GIGABYTE™

Gigabyte P850GM

Serial Number SN20473G016834

Lab ID GB85001800

Certification ID 251800

Test Result Report ID: 21PS1800A

Certificate Issue Date: Mar 2, 2021

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	Gigabyte
Model	P850GM
OEM/ODM	MEIC
Serial Number	SN20473G016834
Product Specifications	
Manufacturer-Provided Information	
Rated Voltage (Vrms)	100-240
Rated Current (Arms)	12-6
Rated Frequency (Hz)	50-60

Rated Power (W)	850
Operating Temperature (Continuous Full Load) (°C)	
Type	ATX12V
Cable Design	Fully Modular
Warranty	-
Cybenetics Measurements	
Dimensions (W x H x D)	
Weight	
Cooling	120mm Rifle Bearing Fan (D12SH-12)
Semi-Passive Operation	✓
Cybenetics Testing Information	
Lab ID	GB85001800
Date of receipt	Feb 24, 2021
Testing Date	Feb 26, 2021
Report Issued Date	Mar 2, 2021
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 (620mm)	1	1	18AWG	No
4+4 pin EPS12V (600mm)	2	2	18AWG	No
6+2 pin PCIe (610mm+150mm)	2	4	18AWG	No
SATA (600mm+150mm+150mm+150mm)	2	8	18AWG	No
4-pin Molex (500mm+110mm+110mm) / FDD (+150mm)	1	3 / 1	18AWG	No
AC Power Cord (1400mm) - C13 coupler	1	1	18AWG	-

Power Specifications

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	20	20	70.8	3	0.3
	Watts	105		849.6	15	3.6
Total Max. Power (W)		850				

Parts Description

General Data	-
Manufacturer (OEM)	MEIC
PCB Type	Double Sided
Primary Side	-
Transient Filter	4x Y caps, 2x X caps, 2x CM chokes, 1x MOV, 1x Chipown PN8200 (Discharge IC)
Inrush Protection	NTC Thermistor 5D-15 (5 Ohm) & Relay
Bridge Rectifier(s)	2x GBU1006 (600V, 10A @ 100°C)
APFC MOSFETs	2x NCE Power NCE65T180F (650V, 13.2A @ 100°C, Rds(on): 0.18Ohm)
APFC Boost Diode	1x CREE C3D08060A (600V, 8A @ 152°C)
Bulk Cap(s)	1x Nippon Chemi-Con (400V, 820uF, 2,000h @ 105°C, KMW)
Main Switchers	2x NCE Power NCE65T180F (650V, 13.2A @ 100°C, Rds(on): 0.18Ohm)
APFC Controller	Champion CM6500UNX
Resonant Controller	Champion CM6901X
Topology	Primary side: APFC, Half-Bridge & LLC converter Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	-
+12V MOSFETs	4x Nexperia PSMN1R4-40YLD (40V, 214A @ 100°C, Rds(on): 2.65mOhm)
5V & 3.3V	DC-DC Converters: 4x Alpha & Omega AON6354 (30V, 52A @ 100°C, Rds(on): 4.4mOhm) PWM Controllers: 2x uPI-Semi uP9303B
Filtering Capacitors	Electrolytic: 9x Lelon (4-7,000h @ 105°C, RXW), 2x Lelon (4-10,000h @ 105°C, RZW), 2x Teapo (2,000h @ 105°C, SH), 1x Teapo (1-5,000h @ 105°C, SJ) Polymer: 10x Teapo, 4x no info
Supervisor IC	Grenergy GR8313 (OVP, UVP, SCP, PG)
Fan Model	Yate Loon D12SH-12 (120mm, 12V, 0.30A, Hydraulic Bearing Fan)
5VSB Circuit	-

Rectifier	1x JF Semiconductor SP10U45L SBR (45V, 10A)
Standby PWM Controller	PR8109T

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)	89.742%
Average Noise Output (>1450 Load Combinations)	37.70dBA
Average PF (>1450 Load Combinations)	0.986
Efficiency With 10W (≤500W) or 2% (>500W) Load	69.662%
Standby Power Consumption	0.0514W
Non-Accredited	
12V Ripple (Full Load)	38.42mV
5V Ripple (Full Load)	22.47mV
3.3V Ripple (Full Load)	21.31mV
5VSB Ripple (Full Load)	39.28mV
12V Load Regulation	0.32%
5V Load Regulation	1.32%
3.3V Load Regulation	2.11%
5VSB Load Regulation	1.72%
Inrush Current	79.340A

230V		
Accredited		
Average Efficiency (>1450 load combinations)		91.789%
Average Noise Output (>1450 Load Combinations)		37.71dBA
Average PF (>1450 Load Combinations)		0.958
Efficiency With 10W (≤500W) or 2% (>500W) Load		-
Standby Power Consumption		0.1478W
Non-Accredited		
12V Ripple (Full Load)		36.09mV
5V Ripple (Full Load)		23.16mV
3.3V Ripple (Full Load)		20.71mV
5VSB Ripple (Full Load)		36.94mV
12V Load Regulation		0.39%
5V Load Regulation		1.31%
3.3V Load Regulation		2.06%
5VSB Load Regulation		1.78%
Inrush Current		78.890A
Hold-Up Time & PWR_OK Signal		14.30ms
AC Loss to PWR_OK Hold Up Time		15.60ms
PWR_OK Inactive to DC Loss Delay		-1.30ms
PSU Timings: T1 (20% / 100%)	79.0ms	79.0ms
PSU Timings: T3 (20% / 100%)	262.0ms	262.0ms
OPP (22.00°C / 43.00°C)	125.36%	117.01%

