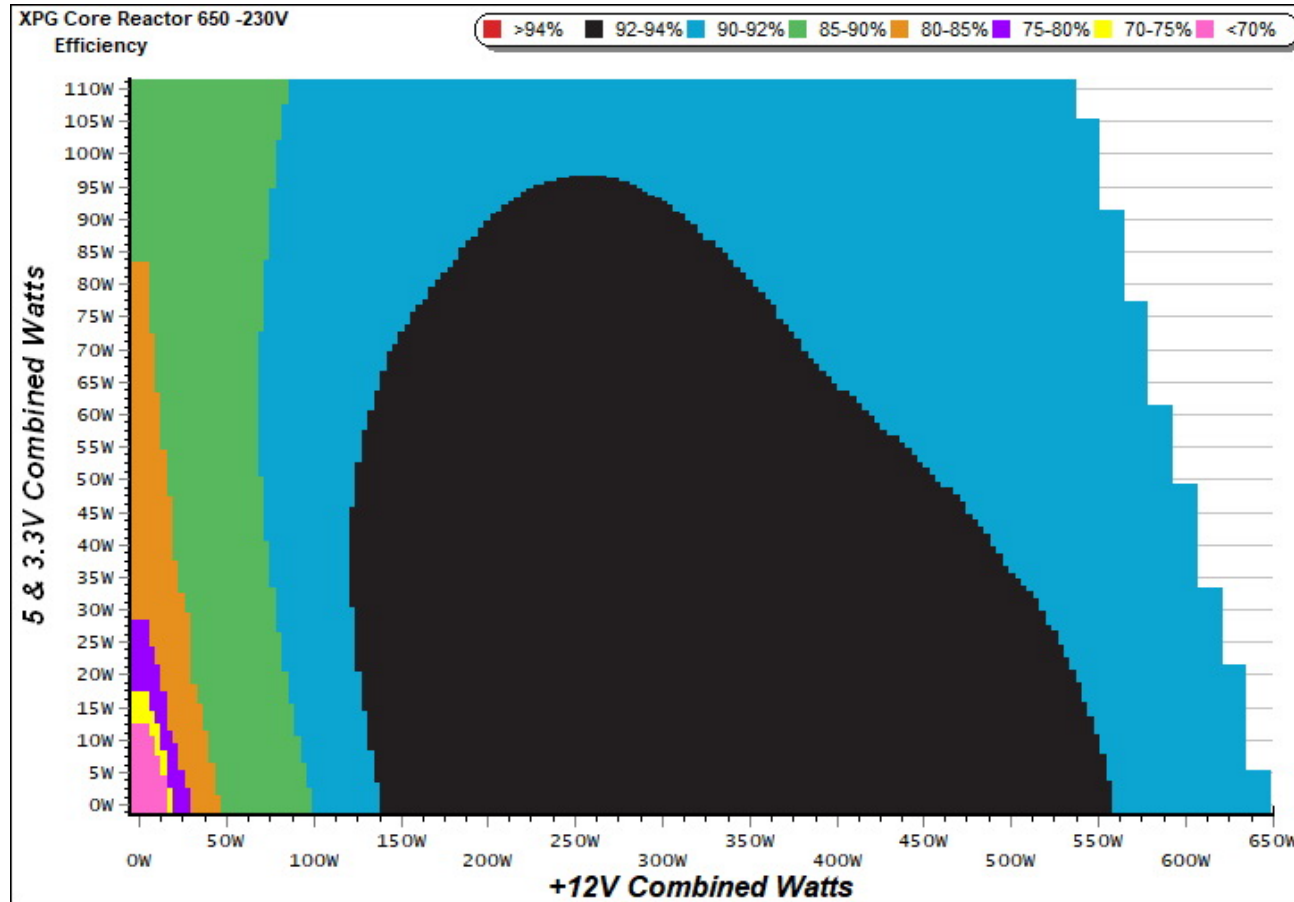
115V



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

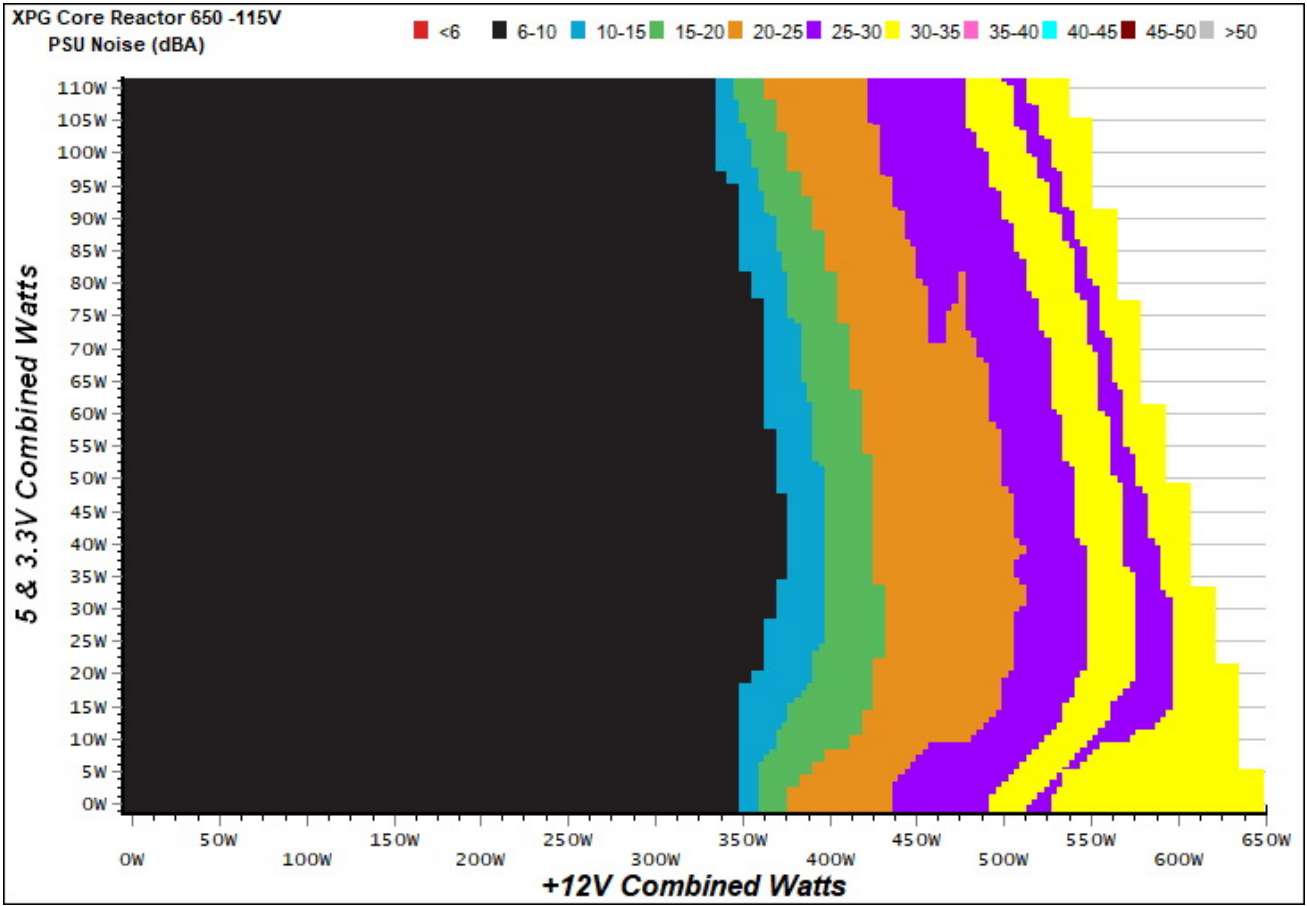


INFO

