PHANTEKS

Phanteks AMP 650W

R1906AA252130039

Lab ID PH19650099

Certification ID 25799

Test Result Report ID: 19PS799A

Certificate Issue Date: Aug 28, 2019

Scheme: ETA-EMI PSU

115V



230V



115V



230V



Scheme: LAMBDA PSU



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	Phanteks
Model	AMP 650W
OEM/ODM	Seasonic
Serial Number	R1906AA252130039
Product Specifications	
Manufacturer-Provided Information	
□□□□ (Vrms)	100-240
□□□□ (Arms)	9-4.5
□□□□ (Hz)	50-60

□□□□ (W)	650
Operating Temperature (Continuous Full Load) (°C)	
□□	ATX12V
□□□□	Fully Modular
Warranty	-
Cybenetics Measurements	
Dimensions (W x H x D)	
Weight	
□□	120mm Fluid Dynamic Bearing Fan (HA1225H12F-Z)
□□□□□	✓ (selectable)
Cybenetics Testing Information	
Lab ID	PH19650099
Date of receipt	Aug 26, 2019
Testing Date	Aug 27, 2019
Report Issued Date	Aug 28, 2019
Engineer Name	-
Authorized By the Laboratory Technical Manager	Aristeidis Bitziopoulos
Signature	

□□□□□ (Non-accredited measurements)

□□□□□				
□□	□□□□	□□□□□□	Gauge	In Cable Capacitors
ATX □□ 20+4 pin (610mm)	1	1	18-22AWG	□
4+4 pin EPS 12V □□ (650mm)	2	2	18AWG	□
6+2pin PCIe□□ (680mm+80mm)	2	4	18AWG	□
SATA□□ (420mm+150mm+150mm+150mm)	2	8	18AWG	□
SATA□□ (300mm+150mm)	1	2	18AWG	□
□ 4pin Molex□□ (450mm+120mm+120mm)	1	3	18AWG	□
□ 4pin Molex□□ to SATA□□ 3.3V Adapter (150mm+150mm)	1	2	18AWG	□
AC Power Cord (1370mm) - C13 coupler	1	1	18AWG	-

		3.3V	5V	12V	5VSB	-12V
		20	20	54	3	0.3
		100		648	15	3.6
(W)		650				

Parts Description

General Data	
Manufacturer (OEM)	Seasonic
PCB Type	Double Sided
Primary Side	
Transient Filter	4x Y caps, 2x X caps, 2x CM chokes, 1x MOV, 1x Discharge IC
Inrush Protection	NTC Thermistor & Relay
Bridge Rectifier(s)	2x GBU1006 (600V, 10A @ 100°C)
APFC MOSFETS	2x Champion GPT18N50D (500V, 18A, 0.27Ohm)
APFC Boost Diode	1x NXP BYC8-600 (600V, 8A @ 109°C)
Hold-up Cap(s)	1x Hitachi (400V, 470uF, 2,000h @ 105°C, HU)
Main Switchers	4x Champion GPT10N50AD (500V, 9.7A, 0.7Ohm)
APFC Controller	Champion CM6500UNX
Resonant Controllers	Champion CM6901T6
Topology	Primary side: Full-Bridge & LLC converter Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	
+12V MOSFETS	2x Nexperia PSMN1R8-40YLC (40V, 100A @ 100°C, 3.25mOhm @ 150°C)
5V & 3.3V	DC-DC Converters
Filtering Capacitors	Electrolytics: 6x Nippon Chemi-Con (4-10,000h @ 105°C, KY), 3x Nippon Chemi-Con (1-5,000h @ 105°C, KZE), 2x Nichicon (2-5,000h @ 105°C, HD), 3x Nichicon (4-10,000h @ 105°C, HE) Polymers: 9x FPCAP, 2x NIC, 4x United Chemi-Con
Supervisor IC	Weltrend WT7527V (OCP, OVP, UVP, SCP, PG)
Fan Model	Hong Hua HA1225H12F-Z (120mm, 12V, 0.58A, Fluid Dynamic Bearing Fan)
5VSB Circuit	
Rectifier	1xPFC P10V45SP SBR (45V, 10A)

Standby PWM Controller	Excelliance MOS EM8569

Test Results

Temperature & Compliance Info

□□□□ (°C /°F)	28-32 / 82.4-89.6
□□ ErP Lot3/6□□	✓
□□ (EU) No 617/2013□□	✓

Performance Summary

115V

Accredited	
□□□□ (>1450 load combinations)	88.686%
Average Noise Output (>1450 Load Combinations)	18.74dBA
PF□□□ (>1450 Load Combinations)	0.985
Efficiency With 10W (≤500W) or 2% (>500W) Load	58.493%
□□□□□□	0.0466W
Non-Accredited	
12V Ripple (Full Load)	34.89mV
5V Ripple (Full Load)	14.58mV
3.3V Ripple (Full Load)	19.09mV
5VSB Ripple (Full Load)	12.64mV
12V Load Regulation	0.11%
5V Load Regulation	0.60%
3.3V Load Regulation	0.69%
5VSB Load Regulation	2.93%
Inrush Current	40.007A