Hold-Up Time & PWR_OK Signal

Hold-Up Time (ms)	14.3
AC Loss to PWR_OK Hold Up Time (ms)	15.6
PWR_OK Inactive to DC Loss Delay (ms)	-1.3

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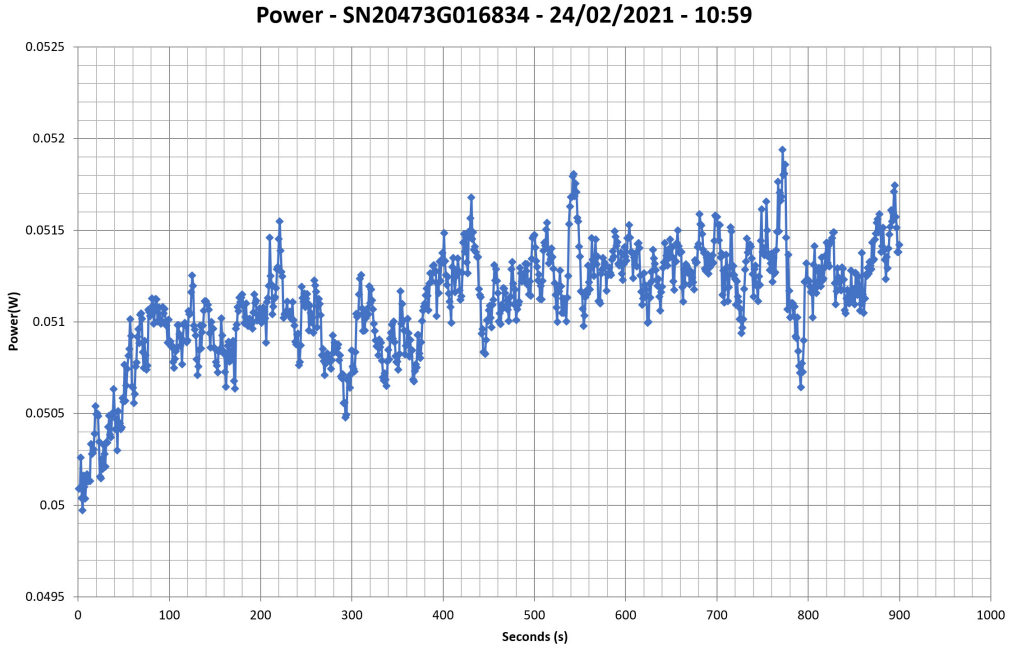
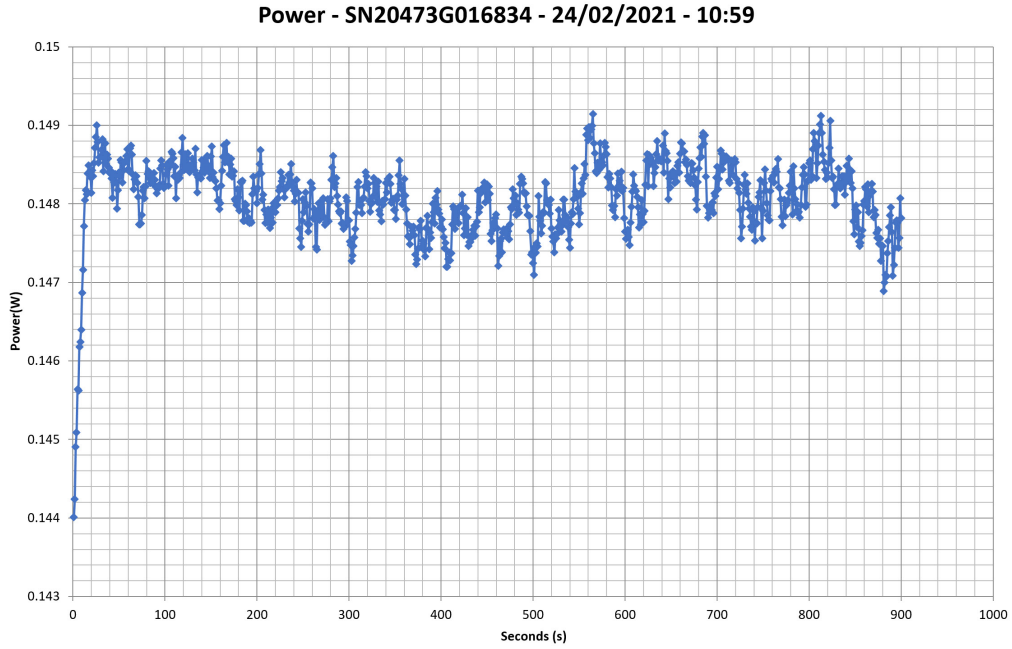
Graphs

