EVGA

EVGA 850 GQ

Serial Number 1603160808800964

Lab ID 93

Certification ID 2593

Test Result Report ID:

Certificate Issue Date: Apr 19, 2018

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	EVGA
Model	850 GQ
OEM/ODM	FSP
Serial Number	1603160808800964
Product Specifications	
Manufacturer-Provided Information	
Rated Voltage (Vrms)	100-240
Rated Current (Arms)	14
Rated Frequency (Hz)	50-60

Rated Power (W)	850
Operating Temperature (Continuous Full Load) (°C)	
Type	ATX12V
Cable Design	Semi Modular
Warranty	-
Cybenetics Measurements	
Dimensions (W x H x D)	
Weight	
Cooling	135 mm Fluid Dynamic Bearing (MGA13512XF-O25)
Semi-Passive Operation	✓ (selectable)
Cybenetics Testing Information	
Lab ID	93
Date of receipt	Apr 5, 2018
Testing Date	Apr 15, 2018
Report Issued Date	Apr 19, 2018
DUT Notes	Retested on 02/06/2018
Engineer Name	-
Authorized By the Laboratory Technical Manager	Aristeidis Bitziopoulos
Signature	

Cables and Connectors(Non-accredited measurements)

Native Cables			
Description	Cable Count	Connector Count (Total)	Gauge
ATX connector 20+4 pin (600mm)	1	1	18-24AWG
Modular Cables			
4+4 pin EPS12V (650mm)	2	2	18AWG
6+2 pin PCIe (600mm+100mm)	4	8	18AWG
SATA (550mm+100mm+100mm)	1	3	18AWG
4 pin Molex (550mm+100mm+100mm)	1	3	18AWG
FDD Adapter (+100mm)	1	2	22AWG

Power Specifications

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	24	24	70.8	3	0.5
	Watts	120		849.6	15	6
Total Max. Power (W)		850				

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	✓

Performance Summary

115V

Accredited	
Average Efficiency (>1450 load combinations)	88.715%
Average Noise Output (>1450 Load Combinations)	24.63dBA
Average PF (>1450 Load Combinations)	0.984
Efficiency With 10W (≤500W) or 2% (>500W) Load	-
Standby Power Consumption	0.1069W
Non-Accredited	
12V Ripple (Full Load)	21.69mV
5V Ripple (Full Load)	19.28mV
3.3V Ripple (Full Load)	22.06mV
5VSB Ripple (Full Load)	32.69mV
12V Load Regulation	1.05%
5V Load Regulation	0.80%
3.3V Load Regulation	1.39%

5VSB Load Regulation	3.42%
Inrush Current	22.587A

230V

Accredited		
Average Efficiency (>1450 load combinations)	90.709%	
Average Noise Output (>1450 Load Combinations)	30.05dBA	
Average PF (>1450 Load Combinations)	0.964	
Efficiency With 10W (≤500W) or 2% (>500W) Load	-	
Standby Power Consumption	0.1962W	
Non-Accredited		
12V Ripple (Full Load)	17.44mV	
5V Ripple (Full Load)	22.37mV	
3.3V Ripple (Full Load)	17.25mV	
5VSB Ripple (Full Load)	26.63mV	
12V Load Regulation	0.52%	
5V Load Regulation	0.36%	
3.3V Load Regulation	0.79%	
5VSB Load Regulation	2.97%	
Inrush Current	47.130A	
Hold-Up Time & PWR_OK Signal	28.24ms	
AC Loss to PWR_OK Hold Up Time	24.06ms	
PWR_OK Inactive to DC Loss Delay	4.18ms	
OPP (0.00°C / 0.00°C)	-	-