230V

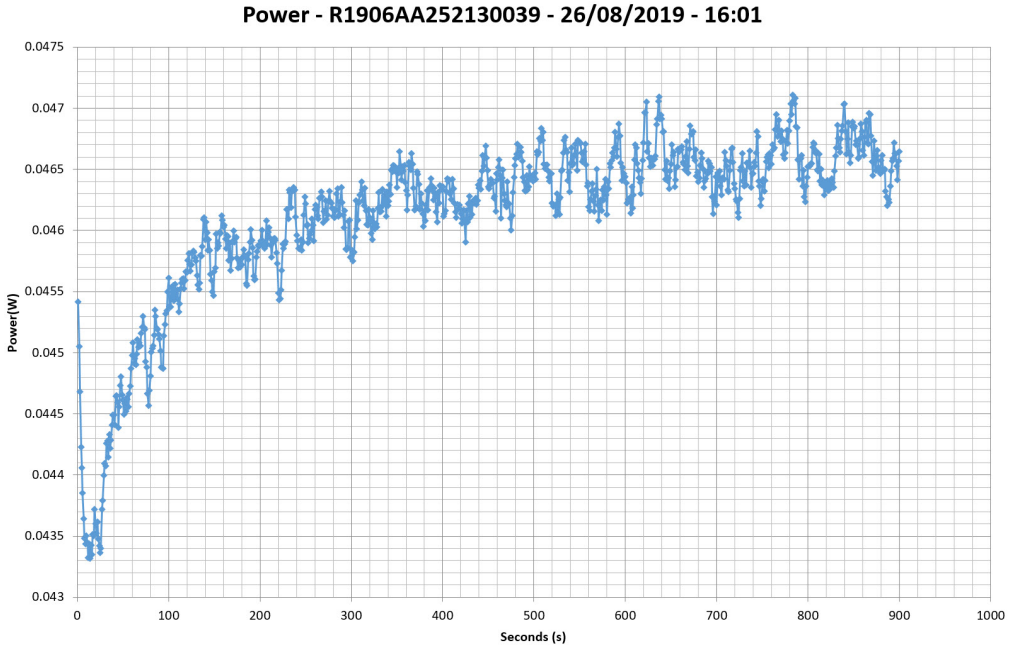
Accredited		
□□□□ (>1450 load combinations)		90.644%
Average Noise Output (>1450 Load Combinations)		18.23dBA
PF□□□ (>1450 Load Combinations)		0.941
Efficiency With 10W (≤500W) or 2% (>500W) Load		-
□□□□□□		0.0785W
Non-Accredited		
12V Ripple (Full Load)		35.26mV
5V Ripple (Full Load)		14.78mV
3.3V Ripple (Full Load)		20.36mV
5VSB Ripple (Full Load)		11.23mV
12V Load Regulation		0.08%
5V Load Regulation		0.64%
3.3V Load Regulation		0.85%
5VSB Load Regulation		2.85%
Inrush Current		55.869A
□□□□ & PG□□		18.30ms
AC Loss to PWR_OK Hold Up Time		15.50ms
PWR_OK Inactive to DC Loss Delay		2.80ms
PSU Timings: T1 (20% / 100%)	79.0ms	79.0ms
PSU Timings: T3 (20% / 100%)	313.0ms	313.0ms
OPP (0.00°C / 0.00°C)	138.15%	-

□□□□ & PG□□

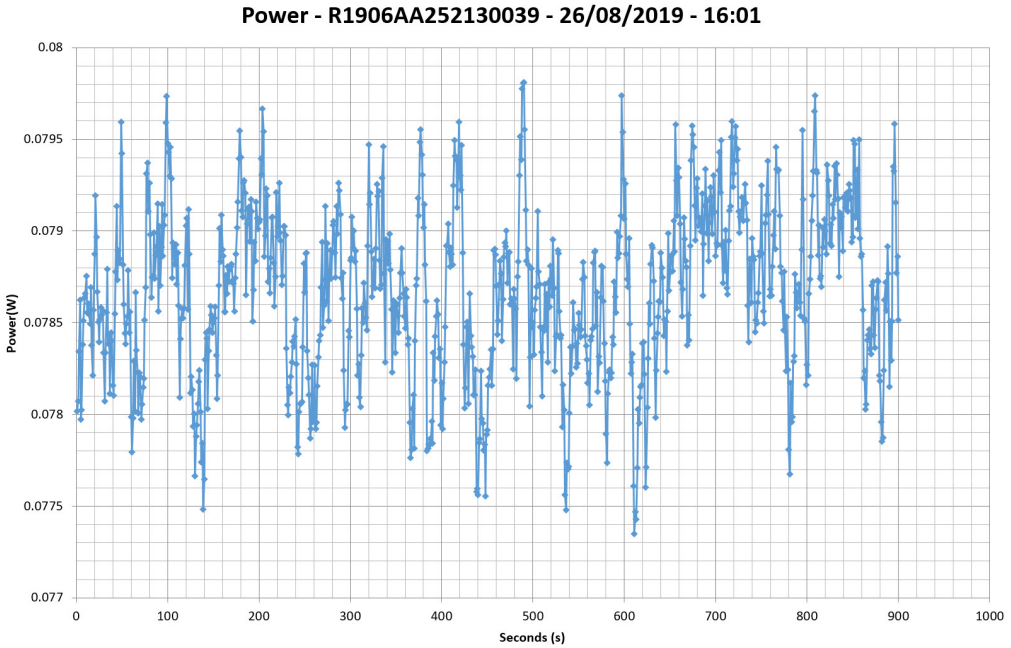
Hold-Up Time (ms)	18.3
AC Loss to PWR_OK Hold Up Time (ms)	15.5
PWR_OK Inactive to DC Loss Delay (ms)	2.8

