EFFICIENCY AND NOISE LEVEL CERTIFICATIONS

Anex

Gigabyte Aorus 850

Lab ID#: 467
Receipt Date: Aug 13, 2018
Test Date: Aug 23, 2018

Report:
Report Date: Aug 27, 2018

DUT INFORMATION

Brand	Gigabyte
Manufacturer (OEM)	MEIC
Series	Aorus
Model Number	GP-AP850GM
Serial Number	SN18273G003569
DUT Notes	

DUT SPECIFICATIONS

Rated Voltage (Vrms)	100-240
Rated Current (Arms)	12-6
Rated Frequency (Hz)	50-60
Rated Power (W)	850
Type	ATX12V
Cooling	135mm Double Ball Bearing Fan (D14BH-12)
Semi-Passive Operation	✓
Cable Design	Fully Modular

POWER SPECIFICATIONS

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	20	20	70.5	3	0.3
	Watts	120		846	15	3.6
Total Max. Power (W)		850				

CABLES AND CONNECTORS

Modular Cables

Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors
ATX connector 20+4 pin (660mm)	1	1	16-22AWG	Yes
4+4 pin EPS12V (800mm)	1	1	18AWG	Yes
4+4 pin EPS12V (650mm)	1	1	18AWG	Yes
6+2 pin PCIe (750mm)	2	2	18AWG	Yes
6+2 pin PCIe (650mm+150mm)	2	4	18AWG	Yes
SATA (550mm+100mm+100mm)+4-pin Molex (+100mm)	1	3 / 1	18AWG	No
SATA (460mm+100mm+100mm)+4-pin Molex (+100mm)	1	3 / 1	18AWG	No
4-pin Molex (450mm+100mm+100mm)+FDD (+100mm)	1	3 / 1	18-22AWG	No
FDD Adapter (+105mm)	1	1	22AWG	No
AC Power Cord (1400mm) - C13 coupler	1	1	16AWG	-

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General Data	
Manufacturer (OEM)	MEIC
Primary Side	
Transient Filter	4x Y caps, 2x X caps, 2x CM chokes, 1x MOV, 1x CM02X
Inrush Protection	NTC Thermistor & Relay
Bridge Rectifier(s)	2x GBU1006 (600V, 10A @ 100°C)
APFC MOSFETS	2x Alpha & Omega AOT42S60 (600V, 25A @ 100°C, 0.28Ohm @ 150°C)
APFC Boost Diode	1x CREE C3D08060A (600V, 8A @ 152°C)
Hold-up Cap(s)	2x Nippon Chemi-Con (400V, 390uF, 2000h @ 105 °C, KMR)
Main Switchers	2x Alpha & Omega AOT42S60 (600V, 25A @ 100°C, 0.28Ohm @ 150°C)
APFC Controller	Champion CM6500UNX & CM03X Green PFC controller
LLC Resonant Controller	Champion CM6901
Topology	Primary side: Half-Bridge & LLC Resonant Controller Secondary side: Synchronous Rectification & DC converters
Secondary Side	
+12V MOSFETS	4x Alpha & Omega AOT2142L (40V, 120A @ 100°C, 1.9mOhm)
5V & 3.3V	DC-DC Converters: 8x GV8G16 PWM Controller: 2x NCP1587
Filtering Capacitors	Electrolytics: Chemi-Con (1-5,000 @ 105°C, KZE), Chemi-Con (4-10,000h @ 105°C, KY) Polymers Chemi-Con
Supervisor IC	Weltrend WT7527A (OVP, UVP, SCP, OCP, PG)
Fan Model	Yate Loon D14BH-12 (140mm, 12V, 0.70A, 2800 RPM, 140CFM, 48.5 dBA, Double-Ball Bearing)
5VSB Circuit	
Rectifier	1x TPD65R1K2C (650V, 4A @ 25°C, 1.2Ohm)
Standby PWM Controller	SI8016HSP8