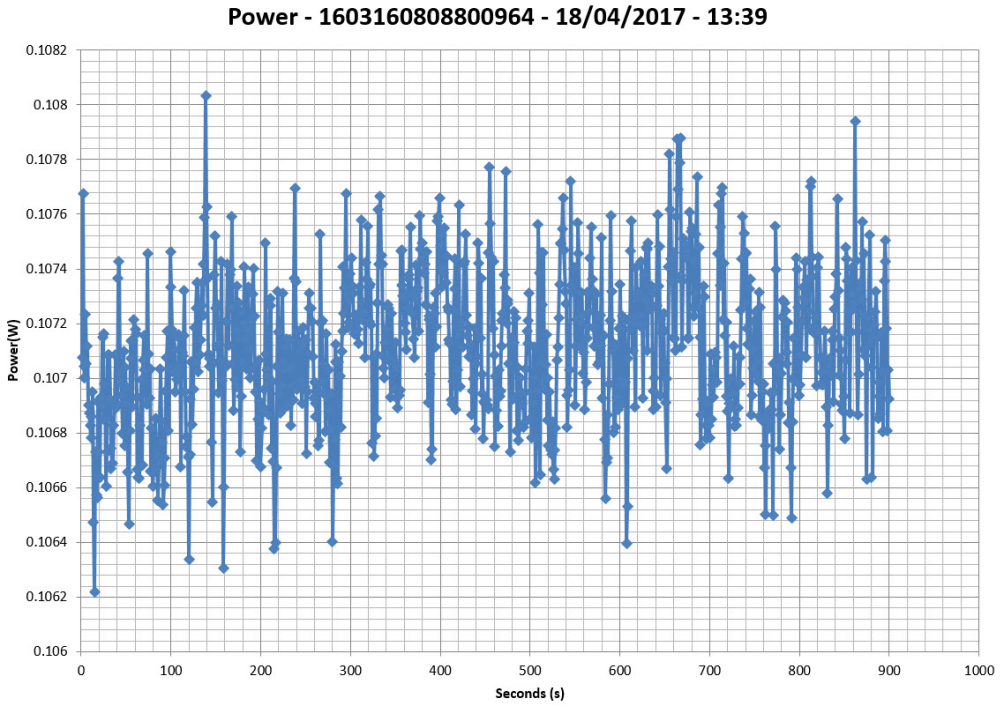
Hold-Up Time & PWR_OK Signal

Hold-Up Time (ms)	28.24
AC Loss to PWR_OK Hold Up Time (ms)	24.06
PWR_OK Inactive to DC Loss Delay (ms)	4.18