Graphs

115V



230V



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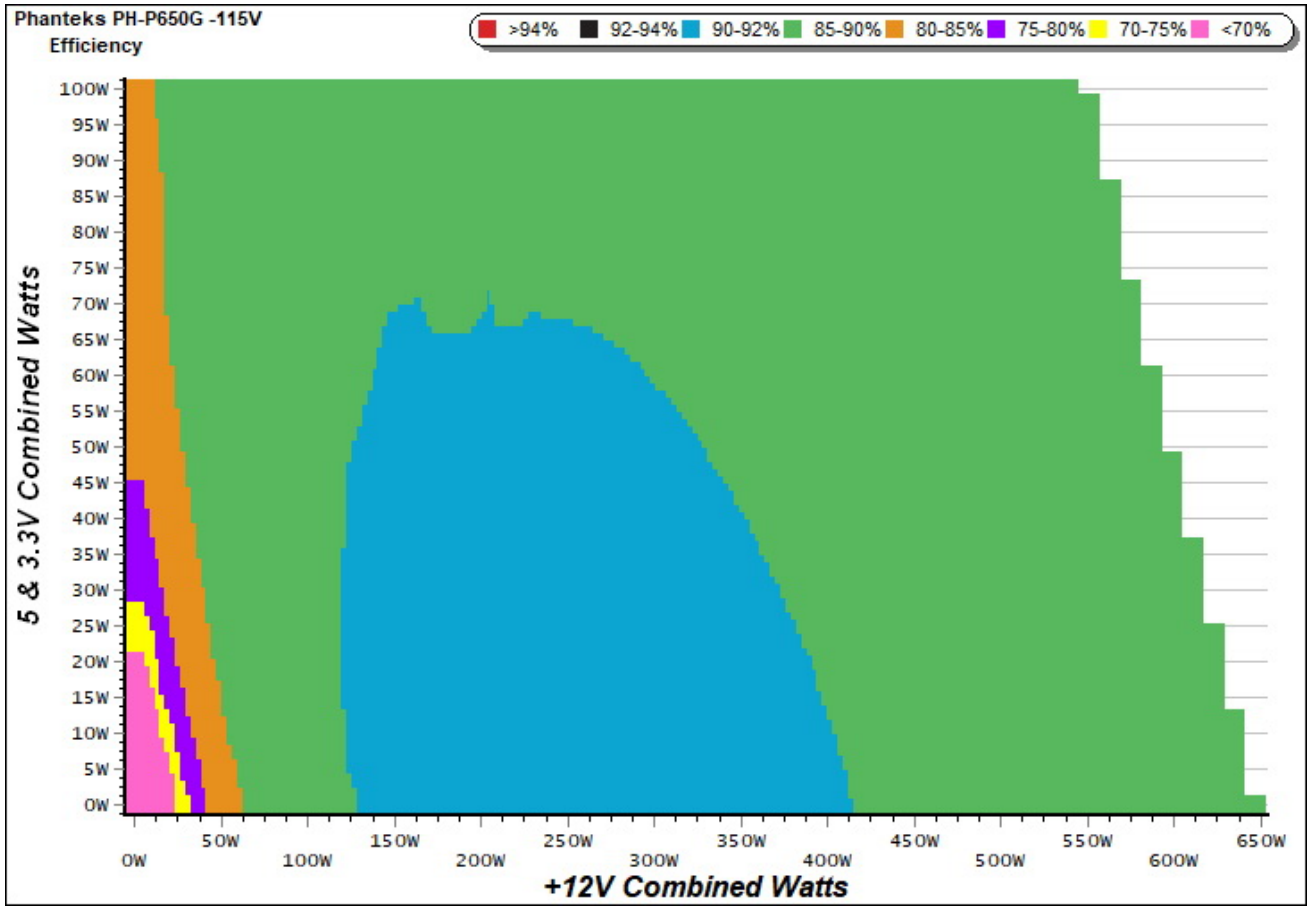
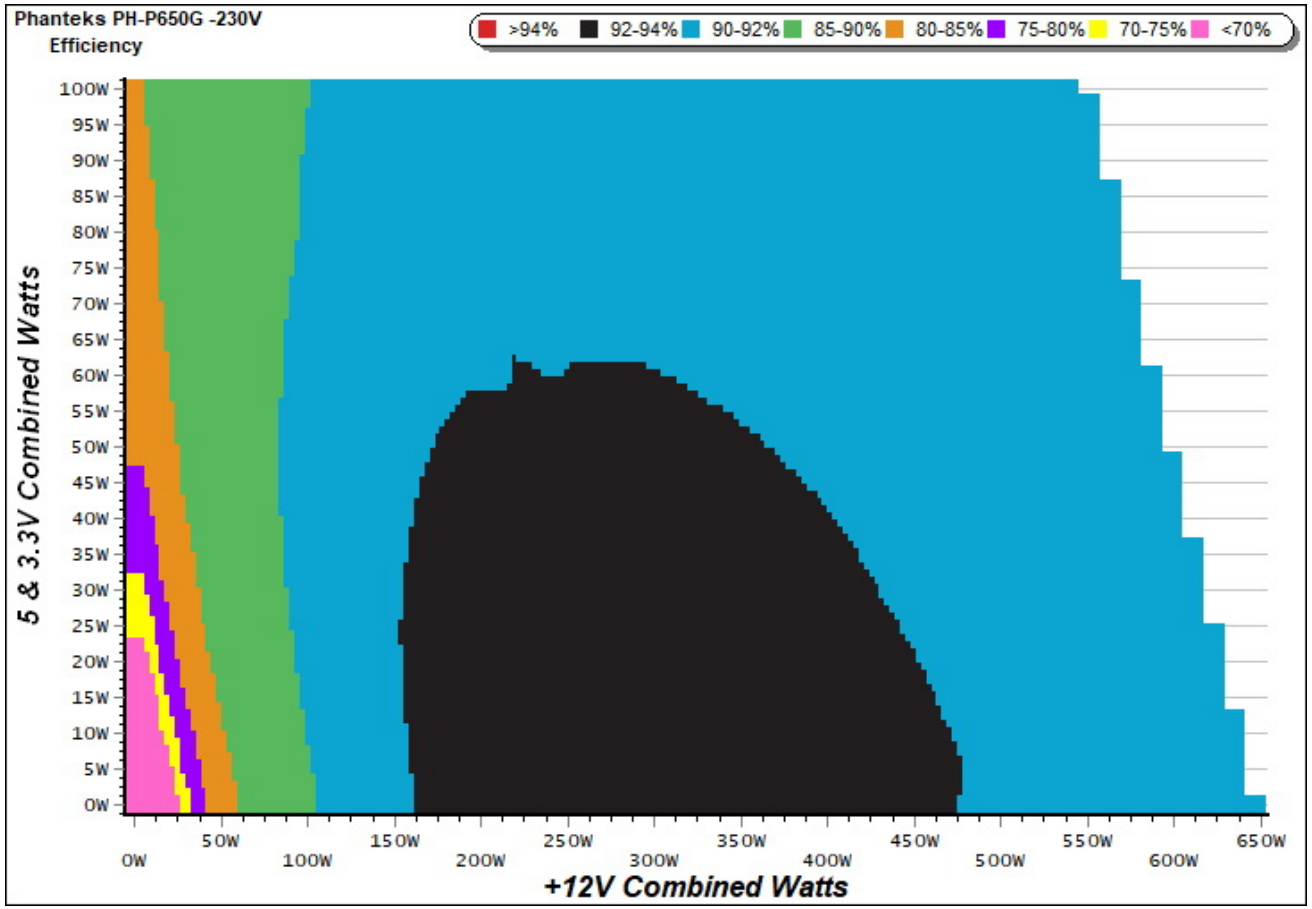
115V