115V

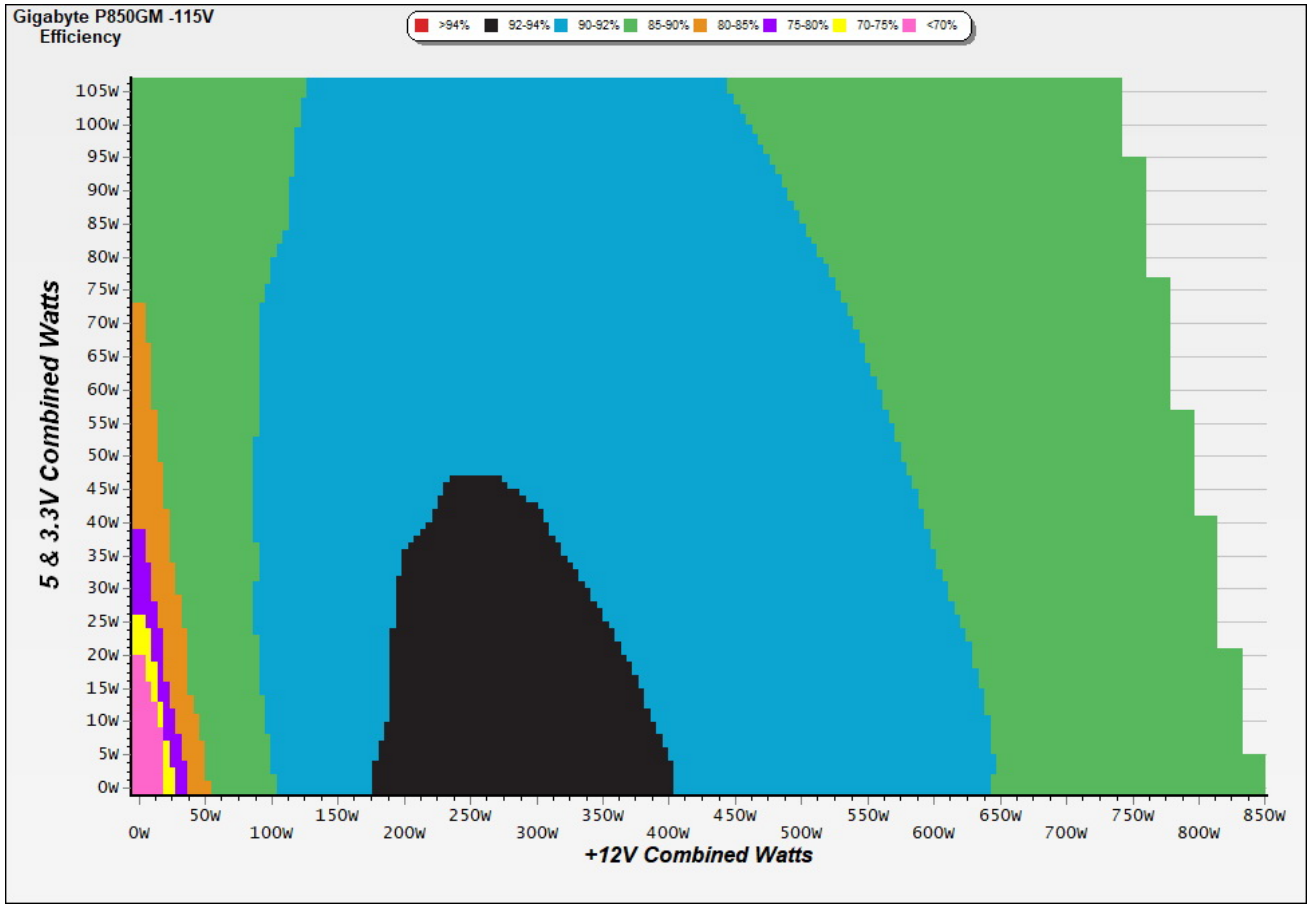


230V



Efficiency Graph

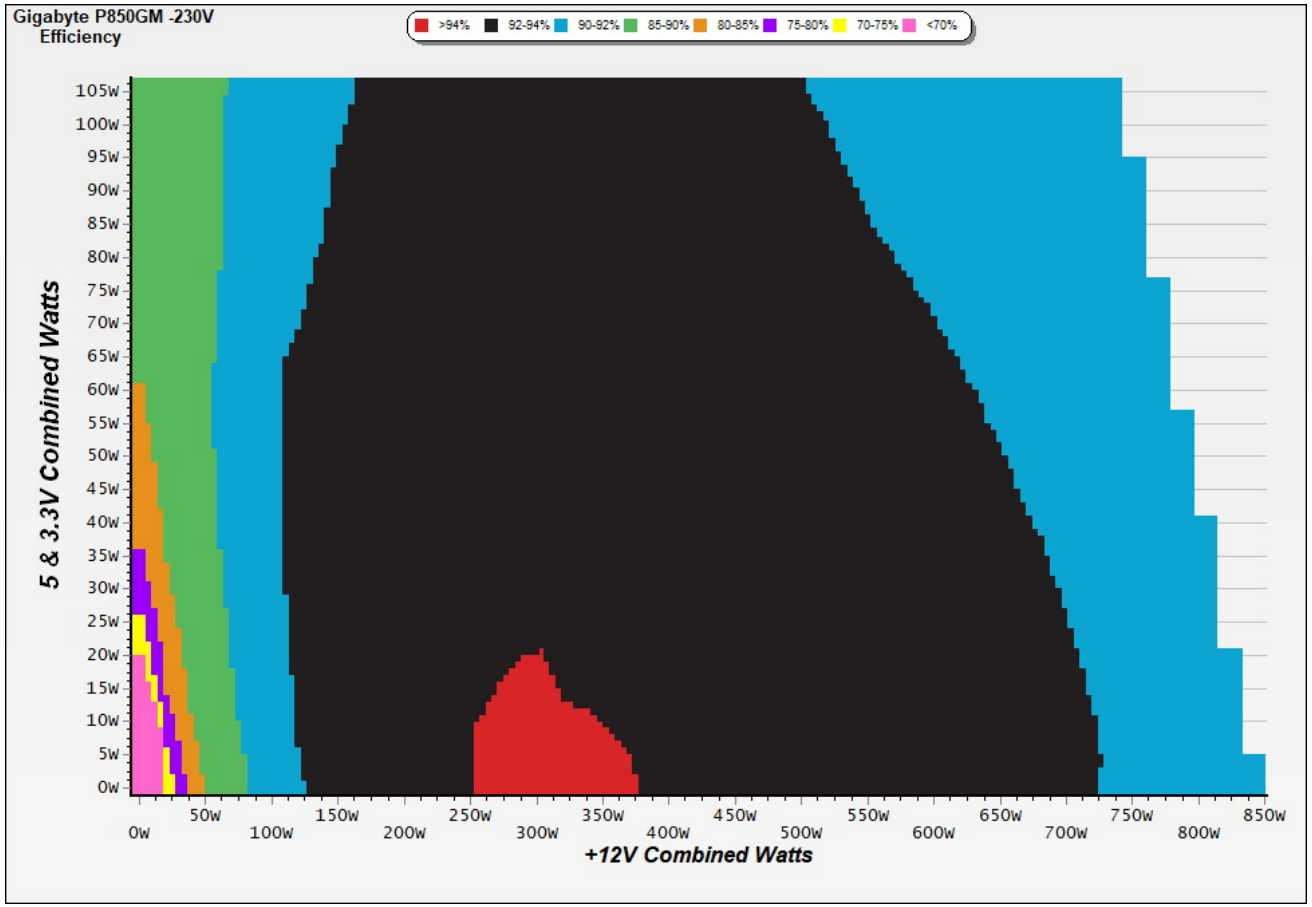
115V