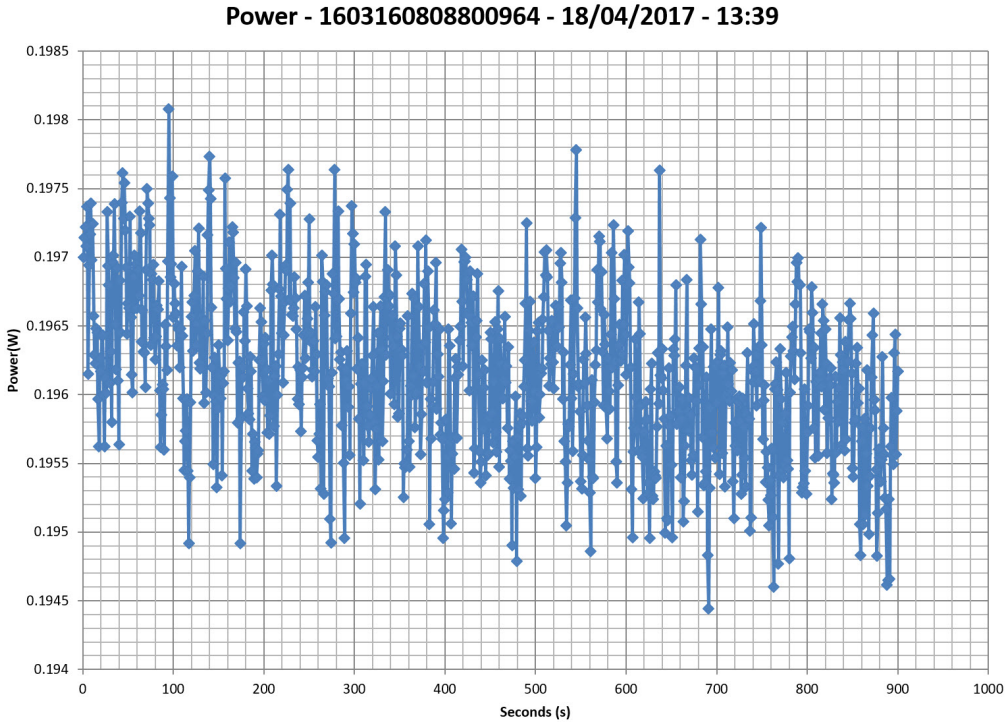
Vampire Power

Graphs

115V

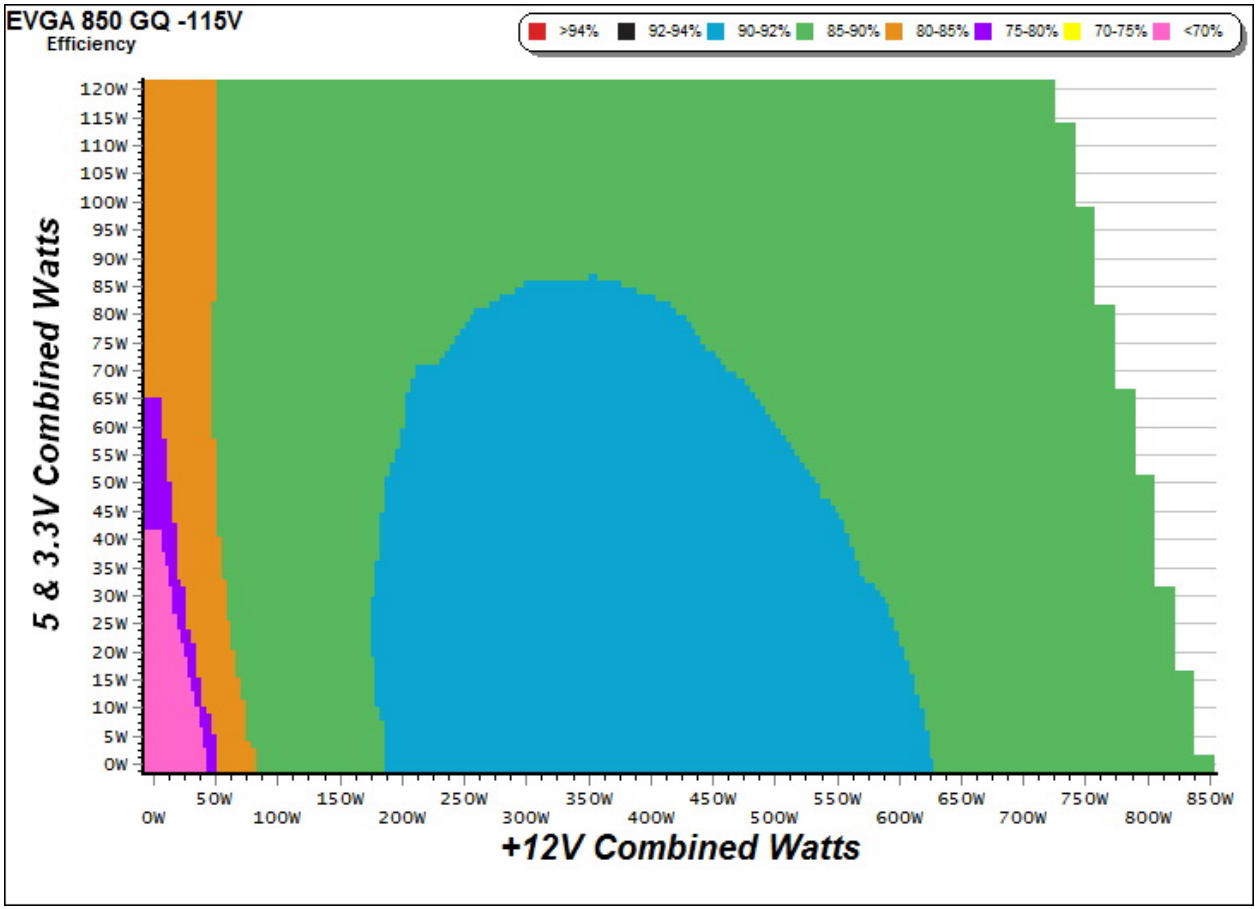


230V



Efficiency Graph

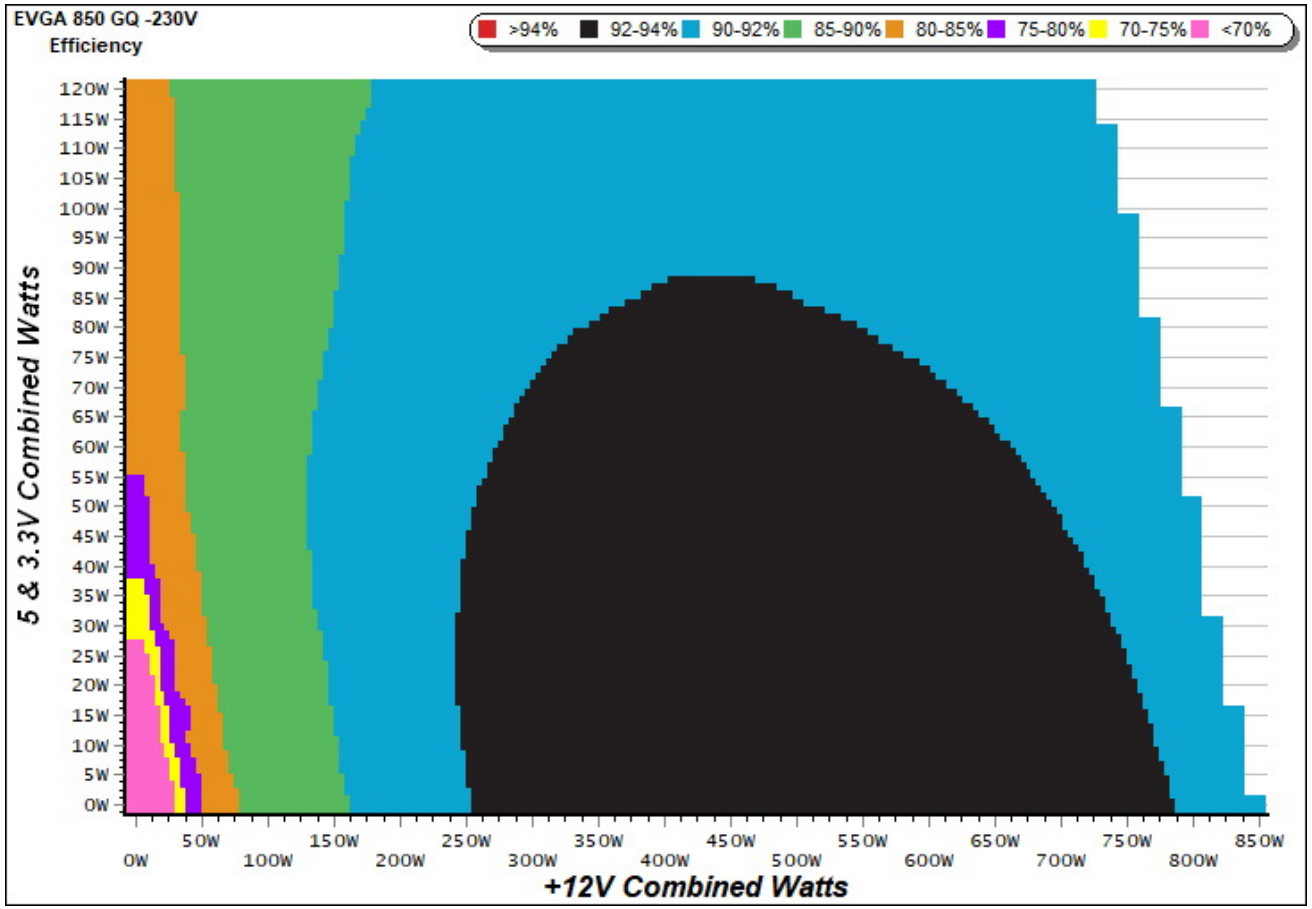
115V



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