□□

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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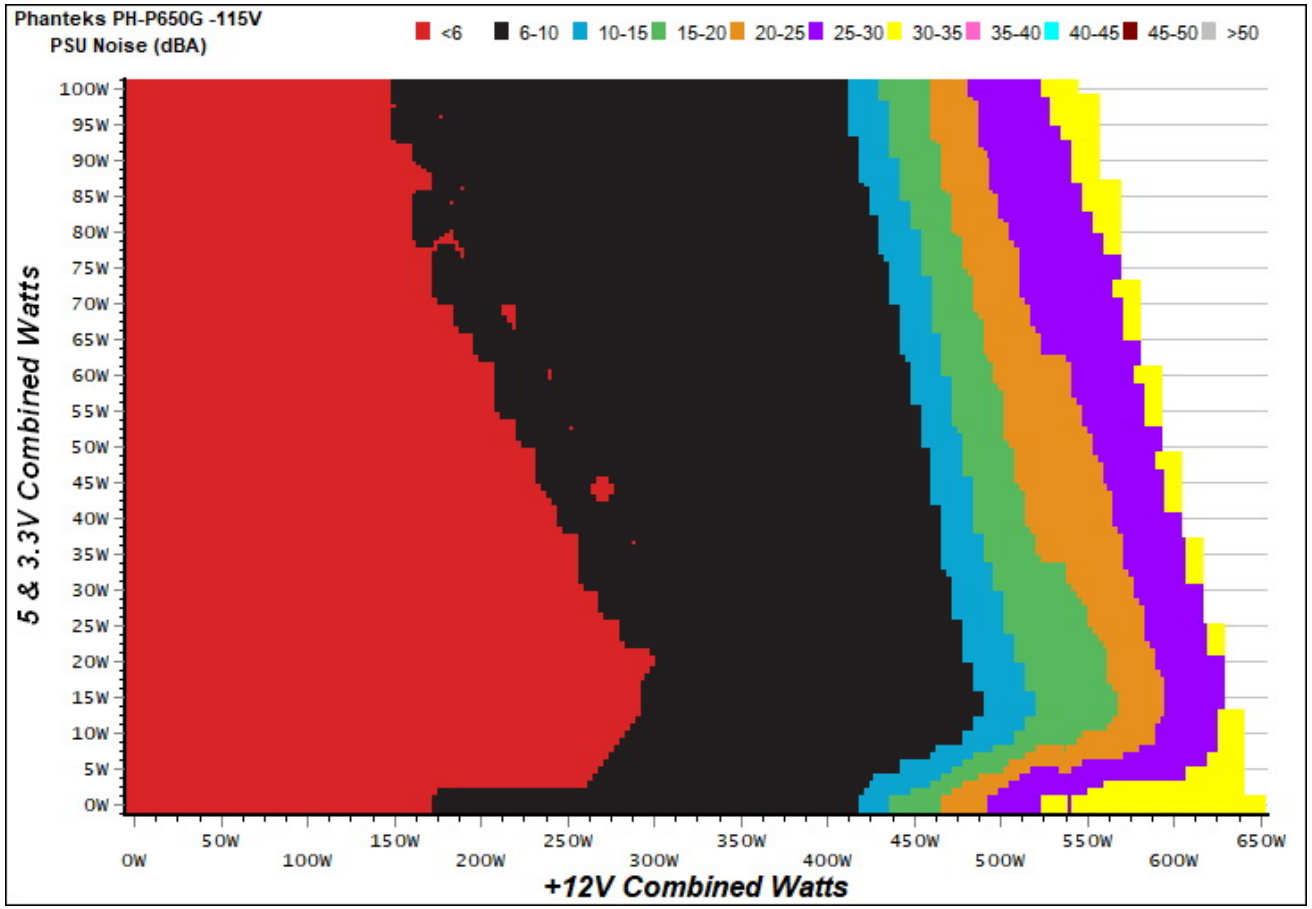
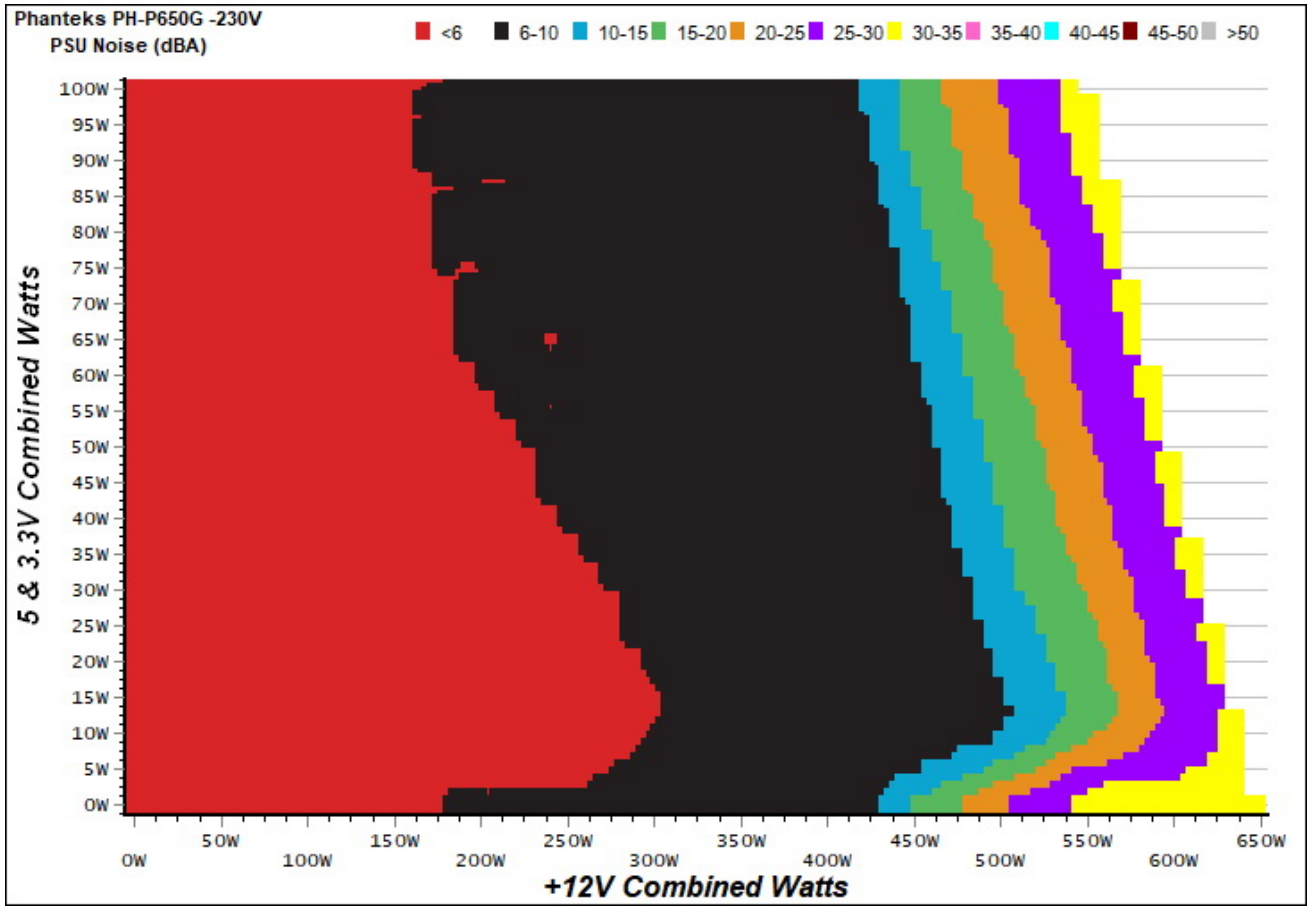
115V