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

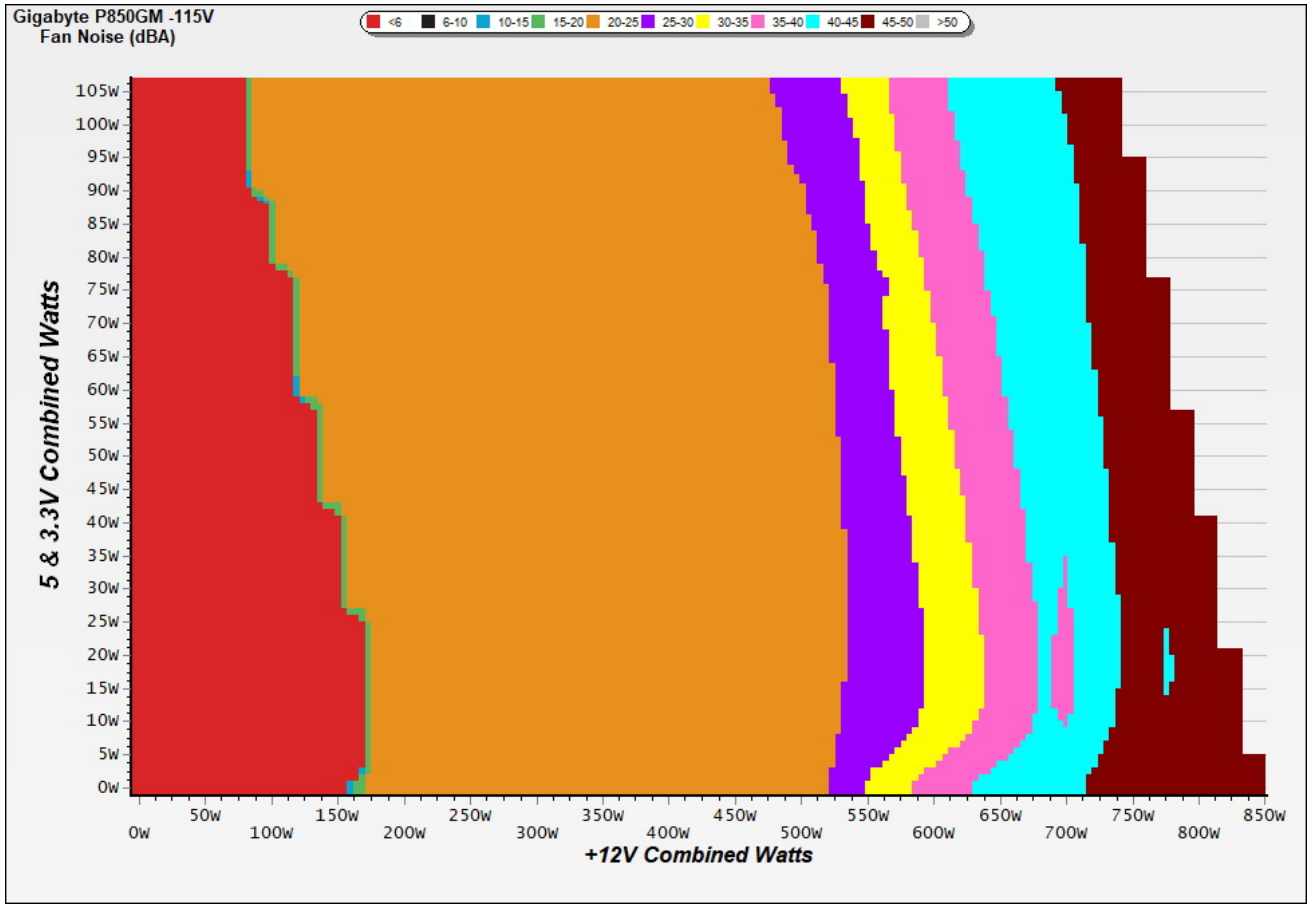


INFO

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