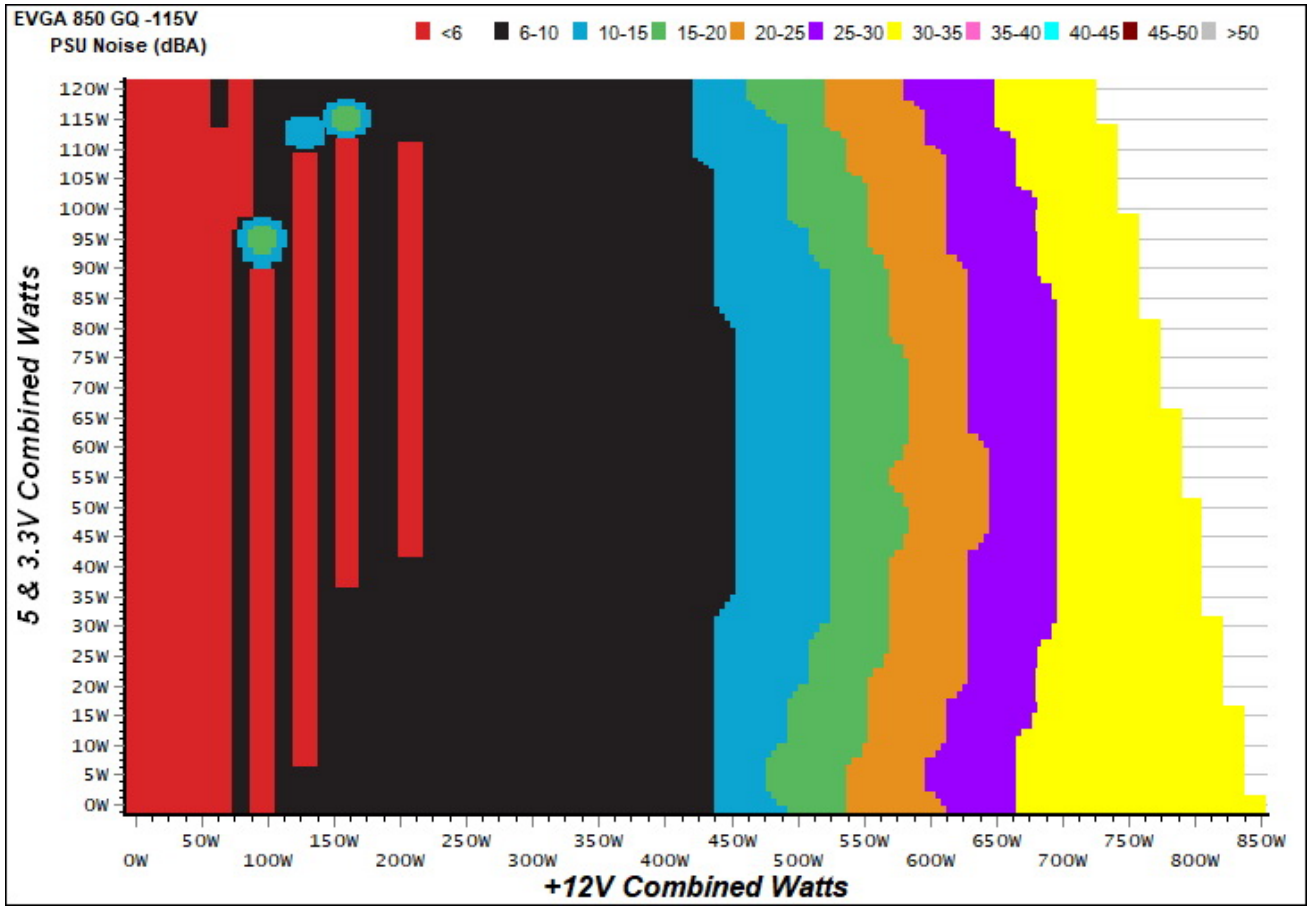


INFO

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Noise Graph

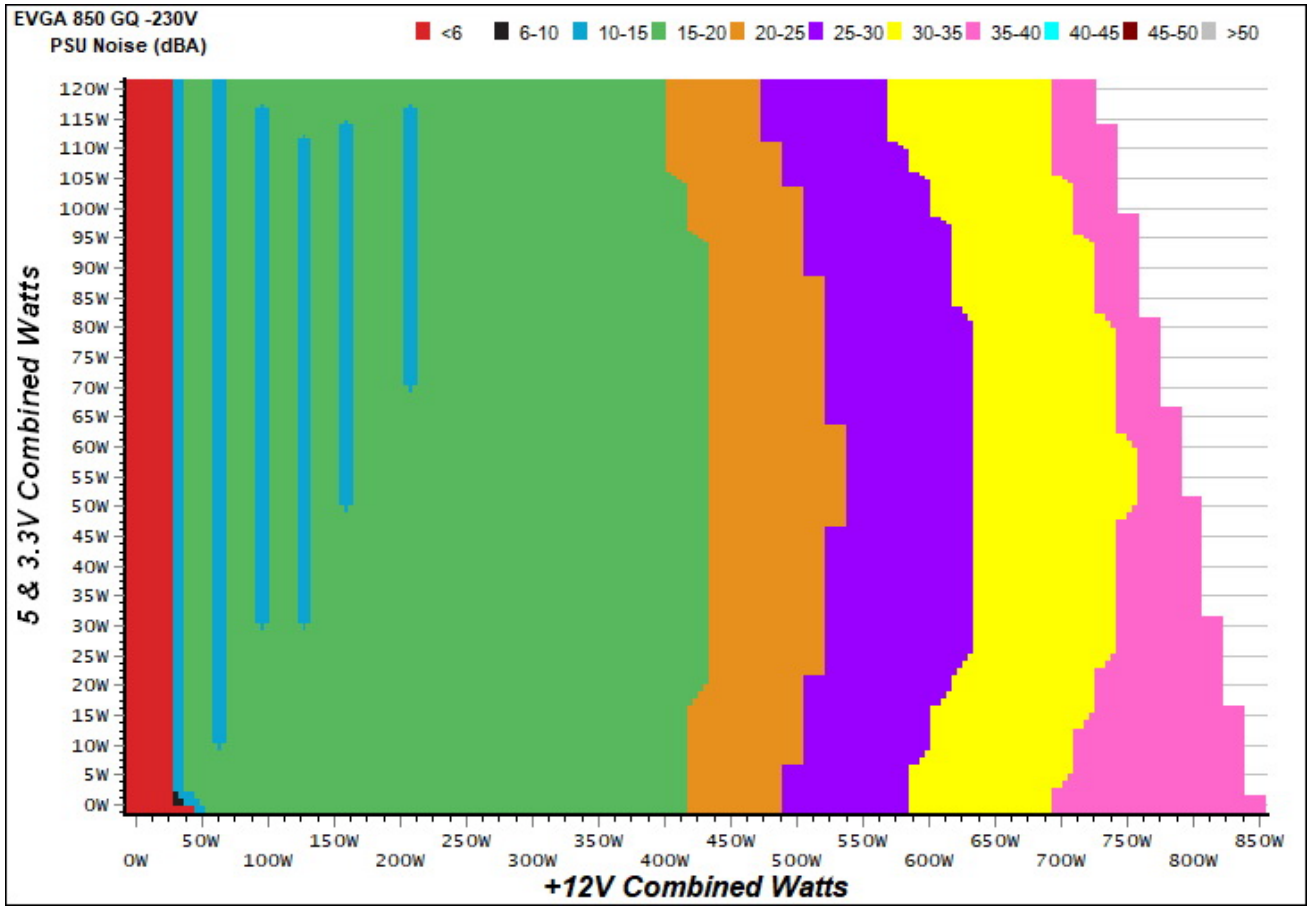
115V



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

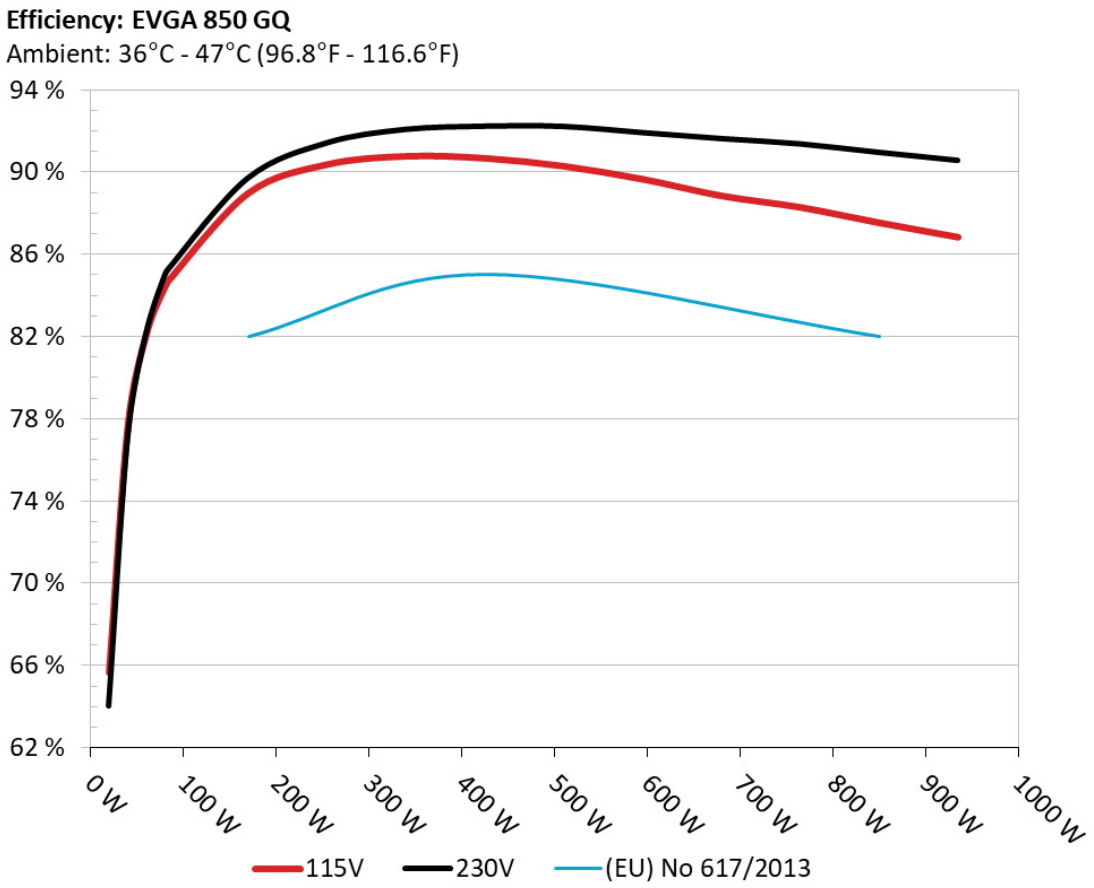


INFO