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RESULTS

Temperature Range (°C /°F)	30-32 / 86-89.6
ErP Lot 3/6 Ready	✓
(EU) No 617/2013 Compliance	✓

115V

Average Efficiency	89.708%
Efficiency With 10W (≤500W) or 2% (>500W)	62.829
Average Efficiency 5VSB	78.019%
Standby Power Consumption (W)	0.0238793
Average PF	0.984
Avg Noise Output	32.06 dB(A)
Efficiency Rating (ETA)	PLATINUM
Noise Rating (LAMBDA)	Standard++

230V

Average Efficiency	91.666%
Average Efficiency 5VSB	78.398%
Standby Power Consumption (W)	0.0371859
Average PF	0.945
Avg Noise Output	32.35 dB(A)
Efficiency Rating (ETA)	PLATINUM
Noise Rating (LAMBDA)	Standard++

TEST EQUIPMENT

Electronic Loads	Chroma 6314A x2 63123A x6 63102A 63101A	Chroma 63601-5 x4 Chroma 63600-2 x2 63640-80-80 x20 63610-80-20 x2
AC Sources	Chroma 6530, Chroma 61604, Keysight AC6804B	
Power Analyzers	N4L PPA1530 x2, N4L PPA5530	
Oscilloscopes	Picoscope 4444 & 3424, Keysight DSOX3024A, Rigol DS2072A	
Voltmeter	Keithley 2015 THD 6.5 Digit	
Sound Analyzer	Bruel & Kjaer 2250-L G4	
Microphone	Bruel & Kjaer Type 4955-A, Bruel & Kjaer Type 4189	
Data Loggers	Picoscope TC-08 x2, Labjack U3-HV x2	

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

Hold-Up Time (ms)	16.8
AC Loss to PWR_OK Hold Up Time (ms)	15.6
PWR_OK Inactive to DC Loss Delay (ms)	1.2

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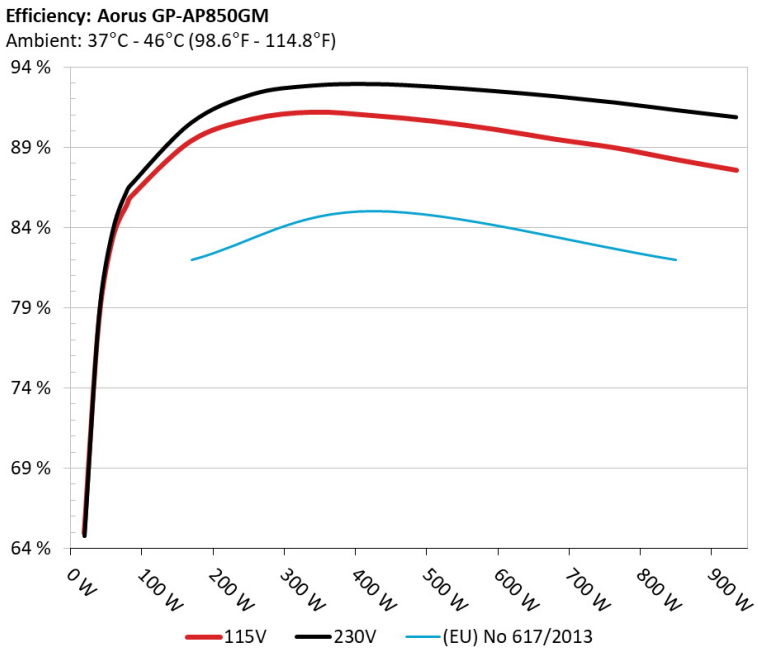
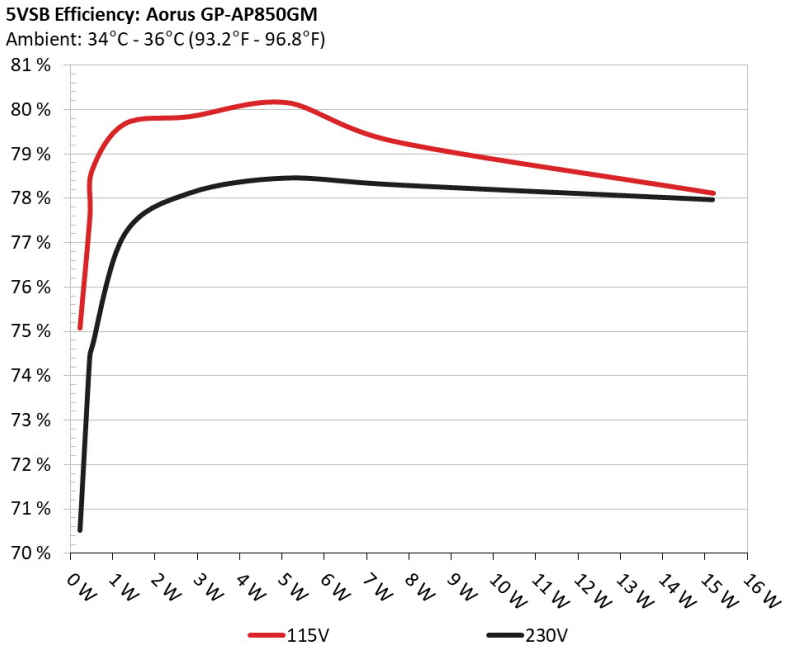
EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE