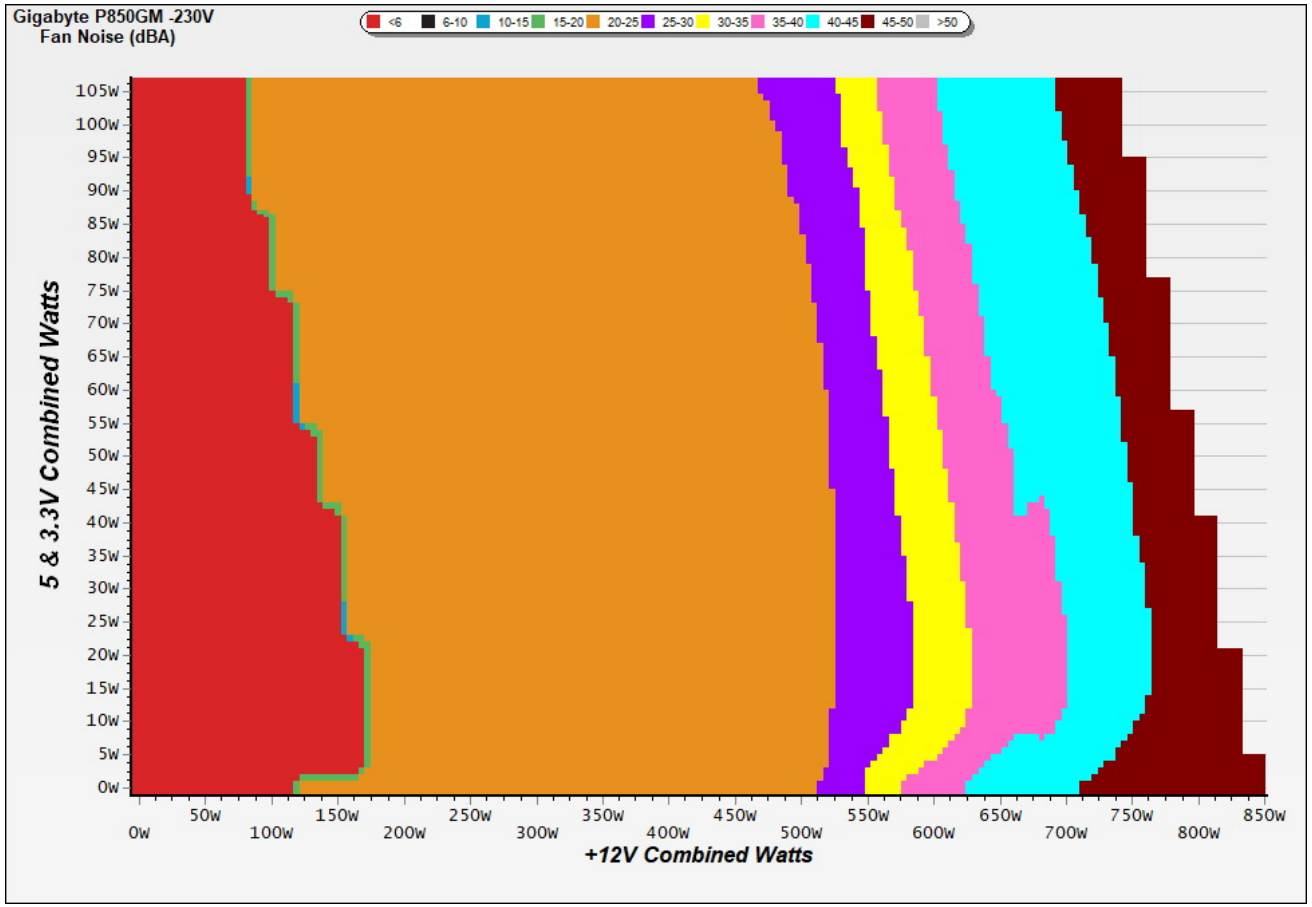
115V



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

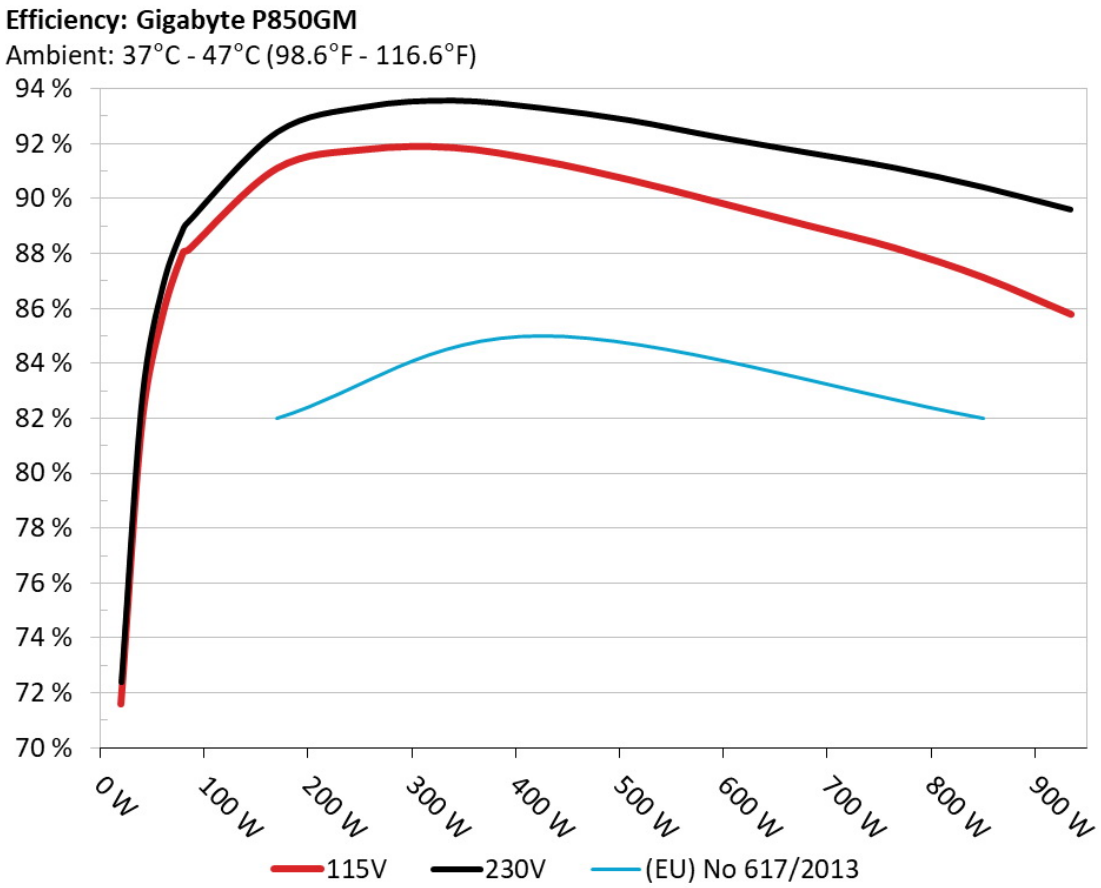