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

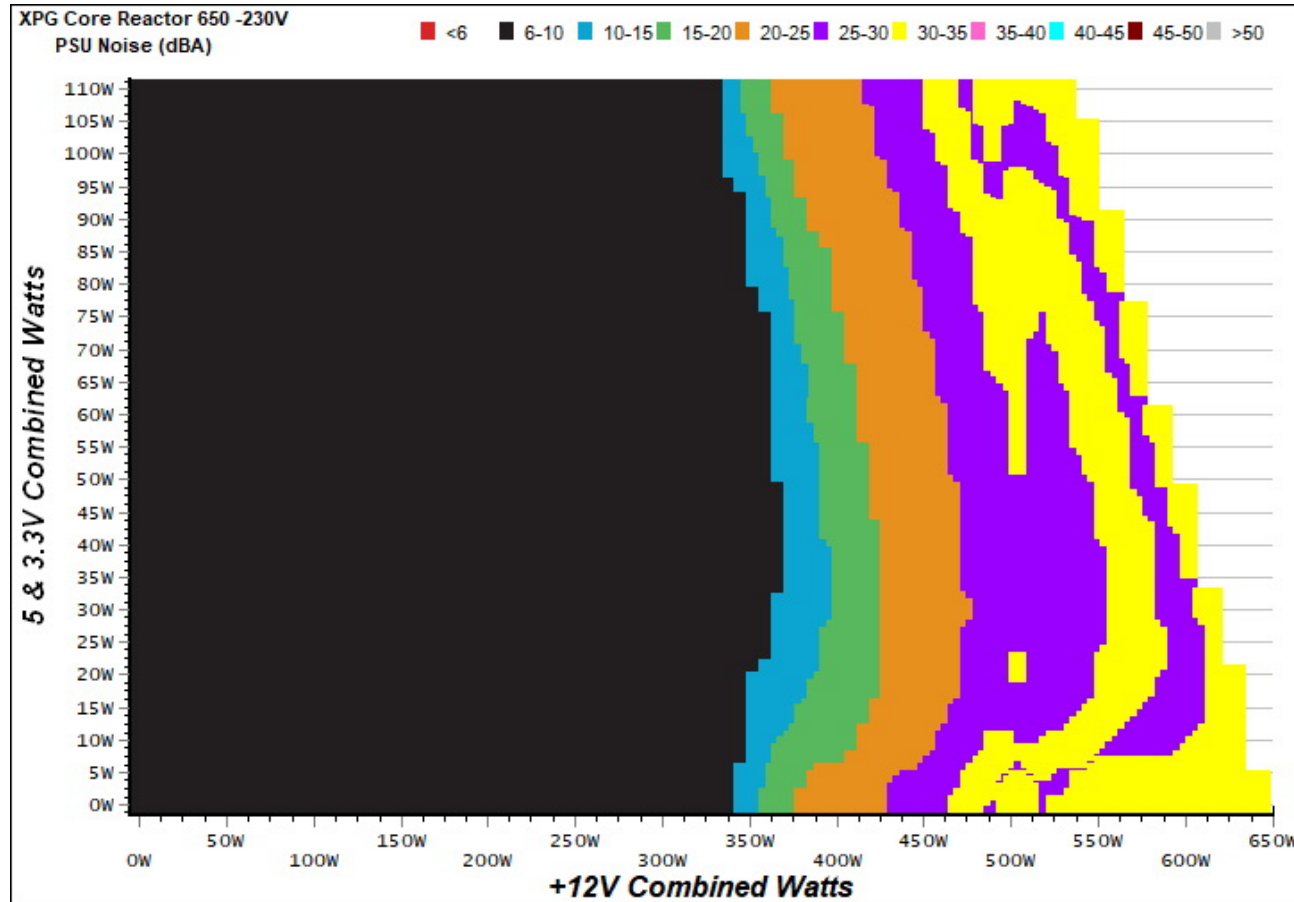
115V



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.

230V



INFO