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



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

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.232	75.081%	0.031
	5.149V	0.309		115.10V
2	0.090A	0.463	77.554%	0.058
	5.147V	0.597		115.10V
3	0.550A	2.824	79.842%	0.250
	5.135V	3.537		115.10V
4	1.000A	5.122	80.156%	0.331
	5.122V	6.390		115.10V
5	1.500A	7.661	79.282%	0.377
	5.107V	9.663		115.10V
6	3.000A	15.190	78.118%	0.437
	5.063V	19.445		115.10V

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.232	70.517%	0.010
	5.149V	0.329		230.27V
2	0.090A	0.463	74.437%	0.018
	5.147V	0.622		230.27V
3	0.550A	2.824	78.119%	0.100
	5.134V	3.615		230.27V
4	1.000A	5.121	78.459%	0.166
	5.121V	6.527		230.27V
5	1.500A	7.660	78.307%	0.221
	5.106V	9.782		230.27V
6	3.000A	15.187	77.970%	0.315
	5.062V	19.478		230.27V

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115V

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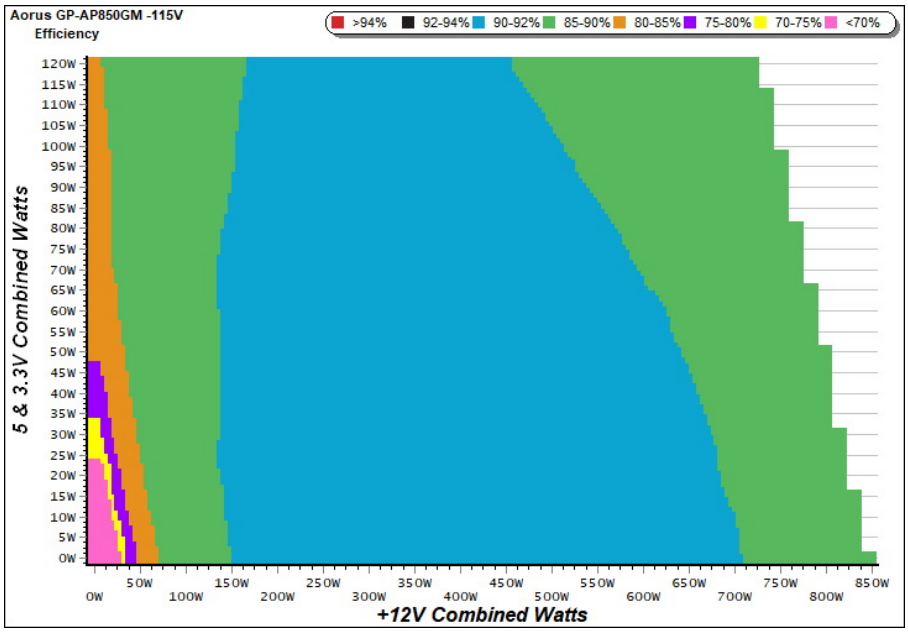
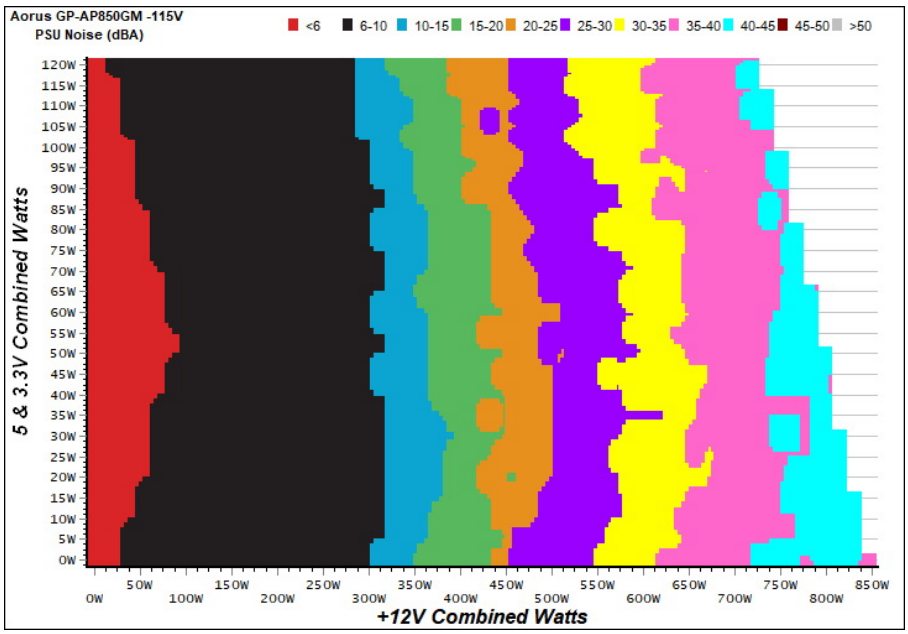
EFFICIENCY GRAPH 115V



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

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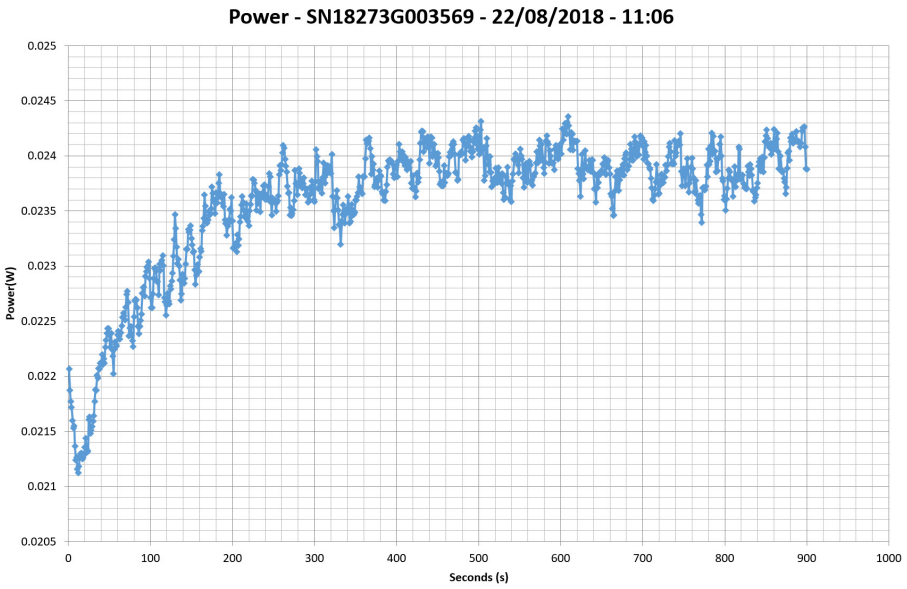
VAMPIRE POWER -115V