INFO

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

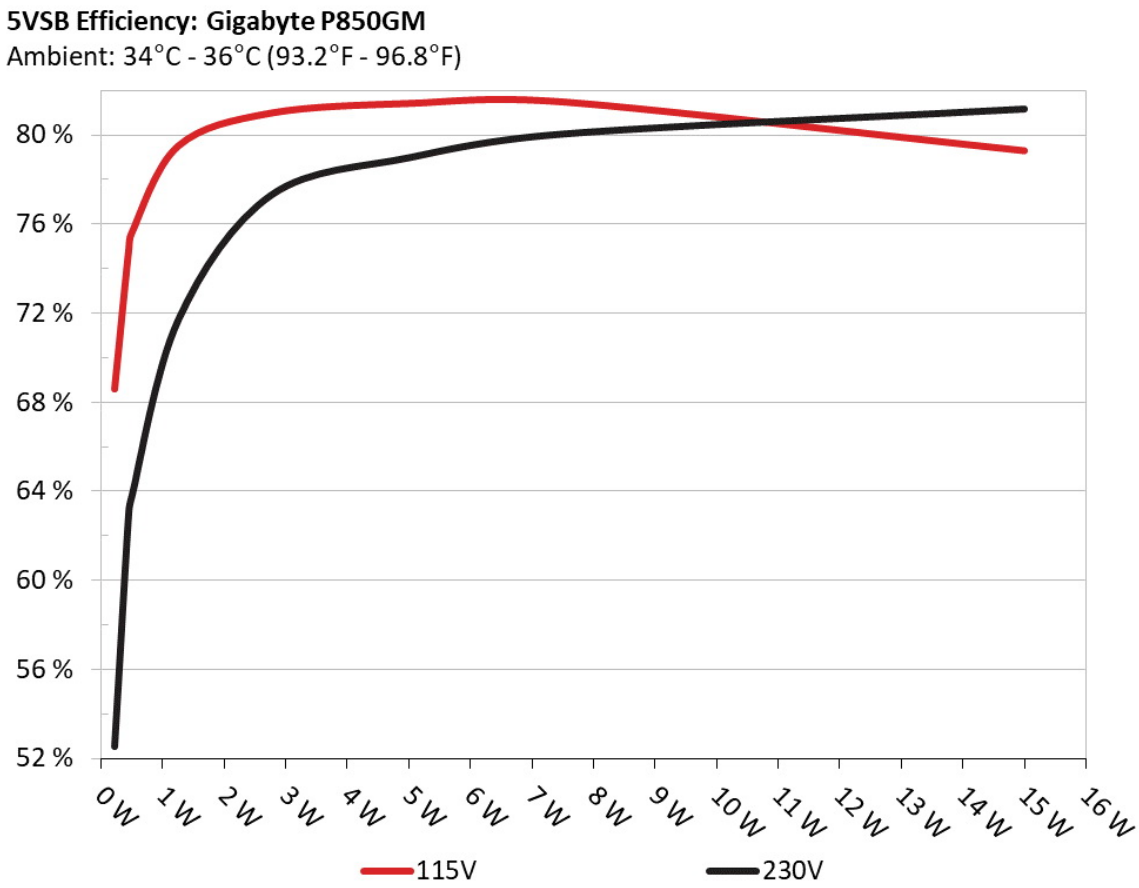
Efficiency under high ambient temperature