□□

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



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) · 44.8 °C	0 RPM · <6.0 dB(A) · 44.8 °C	fan off in both
20%	0 RPM · <6.0 dB(A) · 45.8 °C	0 RPM · <6.0 dB(A) · 45.8 °C	fan off in both
50%	555 RPM · 8.4 dB(A) · 42.5 °C	555 RPM · 8.4 dB(A) · 42.5 °C	**+0.0 dB(A)**
100%	2080 RPM · 41.3 dB(A) · 45.7 °C	2080 RPM · 41.3 dB(A) · 45.7 °C	**+0.0 dB(A)**

230V

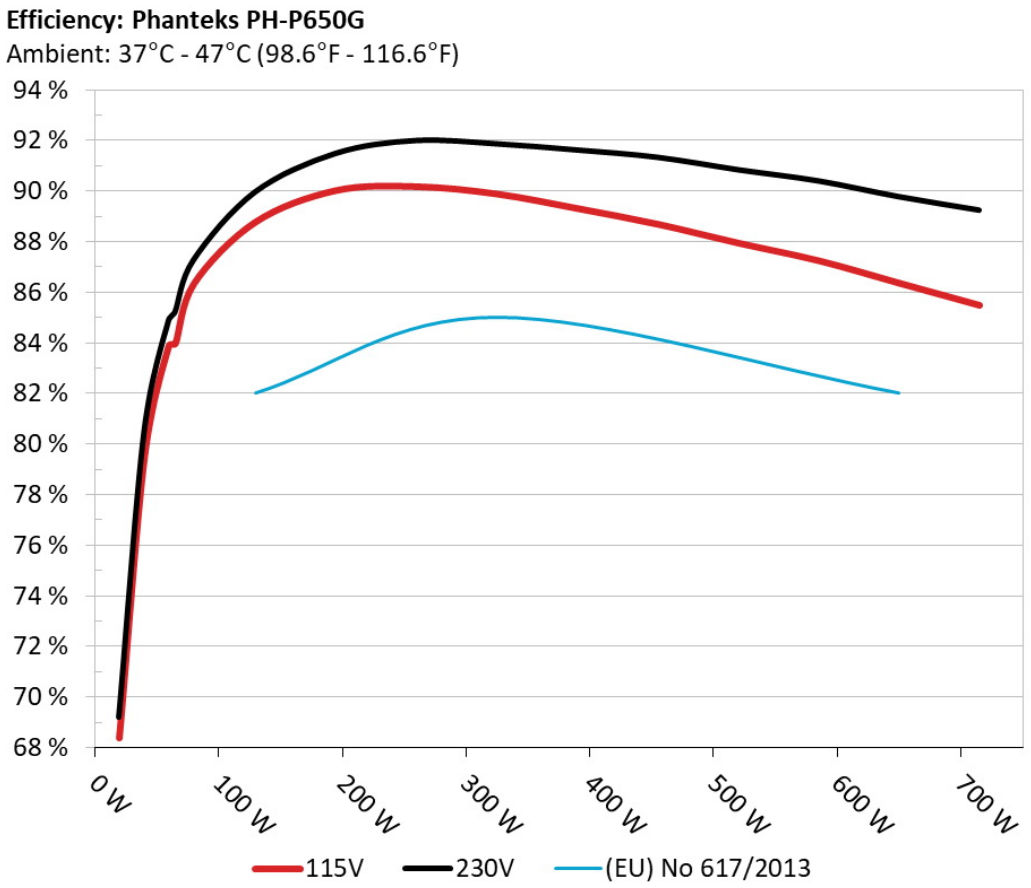
Load	Normal ambient fan · noise · intake	High ambient fan · noise · intake	Noise change
10%	0 RPM · <6.0 dB(A) · 45.5 °C	0 RPM · <6.0 dB(A) · 45.5 °C	fan off in both
20%	0 RPM · <6.0 dB(A) · 46.3 °C	0 RPM · <6.0 dB(A) · 46.3 °C	fan off in both
50%	561 RPM · 8.5 dB(A) · 42.5 °C	561 RPM · 8.5 dB(A) · 42.5 °C	**+0.0 dB(A)**
100%	2098 RPM · 41.1 dB(A) · 45.7 °C	2098 RPM · 41.1 dB(A) · 45.7 °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.

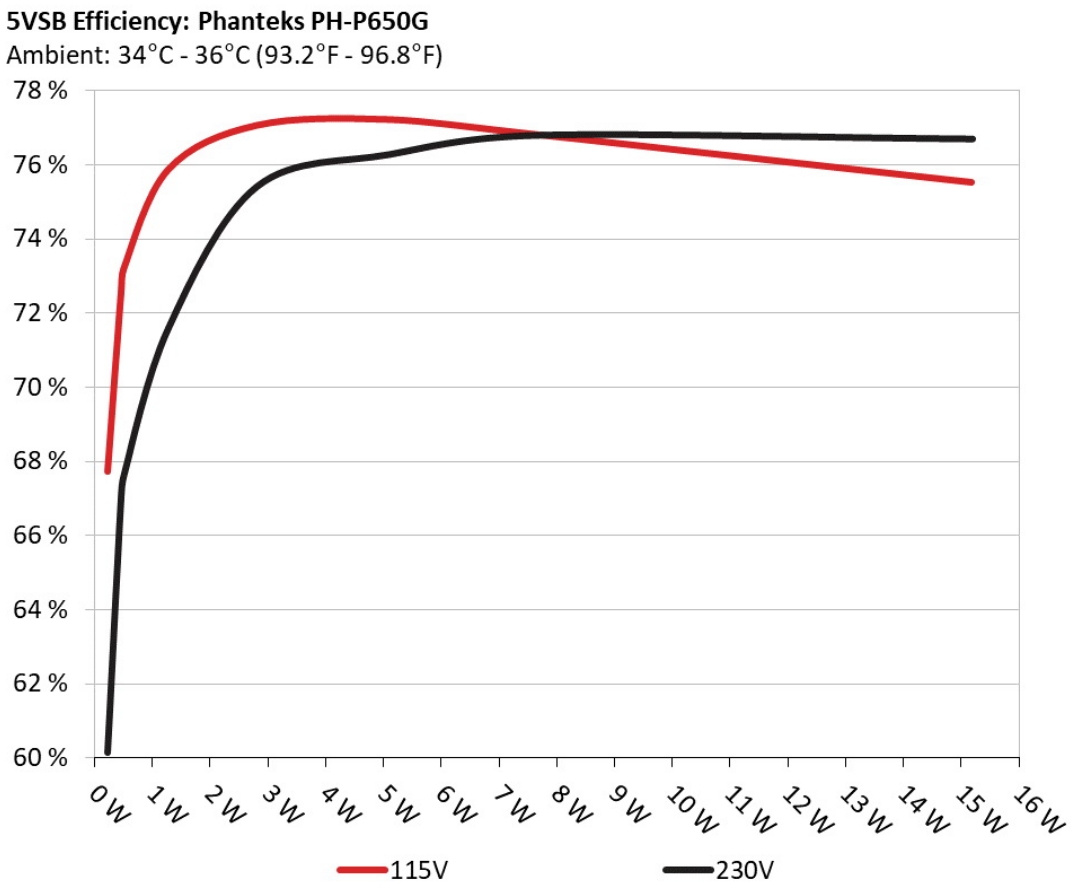
Informational. Not part of the ETA or LAMBDA rating.