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

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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	5.159A	1.968A	1.942A	0.978A	84.888	85.923%	0	<6.0	46.65°C	0.963
	12.267V	5.083V	3.398V	5.114V	98.796				40.33°C	115.12V
2	11.298A	2.959A	2.920A	1.176A	169.342	89.404%	532	14.2	40.77°C	0.983
	12.254V	5.071V	3.388V	5.101V	189.413				49.04°C	115.11V
3	17.828A	3.455A	3.399A	1.376A	254.476	90.768%	590	17.0	41.18°C	0.989
	12.255V	5.064V	3.382V	5.089V	280.358				51.70°C	115.11V
4	24.374A	3.955A	3.907A	1.576A	339.688	91.208%	765	24.2	41.91°C	0.987
	12.246V	5.058V	3.378V	5.077V	372.432				53.10°C	115.11V
5	30.606A	4.948A	4.894A	1.777A	425.015	90.992%	860	27.9	42.12°C	0.986
	12.237V	5.051V	3.371V	5.064V	467.092				54.28°C	115.35V
6	36.778A	5.950A	5.883A	1.980A	509.536	90.642%	1075	33.7	42.67°C	0.988
	12.228V	5.044V	3.366V	5.051V	562.141				55.19°C	115.11V
7	43.028A	6.950A	6.876A	2.184A	594.873	90.139%	1255	37.8	43.30°C	0.989
	12.219V	5.037V	3.360V	5.038V	659.951				56.06°C	115.10V
8	49.284A	7.954A	7.871A	2.388A	680.216	89.520%	1480	42.2	43.63°C	0.990
	12.211V	5.030V	3.354V	5.025V	759.846				57.20°C	115.11V
9	55.946A	8.463A	8.360A	2.391A	765.160	88.976%	1630	43.7	44.61°C	0.991
	12.202V	5.023V	3.349V	5.019V	859.963				58.82°C	115.09V
10	62.349A	8.972A	8.884A	3.004A	850.007	88.249%	1760	45.5	45.70°C	0.992
	12.194V	5.017V	3.344V	4.994V	963.187				60.22°C	115.11V
11	69.346A	8.981A	8.893A	3.008A	934.773	87.580%	1830	46.5	46.34°C	0.992
	12.186V	5.012V	3.340V	4.989V	1067.342				61.74°C	115.09V
CL1	0.151A	14.002A	13.999A	0.000A	120.115	84.501%	0	0	46.79°C	0.977
	12.260V	5.065V	3.382V	5.125V	142.146				42.00°C	115.16V
CL2	70.522A	1.002A	1.001A	1.000A	873.623	88.531%	1780	45.8	45.64°C	0.992
	12.197V	5.030V	3.356V	5.067V	986.802				60.32°C	115.09V

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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	1.172A	0.492A	0.469A	0.194A	19.470	64.937%	0	<6.0	0.796
	12.266V	5.086V	3.400V	5.143V	29.983				115.11V
2	2.414A	0.984A	0.969A	0.390A	39.903	78.102%	0	<6.0	0.905
	12.264V	5.084V	3.398V	5.136V	51.091				115.11V
3	3.593A	1.477A	1.440A	0.585A	59.481	83.344%	0	<6.0	0.948
	12.268V	5.084V	3.398V	5.128V	71.368				115.12V
4	4.833A	1.968A	1.942A	0.781A	79.883	85.471%	0	<6.0	0.960
	12.266V	5.083V	3.398V	5.120V	93.462				115.12V