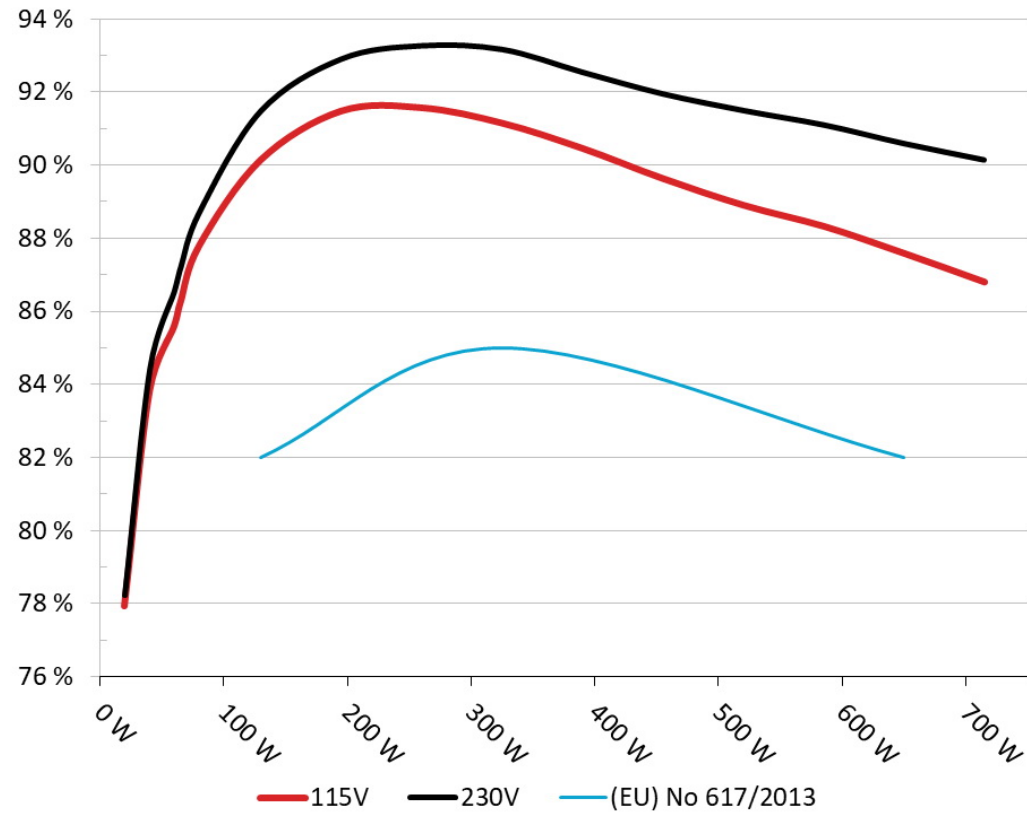
The PSU's noise in its entire operational range and under 30-32 °C ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails.