Indicative Performance



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□□□□



□□

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

□□□□ □□ 5Vsb □□ (ErP Lot3/6 & CEC)

115V

□□ #	5VSB	DC/AC (□)	□□	PF/AC □□
1	0.045A	0.231	67.742%	0.056
	5.134V	0.341		115.17V
2	0.090A	0.462	72.527%	0.102
	5.132V	0.637		115.17V
3	0.550A	2.818	77.058%	0.343
	5.122V	3.657		115.17V
4	1.000A	5.113	77.212%	0.420
	5.112V	6.622		115.17V
5	1.500A	7.651	76.810%	0.457
	5.100V	9.961		115.17V
6	3.000A	15.184	75.524%	0.499
	5.061V	20.105		115.14V

230V

□□ #	5VSB	DC/AC (□)	□□	PF/AC □□
1	0.045A	0.231	60.156%	0.189
	5.100V	0.384		230.37V
2	0.090A	0.462	66.957%	0.034
	5.132V	0.690		230.37V
3	0.550A	2.817	75.401%	0.162
	5.121V	3.736		230.37V
4	1.000A	5.112	76.264%	0.243
	5.111V	6.703		230.37V
5	1.500A	7.651	76.779%	0.298
	5.100V	9.965		230.36V
6	3.000A	15.197	76.679%	0.377
	5.065V	19.819		230.36V

Supplementary Tests (For Reference)

10-110%□□□□

115V

□□ #	12V	5V	3.3V	5VSB	DC/AC (□)	□□	□□□□ (RPM)	□□□□□□□ (dB[A])	□□ (□□ /□□)	PF/AC □□
1	3.567A	2.009A	1.995A	0.980A	64.928	83.985%	0	<6.0	44.79°C	0.961
	12.147V	4.978V	3.307V	5.103V	77.309				40.15°C	115.14V
2	8.111A	3.016A	2.995A	1.179A	129.417	88.789%	0	<6.0	45.77°C	0.982
	12.146V	4.974V	3.305V	5.090V	145.758				40.51°C	115.14V
3	13.050A	3.522A	3.480A	1.379A	194.522	90.044%	0	<6.0	46.87°C	0.987
	12.147V	4.971V	3.303V	5.077V	216.029				40.86°C	115.15V
4	17.990A	4.027A	3.997A	1.580A	259.746	90.199%	0	<6.0	47.73°C	0.989
	12.148V	4.968V	3.301V	5.065V	287.971				41.40°C	115.14V
5	22.596A	5.037A	5.003A	1.782A	325.050	89.905%	555	8.4	42.53°C	0.990
	12.150V	4.965V	3.298V	5.051V	361.547				49.37°C	115.14V
6	27.143A	6.047A	6.008A	1.986A	389.571	89.336%	567	8.5	43.14°C	0.990
	12.149V	4.962V	3.296V	5.037V	436.074				50.33°C	115.16V
7	31.746A	7.061A	7.015A	2.190A	454.890	88.710%	721	12.1	43.42°C	0.990
	12.152V	4.958V	3.293V	5.024V	512.786				51.29°C	115.14V
8	36.355A	8.075A	8.024A	2.397A	520.202	87.961%	1147	25.4	44.13°C	0.991
	12.152V	4.955V	3.290V	5.008V	591.399				52.69°C	115.14V
9	41.378A	8.584A	8.514A	2.401A	585.134	87.263%	1624	33.1	44.42°C	0.992
	12.147V	4.952V	3.289V	5.000V	670.543				53.68°C	115.14V
10	46.144A	9.093A	9.034A	3.014A	649.987	86.376%	2080	41.3	45.69°C	0.992
	12.142V	4.950V	3.287V	4.977V	752.513				55.49°C	115.13V
11	51.491A	9.098A	9.037A	3.019A	714.815	85.500%	2119	42.2	46.60°C	0.992
	12.140V	4.948V	3.286V	4.969V	836.038				56.80°C	115.12V
CL1	0.149A	12.002A	12.000A	0.000A	100.824	84.397%	0	<6.0	42.72°C	0.977
	12.175V	4.960V	3.290V	5.100V	119.464				49.14°C	115.17V

CL2	54.017A	1.003A	0.998A	1.000A	668.967	86.848%	2105	41.3	45.70°C	0.992
	12.138V	4.963V	3.300V	5.038V	770.273				55.29°C	115.12V

The results above are not used in the certification process

230V

□□ #	12V	5V	3.3V	5VSB	DC/AC (□)	□□	□□□□ (RPM)	□□□□□□□ (dB[A])	□□ (□□ /□□)	PF/AC □□
1	3.571A	2.010A	1.996A	0.980A	64.982	85.204%	0	<6.0	45.47°C	0.775
	12.148V	4.977V	3.306V	5.101V	76.266				40.43°C	230.38V
2	8.114A	3.018A	2.996A	1.179A	129.467	89.946%	0	<6.0	46.34°C	0.891
	12.148V	4.972V	3.302V	5.088V	143.939				40.72°C	230.38V
3	13.052A	3.523A	3.485A	1.379A	194.575	91.478%	0	<6.0	47.05°C	0.935
	12.149V	4.969V	3.300V	5.076V	212.701				40.95°C	230.37V
4	17.993A	4.028A	4.003A	1.580A	259.807	91.992%	452	7.0	41.93°C	0.953
	12.149V	4.967V	3.298V	5.064V	282.424				48.72°C	230.37V
5	22.602A	5.039A	5.008A	1.782A	325.107	91.861%	561	8.5	42.46°C	0.963
	12.149V	4.964V	3.295V	5.050V	353.912				49.62°C	230.37V
6	27.151A	6.051A	6.014A	1.986A	389.636	91.619%	570	8.5	43.04°C	0.969
	12.148V	4.960V	3.291V	5.036V	425.280				50.65°C	230.37V
7	31.760A	7.064A	7.025A	2.190A	454.962	91.328%	651	9.7	43.78°C	0.973
	12.149V	4.956V	3.288V	5.024V	498.162				51.97°C	230.37V
8	36.374A	8.079A	8.037A	2.397A	520.284	90.834%	1104	24.3	44.25°C	0.976
	12.148V	4.952V	3.285V	5.008V	572.786				53.13°C	230.37V
9	41.397A	8.589A	8.530A	2.400A	585.203	90.394%	1615	33.1	44.94°C	0.979
	12.143V	4.950V	3.283V	5.000V	647.395				54.31°C	230.37V
10	46.161A	9.100A	9.054A	3.014A	650.067	89.770%	2098	41.1	45.71°C	0.981
	12.139V	4.947V	3.280V	4.978V	724.149				55.47°C	230.38V
11	51.505A	9.104A	9.056A	3.018A	714.885	89.241%	2118	41.7	46.50°C	0.982
	12.138V	4.945V	3.279V	4.971V	801.074				56.74°C	230.37V
CL1	0.155A	12.001A	12.000A	0.000A	100.736	85.522%	625	9.2	42.12°C	0.869
	12.172V	4.956V	3.281V	5.099V	117.789				49.39°C	230.40V