RIPPLE MEASUREMENTS 115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	4.9 mV	6.2 mV	13.1 mV	5.2 mV	Pass
20% Load	22.5 mV	7.2 mV	13.2 mV	6.4 mV	Pass
30% Load	7.1 mV	6.1 mV	12.3 mV	4.9 mV	Pass
40% Load	5.6 mV	6.5 mV	11.9 mV	4.9 mV	Pass
50% Load	5.6 mV	7.3 mV	12.3 mV	4.7 mV	Pass
60% Load	6.4 mV	8.9 mV	13.6 mV	6.5 mV	Pass
70% Load	7.0 mV	10.1 mV	14.5 mV	6.7 mV	Pass
80% Load	8.3 mV	10.3 mV	14.2 mV	7.7 mV	Pass
90% Load	7.7 mV	9.1 mV	15.2 mV	6.4 mV	Pass
100% Load	11.3 mV	14.4 mV	18.2 mV	10.3 mV	Pass
110% Load	77.1 mV	28.6 mV	52.9 mV	26.6 mV	Fail
Crossload 1	27.1 mV	16.9 mV	19.3 mV	5.8 mV	Pass
Crossload 2	9.9 mV	11.5 mV	16.1 mV	7.8 mV	Pass

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230V

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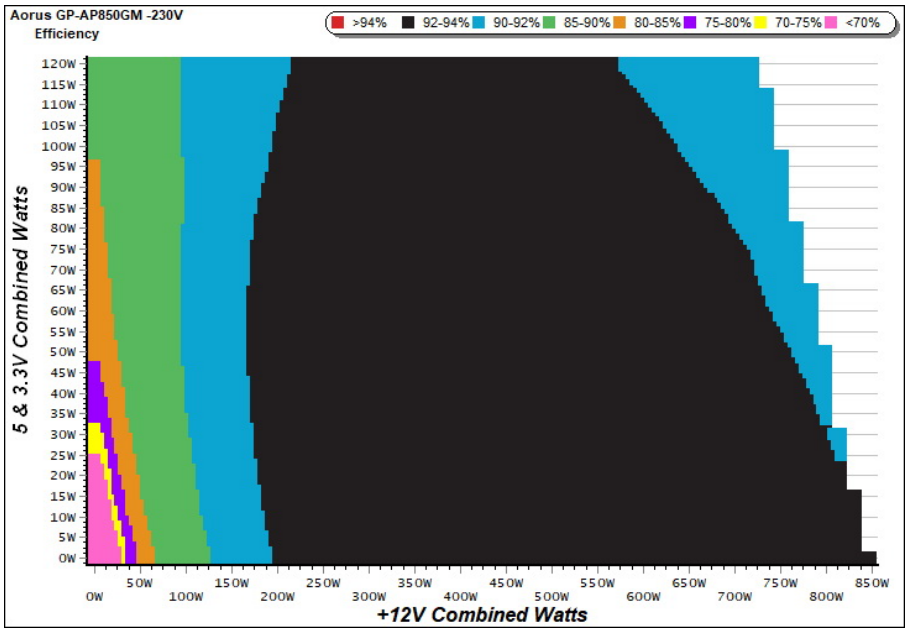
EFFICIENCY GRAPH 230V



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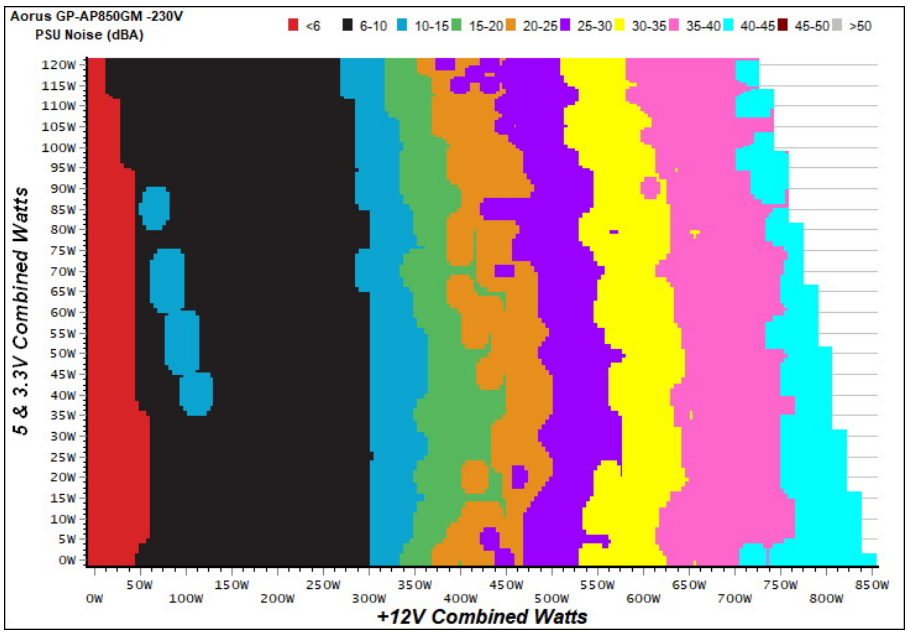
NOISE GRAPH 230V