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	0.227	68.580%	0.046
	5.053V	0.331		115.14V
2	0.090A	0.455	74.836%	0.084
	5.051V	0.608		115.13V
3	0.550A	2.773	80.987%	0.307
	5.044V	3.424		115.13V
4	1.000A	5.035	81.420%	0.385
	5.036V	6.184		115.13V
5	1.500A	7.541	81.480%	0.427
	5.028V	9.255		115.13V
6	2.999A	15.006	79.292%	0.475
	5.004V	18.925		115.14V

230V

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.227	52.546%	0.019
	5.052V	0.432		230.32V
2	0.090A	0.455	63.019%	0.031
	5.051V	0.722		230.32V
3	0.550A	2.773	77.307%	0.139
	5.043V	3.587		230.30V
4	1.000A	5.036	78.996%	0.215
	5.036V	6.375		230.29V
5	1.500A	7.541	80.053%	0.271
	5.028V	9.420		230.29V
6	2.999A	15.006	81.166%	0.358
	5.003V	18.488		230.29V

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	5.261A	1.949A	1.940A	0.993A	84.950	88.128%	0	<6.0	42.60°C	0.971
	12.042V	5.131V	3.401V	5.034V	96.394				40.35°C	115.14V
2	11.552A	2.926A	2.917A	1.193A	169.988	91.088%	0	<6.0	43.60°C	0.983
	12.041V	5.124V	3.394V	5.027V	186.620				40.70°C	115.13V
3	18.198A	3.420A	3.408A	1.394A	254.990	91.778%	973	25.2	41.38°C	0.987
	12.031V	5.118V	3.389V	5.019V	277.834				44.65°C	115.13V
4	24.840A	3.913A	3.908A	1.596A	339.987	91.847%	976	25.3	42.02°C	0.988
	12.028V	5.111V	3.381V	5.012V	370.165				45.83°C	115.13V
5	31.119A	4.901A	4.894A	1.798A	424.718	91.369%	980	25.3	42.69°C	0.989
	12.025V	5.103V	3.372V	5.005V	464.836				46.94°C	115.13V
6	37.379A	5.891A	5.887A	2.000A	509.258	90.677%	1265	32.8	43.23°C	0.990
	12.024V	5.095V	3.364V	4.997V	561.617				48.18°C	115.13V
7	43.726A	6.880A	6.883A	2.204A	594.599	89.860%	1755	42.4	43.73°C	0.991
	12.018V	5.088V	3.356V	4.989V	661.693				49.47°C	115.13V
8	50.081A	7.875A	7.881A	2.408A	679.922	89.024%	2071	47.2	44.38°C	0.991
	12.011V	5.081V	3.349V	4.981V	763.754				50.73°C	115.13V
9	56.830A	8.375A	8.377A	2.410A	764.843	88.195%	2087	47.2	45.60°C	0.992
	12.007V	5.074V	3.342V	4.977V	867.217				52.75°C	115.13V
10	63.300A	8.880A	8.907A	3.022A	849.660	87.130%	2090	47.2	46.57°C	0.993
	12.006V	5.066V	3.334V	4.963V	975.161				54.60°C	115.12V
11	70.361A	8.893A	8.925A	3.024A	934.436	85.785%	2087	47.2	46.72°C	0.994
	12.006V	5.059V	3.327V	4.960V	1089.271				55.59°C	115.11V
CL1	0.116A	12.999A	12.997A	0.000A	111.909	85.349%	0	<6.0	46.52°C	0.979
	12.061V	5.120V	3.382V	5.044V	131.119				42.26°C	115.17V

CL2	70.819A	0.999A	0.999A	1.000A	863.871	87.542%	2084	47.2	46.38°C	0.993
	12.009V	5.070V	3.342V	5.002V	986.808				54.59°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	5.259A	1.949A	1.941A	0.993A	84.951	89.170%	0	<6.0	42.70°C	0.866
	12.046V	5.131V	3.401V	5.034V	95.269				40.32°C	230.31V
2	11.546A	2.928A	2.918A	1.193A	169.997	92.410%	0	<6.0	43.52°C	0.937
	12.047V	5.124V	3.393V	5.027V	183.960				40.47°C	230.31V
3	18.197A	3.418A	3.409A	1.395A	254.998	93.333%	973	25.2	40.54°C	0.960
	12.032V	5.119V	3.389V	5.019V	273.214				44.30°C	230.32V
4	24.840A	3.913A	3.904A	1.596A	340.002	93.559%	977	25.3	41.84°C	0.971
	12.029V	5.112V	3.381V	5.012V	363.408				45.92°C	230.32V
5	31.122A	4.899A	4.893A	1.798A	424.774	93.287%	981	25.3	42.12°C	0.976
	12.026V	5.104V	3.372V	5.004V	455.342				46.89°C	230.32V
6	37.386A	5.889A	5.888A	2.000A	509.302	92.844%	1298	33.7	42.76°C	0.980
	12.023V	5.096V	3.364V	4.996V	548.559				48.39°C	230.31V
7	43.733A	6.881A	6.885A	2.205A	594.654	92.233%	1793	42.5	43.48°C	0.982
	12.017V	5.088V	3.356V	4.988V	644.733				49.73°C	230.32V
8	50.089A	7.876A	7.882A	2.409A	679.980	91.674%	2068	47.2	43.77°C	0.984
	12.010V	5.081V	3.349V	4.980V	741.739				50.83°C	230.32V
9	56.848A	8.374A	8.378A	2.412A	764.895	91.116%	2083	47.2	44.40°C	0.985
	12.004V	5.074V	3.342V	4.976V	839.474				52.26°C	230.33V
10	63.314A	8.883A	8.912A	3.024A	849.725	90.412%	2090	47.2	45.73°C	0.986
	12.004V	5.066V	3.333V	4.960V	939.833				54.20°C	230.33V
11	70.388A	8.898A	8.932A	3.026A	934.499	89.595%	2091	47.2	46.81°C	0.987
	12.002V	5.058V	3.325V	4.956V	1043.027				55.75°C	230.33V
CL1	0.109A	12.999A	12.997A	0.000A	111.890	86.350%	0	<6.0	46.82°C	0.906
	12.059V	5.123V	3.384V	5.044V	129.577				42.29°C	230.35V