CL2	54.022A	1.004A	1.000A	1.000A	668.879	90.337%	2106	41.5	45.24°C	0.981
	12.135V	4.962V	3.299V	5.040V	740.428				55.34°C	230.38V

The results above are not used in the certification process

20-80□□□□□

115V

□□ #	12V	5V	3.3V	5VSB	DC/AC (□)	□□	□□□□ (RPM)	□□□□□□□ (dB[A])	PF/AC □□
1	1.194A	0.502A	0.481A	0.195A	19.589	68.366%	0	<6.0	0.827
	12.138V	4.987V	3.314V	5.127V	28.653				115.23V
2	2.450A	1.004A	0.995A	0.391A	40.035	79.531%	0	<6.0	0.927
	12.139V	4.980V	3.310V	5.120V	50.339				115.17V
3	3.632A	1.507A	1.480A	0.587A	59.499	83.882%	0	<6.0	0.957
	12.141V	4.979V	3.309V	5.113V	70.932				115.19V
4	4.881A	2.011A	1.995A	0.784A	79.888	86.352%	0	<6.0	0.968
	12.144V	4.978V	3.308V	5.106V	92.514				115.14V

The results above are not used in the certification process

230V

□□ #	12V	5V	3.3V	5VSB	DC/AC (□)	□□	□□□□ (RPM)	□□□□□□□ (dB[A])	PF/AC □□
1	1.198A	0.502A	0.482A	0.195A	19.644	69.191%	0	<6.0	0.510
	12.142V	4.985V	3.313V	5.126V	28.391				230.37V
2	2.455A	1.004A	0.997A	0.391A	40.108	80.490%	0	<6.0	0.653
	12.142V	4.979V	3.309V	5.119V	49.830				230.38V
3	3.637A	1.506A	1.481A	0.587A	59.562	84.841%	0	<6.0	0.753
	12.143V	4.979V	3.308V	5.111V	70.204				230.38V
4	4.886A	2.010A	1.997A	0.784A	79.946	87.268%	0	<6.0	0.815
	12.145V	4.976V	3.306V	5.104V	91.610				230.38V

The results above are not used in the certification process

□□□□

115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	9.4 mV	7.3 mV	11.5 mV	8.8 mV	Pass
20% Load	13.9 mV	8.0 mV	12.4 mV	9.4 mV	Pass
30% Load	16.6 mV	8.8 mV	12.8 mV	8.8 mV	Pass
40% Load	19.4 mV	9.5 mV	14.0 mV	9.0 mV	Pass
50% Load	20.5 mV	10.0 mV	14.7 mV	9.1 mV	Pass
60% Load	21.6 mV	10.3 mV	15.2 mV	9.2 mV	Pass
70% Load	21.4 mV	10.7 mV	15.2 mV	9.5 mV	Pass
80% Load	22.2 mV	11.6 mV	18.1 mV	10.0 mV	Pass
90% Load	23.3 mV	12.2 mV	18.6 mV	10.4 mV	Pass
100% Load	34.9 mV	14.6 mV	19.1 mV	12.6 mV	Pass
110% Load	37.6 mV	15.0 mV	20.0 mV	12.9 mV	Pass
Crossload 1	15.7 mV	11.3 mV	18.7 mV	9.6 mV	Pass
Crossload 2	35.0 mV	10.7 mV	14.0 mV	12.2 mV	Pass

The results above are not used in the certification process

230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	9.00mV	7.20mV	11.90mV	9.30mV	Pass
20% Load	13.20mV	7.60mV	12.00mV	9.20mV	Pass
30% Load	16.70mV	8.30mV	12.70mV	9.00mV	Pass
40% Load	19.40mV	9.50mV	14.20mV	9.00mV	Pass
50% Load	20.80mV	10.20mV	16.30mV	9.30mV	Pass
60% Load	21.40mV	11.30mV	15.20mV	9.20mV	Pass
70% Load	22.00mV	10.50mV	15.30mV	10.20mV	Pass
80% Load	22.70mV	11.20mV	17.60mV	10.20mV	Pass

Test	12V	5V	3.3V	5VSB	Pass/Fail
90% Load	24.10mV	13.20mV	19.20mV	9.60mV	Pass
100% Load	35.30mV	14.80mV	20.40mV	11.20mV	Pass
110% Load	38.00mV	15.00mV	19.30mV	10.90mV	Pass
Crossload1	15.40mV	11.40mV	18.10mV	10.40mV	Pass
Crossload2	35.00mV	11.40mV	14.50mV	11.00mV	Pass

The results above are not used in the certification process

Phanteks AMP 650W

Top side

Power specifications label

本测试报告中包含的所有数据和图表均可在以下条件下由任何人使用：使用过程需提及测试结果由 Cybenetics提供。
在任何情况下都应提供原始测试结果文档的网站链接

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