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.

Indicative Performance

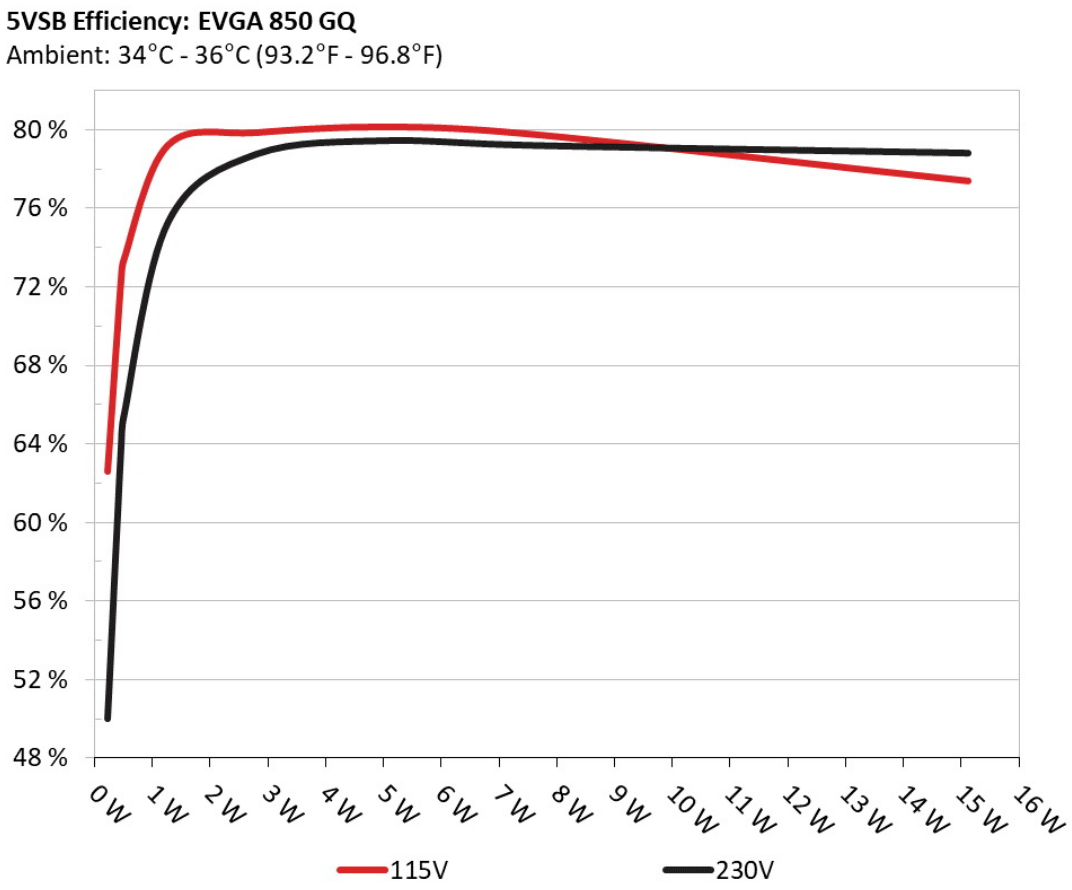
Efficiency under high ambient temperature



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	0.231	62.602%	0.031
	5.129V	0.369		115.37V
2	0.090A	0.462	72.300%	0.052
	5.127V	0.639		115.38V
3	0.550A	2.813	79.847%	0.236
	5.113V	3.523		115.37V
4	1.000A	5.100	80.138%	0.338
	5.099V	6.364		115.37V
5	1.500A	7.627	79.747%	0.401
	5.084V	9.564		115.36V
6	3.000A	15.114	77.385%	0.481
	5.038V	19.531		115.35V