CL2	70.822A	1.000A	1.002A	1.000A	863.988	90.800%	2088	47.2	45.98°C	0.987
	12.010V	5.068V	3.340V	5.001V	951.530				54.86°C	230.33V

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	1.229A	0.487A	0.482A	0.198A	19.976	71.611%	0	<6.0	0.887
	12.070V	5.134V	3.407V	5.050V	27.895				115.16V
2	2.463A	0.974A	0.969A	0.396A	39.965	81.753%	0	<6.0	0.941
	12.045V	5.133V	3.406V	5.046V	48.885				115.15V
3	3.699A	1.461A	1.455A	0.595A	59.997	85.746%	0	<6.0	0.960
	12.042V	5.134V	3.404V	5.042V	69.971				115.14V
4	4.929A	1.949A	1.940A	0.794A	79.949	88.049%	0	<6.0	0.970
	12.041V	5.131V	3.401V	5.038V	90.801				115.14V

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	1.227A	0.486A	0.484A	0.198A	19.977	72.399%	0	<6.0	0.590
	12.089V	5.134V	3.405V	5.051V	27.593				230.31V
2	2.461A	0.974A	0.969A	0.396A	39.966	82.720%	0	<6.0	0.736
	12.056V	5.133V	3.404V	5.046V	48.315				230.31V
3	3.697A	1.461A	1.454A	0.595A	59.998	86.829%	0	<6.0	0.813
	12.050V	5.134V	3.403V	5.042V	69.099				230.31V
4	4.926A	1.948A	1.942A	0.794A	79.950	88.940%	0	<6.0	0.858
	12.048V	5.132V	3.401V	5.038V	89.892				230.31V

The results above are not used in the certification process

Ripple Measurements

115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	22.60mV	11.90mV	10.30mV	30.20mV	Pass
20% Load	39.90mV	16.00mV	11.90mV	36.30mV	Pass
30% Load	28.00mV	15.20mV	12.30mV	34.50mV	Pass
40% Load	26.70mV	14.90mV	12.20mV	33.20mV	Pass
50% Load	24.90mV	15.80mV	12.60mV	35.00mV	Pass
60% Load	26.40mV	17.30mV	13.40mV	31.90mV	Pass
70% Load	24.80mV	18.40mV	15.30mV	35.60mV	Pass
80% Load	27.30mV	19.10mV	17.60mV	34.80mV	Pass
90% Load	28.40mV	20.00mV	18.40mV	35.70mV	Pass
100% Load	38.40mV	22.50mV	21.30mV	39.30mV	Pass
110% Load	39.90mV	23.30mV	20.50mV	41.50mV	Pass
Crossload1	23.30mV	20.40mV	21.90mV	31.60mV	Pass
Crossload2	38.90mV	14.60mV	12.90mV	37.70mV	Pass

The results above are not used in the certification process

230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	21.30mV	9.80mV	10.60mV	31.00mV	Pass
20% Load	38.90mV	12.60mV	11.20mV	30.30mV	Pass
30% Load	28.10mV	13.00mV	13.40mV	33.70mV	Pass
40% Load	24.70mV	12.50mV	12.20mV	31.30mV	Pass
50% Load	23.80mV	14.40mV	12.90mV	33.60mV	Pass
60% Load	22.70mV	15.40mV	13.60mV	32.50mV	Pass
70% Load	25.10mV	16.70mV	14.60mV	33.70mV	Pass
80% Load	25.00mV	17.90mV	16.70mV	32.90mV	Pass

Test	12V	5V	3.3V	5VSB	Pass/Fail
90% Load	26.60mV	19.80mV	18.10mV	33.30mV	Pass
100% Load	36.10mV	23.20mV	20.70mV	36.90mV	Pass
110% Load	37.40mV	22.80mV	21.50mV	37.40mV	Pass
Crossload1	22.50mV	21.40mV	22.40mV	29.40mV	Pass
Crossload2	35.10mV	14.90mV	12.30mV	36.30mV	Pass

The results above are not used in the certification process

Gigabyte P850GM

Top side

Power specifications label

Cybenetics bietet freiwillige Zertifizierungsprogramme für Netzteile – ETA für Effizienz, LAMBDA für Lautstärke und SAFE für Sicherheit und korrekten Betrieb – sowie für Kühlprodukte mit DELTA für die Schalldämmung von Gehäusen und PHI für Luftstrom und statischen Druck von Lüftern

CYBENETICS LTD Syrou 6, Latsia, 2231, Nicosia Cyprus

www.cybenetics.com - info@cybenetics.com