Indicative Performance

Efficiency under high ambient temperature

Efficiency: XPG Core Reactor 650

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



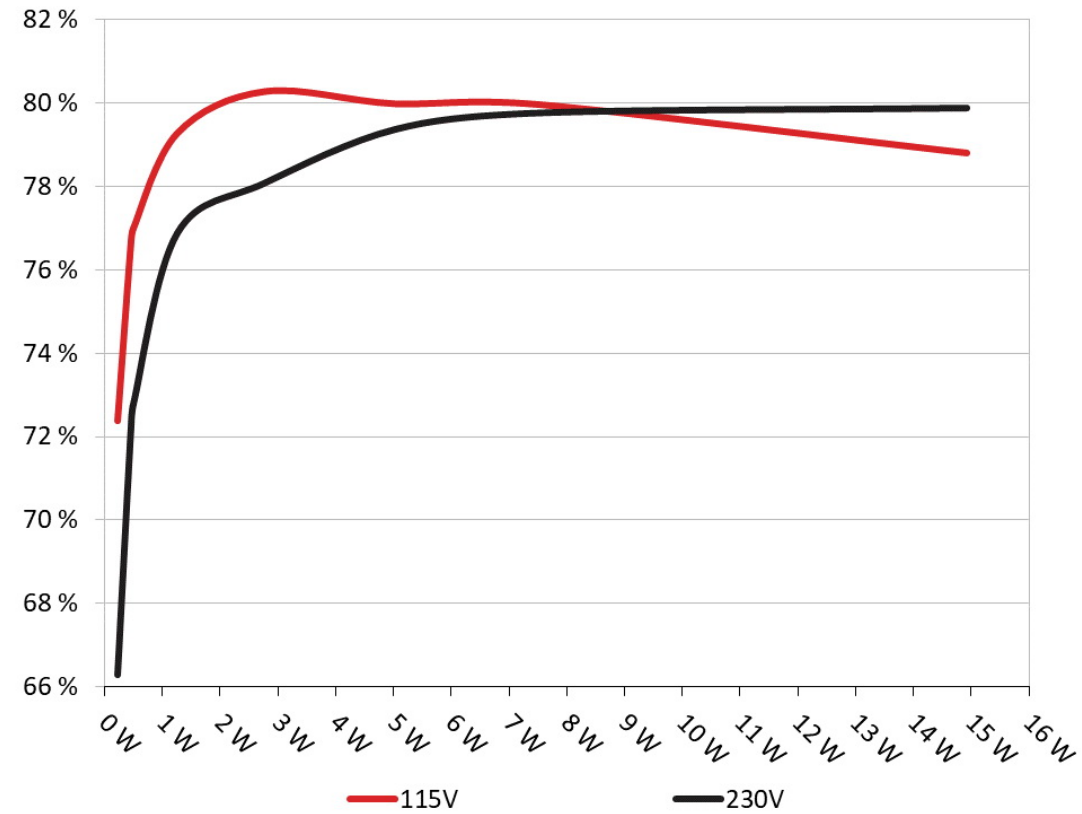
INFO

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.

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

115V

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

230V

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

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
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

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
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

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])	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

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])	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

The results above are not used in the certification process

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

The results above are not used in the certification process

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

Test	12V	5V	3.3V	5VSB	Pass/Fail
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

The results above are not used in the certification process

XPG Core Reactor 650W



Top side

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

CYBENETICS LTD Syrou 6, Latsia, 2231, Nicosia Cyprus



Power specifications label

Cybenetics runs voluntary certification programs for power supplies - ETA for efficiency, LAMBDA for noise and SAFE for safety and correct operation - and for cooling products, with DELTA for chassis soundproofing and PHI for fan airflow and static pressure. THETA rates cooler performance on AMD AM5 and Intel LGA1851 outside ISO 17065 and accreditation scope

www.cybenetics.com - info@cybenetics.com