230V

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.231	50.000%	0.014
	5.128V	0.462		230.92V
2	0.090A	0.462	63.724%	0.021
	5.127V	0.725		230.92V
3	0.550A	2.813	78.751%	0.099
	5.113V	3.572		230.92V
4	1.000A	5.099	79.436%	0.166
	5.098V	6.419		230.92V
5	1.500A	7.628	79.186%	0.227
	5.084V	9.633		230.92V
6	3.000A	15.116	78.799%	0.337
	5.038V	19.183		230.91V

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	5.235A	1.994A	2.000A	0.981A	84.823	84.781%	520	11.8	37.77°C	0.975
	12.083V	5.005V	3.299V	5.087V	100.050				40.96°C	115.02V
2	11.518A	2.994A	3.004A	1.179A	169.695	88.983%	520	11.8	37.98°C	0.989
	12.055V	5.000V	3.294V	5.072V	190.704				41.49°C	115.02V
3	18.170A	3.507A	3.523A	1.380A	254.969	90.384%	520	11.8	38.50°C	0.991
	12.046V	4.996V	3.290V	5.059V	282.096				42.36°C	115.03V
4	24.828A	4.004A	4.014A	1.583A	339.795	90.782%	520	11.8	38.99°C	0.995
	12.028V	4.991V	3.287V	5.045V	374.299				43.79°C	115.03V
5	31.127A	5.007A	5.025A	1.787A	424.698	90.685%	725	18.5	39.73°C	0.997
	12.023V	4.988V	3.282V	5.031V	468.321				44.73°C	115.13V
6	37.461A	6.019A	6.043A	1.991A	509.688	90.296%	998	27.9	40.53°C	0.998
	12.010V	4.984V	3.276V	5.015V	564.466				45.63°C	115.05V
7	43.794A	7.025A	7.060A	2.199A	594.627	89.666%	1320	34.2	41.58°C	0.999
	12.001V	4.978V	3.271V	4.998V	663.158				46.90°C	115.04V
8	50.126A	8.045A	8.081A	2.405A	679.613	88.853%	1600	39.9	42.71°C	0.999
	11.994V	4.974V	3.267V	4.983V	764.873				48.18°C	115.08V
9	56.915A	8.547A	8.612A	2.411A	764.652	88.292%	1690	41.6	43.97°C	0.999
	11.984V	4.971V	3.263V	4.975V	866.051				50.19°C	115.06V
10	63.436A	9.063A	9.110A	3.031A	849.487	87.542%	1690	41.6	45.43°C	0.998
	11.977V	4.969V	3.259V	4.946V	970.374				52.13°C	115.04V
11	70.594A	9.064A	9.120A	3.034A	934.422	86.841%	1690	41.6	46.60°C	0.998
	11.966V	4.967V	3.255V	4.940V	1076.019				53.83°C	115.06V
CL1	0.101A	14.024A	14.003A	0.004A	117.079	81.630%	700	17.6	42.64°C	0.982
	12.071V	4.992V	3.273V	5.086V	143.426				46.79°C	115.06V

CL2	70.793A	1.002A	1.003A	1.002A	860.645	88.213%	1690	41.6	43.78°C	0.998
	11.969V	4.981V	3.280V	5.032V	975.640				50.26°C	115.06V

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	5.224A	1.993A	1.994A	0.982A	84.576	85.355%	680	16.9	37.98°C	0.696
	12.060V	5.010V	3.305V	5.091V	99.087				43.21°C	230.65V
2	11.485A	2.993A	2.994A	1.182A	169.101	89.709%	680	16.9	38.48°C	0.948
	12.035V	5.008V	3.303V	5.078V	188.500				43.84°C	230.59V
3	18.129A	3.494A	3.482A	1.382A	254.188	91.424%	725	18.5	39.38°C	0.971
	12.036V	5.007V	3.300V	5.066V	278.033				45.17°C	230.63V
4	24.791A	3.994A	4.000A	1.583A	339.391	92.083%	965	27.3	40.44°C	0.981
	12.029V	5.005V	3.298V	5.053V	368.571				46.62°C	230.57V
5	31.122A	4.995A	5.006A	1.786A	424.697	92.239%	1230	32.8	41.10°C	0.986
	12.024V	5.003V	3.295V	5.040V	460.433				47.54°C	230.49V
6	37.378A	5.999A	6.013A	1.989A	509.229	92.226%	1445	39.2	41.61°C	0.990
	12.024V	5.001V	3.292V	5.028V	552.156				48.44°C	230.44V
7	43.724A	6.999A	7.023A	2.194A	594.562	91.927%	1752	43.0	42.91°C	0.993
	12.018V	4.999V	3.289V	5.014V	646.774				49.98°C	230.30V
8	50.050A	8.002A	8.031A	2.400A	679.895	91.636%	1835	44.4	44.16°C	0.994
	12.018V	4.998V	3.287V	5.001V	741.949				51.75°C	230.40V
9	56.780A	8.505A	8.524A	2.403A	764.819	91.376%	1835	44.4	44.78°C	0.995
	12.017V	4.997V	3.284V	4.994V	836.998				52.78°C	230.34V
10	63.252A	9.008A	9.046A	3.020A	849.659	90.965%	1835	44.4	45.34°C	0.995
	12.015V	4.995V	3.282V	4.968V	934.046				53.98°C	230.27V
11	70.313A	9.008A	9.052A	3.024A	934.431	90.576%	1835	44.4	46.36°C	0.996
	12.014V	4.995V	3.280V	4.962V	1031.649				55.68°C	230.30V
CL1	0.724A	14.000A	13.997A	0.000A	125.023	83.257%	1240	33.6	43.68°C	0.929
	12.047V	5.009V	3.299V	5.094V	150.166				48.51°C	230.80V

CL2	70.829A	0.999A	0.996A	1.000A	864.251	91.447%	1835	44.4	45.19°C	0.996
	12.014V	4.998V	3.287V	5.045V	945.084				52.40°C	230.37V

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	1.211A	0.489A	0.480A	0.196A	19.701	65.633%	0	<6.0	0.652
	12.107V	5.009V	3.304V	5.121V	30.017				115.00V
2	2.441A	0.989A	0.997A	0.391A	39.794	77.592%	0	<6.0	0.715
	12.104V	5.009V	3.305V	5.112V	51.286				115.00V
3	3.674A	1.485A	1.515A	0.586A	59.870	82.118%	520	11.8	0.775
	12.097V	5.007V	3.301V	5.101V	72.907				115.02V
4	4.903A	1.994A	2.000A	0.785A	79.832	84.419%	520	11.8	0.972
	12.085V	5.007V	3.299V	5.093V	94.566				115.02V

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	1.207A	0.491A	0.481A	0.196A	19.659	64.905%	680	16.9	0.433
	12.089V	5.012V	3.305V	5.120V	30.289				230.25V
2	2.444A	0.990A	0.997A	0.391A	39.769	77.248%	680	16.9	0.536
	12.085V	5.010V	3.304V	5.111V	51.482				230.26V
3	3.679A	1.486A	1.513A	0.586A	59.854	82.321%	680	16.9	0.685
	12.077V	5.009V	3.302V	5.101V	72.708				230.24V
4	4.912A	1.995A	1.999A	0.785A	79.794	85.025%	680	16.9	0.701
	12.060V	5.007V	3.299V	5.093V	93.848				230.24V

The results above are not used in the certification process

Ripple Measurements

115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	10.4 mV	10.5 mV	13.5 mV	22.6 mV	Pass
20% Load	13.9 mV	11.2 mV	14.5 mV	27.8 mV	Pass
30% Load	13.4 mV	12.2 mV	14.8 mV	18.4 mV	Pass
40% Load	14.2 mV	12.1 mV	15.7 mV	18.7 mV	Pass
50% Load	14.8 mV	13.8 mV	15.6 mV	21.8 mV	Pass
60% Load	15.4 mV	13.9 mV	15.6 mV	23.2 mV	Pass
70% Load	16.9 mV	15.5 mV	17.0 mV	27.5 mV	Pass
80% Load	18.7 mV	16.5 mV	18.7 mV	30.4 mV	Pass
90% Load	18.5 mV	17.6 mV	20.5 mV	31.0 mV	Pass
100% Load	21.7 mV	19.3 mV	22.1 mV	32.7 mV	Pass
110% Load	23.0 mV	21.9 mV	25.1 mV	35.1 mV	Pass
Crossload 1	10.3 mV	12.2 mV	14.1 mV	15.6 mV	Pass
Crossload 2	21.0 mV	18.6 mV	21.9 mV	29.7 mV	Pass

The results above are not used in the certification process

230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	17.0 mV	9.6 mV	9.3 mV	16.0 mV	Pass
20% Load	23.7 mV	10.5 mV	10.3 mV	17.6 mV	Pass
30% Load	26.9 mV	11.5 mV	11.1 mV	19.7 mV	Pass
40% Load	27.9 mV	13.2 mV	15.8 mV	19.7 mV	Pass
50% Load	31.0 mV	15.0 mV	17.7 mV	20.1 mV	Pass
60% Load	37.7 mV	17.3 mV	34.0 mV	21.8 mV	Pass
70% Load	36.5 mV	19.7 mV	16.9 mV	32.1 mV	Pass
80% Load	39.2 mV	21.4 mV	17.9 mV	27.9 mV	Pass

Test	12V	5V	3.3V	5VSB	Pass/Fail
90% Load	41.0 mV	23.9 mV	28.2 mV	30.1 mV	Pass
100% Load	45.1 mV	29.9 mV	33.9 mV	28.4 mV	Pass
110% Load	47.2 mV	31.7 mV	39.7 mV	30.2 mV	Pass
Crossload 1	36.2 mV	17.4 mV	11.9 mV	15.1 mV	Pass
Crossload 2	37.4 mV	26.8 mV	38.9 mV	33.9 mV	Pass

The results above are not used in the certification process

EVGA 850 GQ



Top side



Power specifications label

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 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

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