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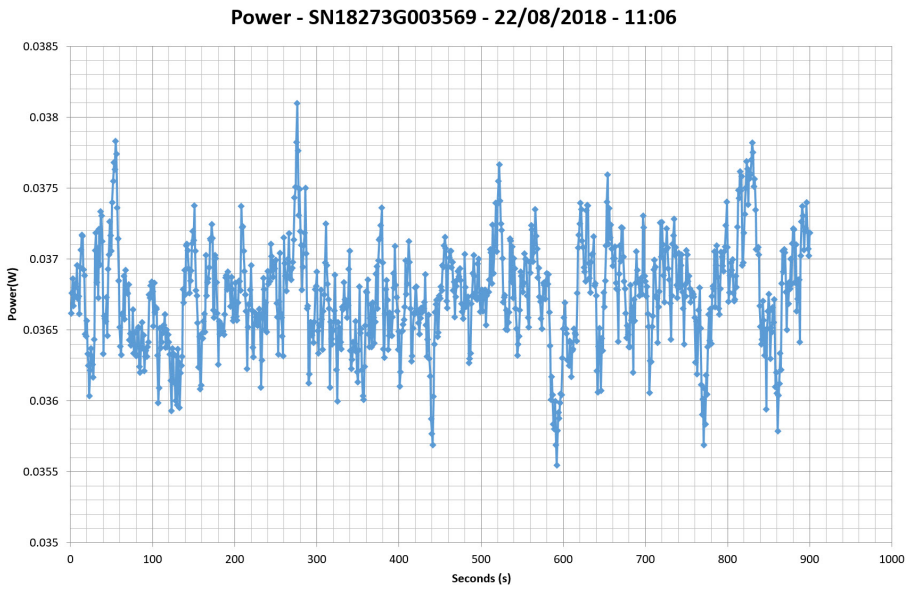
VAMPIRE POWER -230V



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Gigabyte Aorus 850

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	5.158A	1.967A	1.940A	0.978A	84.857	86.683%	0	<6.0	46.80°C	0.790
	12.265V	5.083V	3.399V	5.114V	97.893				40.05°C	230.30V
2	11.298A	2.959A	2.920A	1.176A	169.330	90.547%	500	12.8	40.32°C	0.907
	12.253V	5.071V	3.388V	5.101V	187.008				47.55°C	230.33V
3	17.829A	3.456A	3.399A	1.375A	254.461	92.316%	605	17.1	41.05°C	0.944
	12.253V	5.065V	3.383V	5.090V	275.641				48.65°C	230.33V
4	24.375A	3.955A	3.905A	1.576A	339.668	92.868%	730	23.1	41.86°C	0.960
	12.245V	5.058V	3.378V	5.077V	365.752				50.15°C	230.30V
5	30.605A	4.949A	4.893A	1.777A	424.980	92.962%	905	29.1	42.34°C	0.968
	12.236V	5.051V	3.372V	5.065V	457.154				51.25°C	230.30V
6	36.779A	5.949A	5.880A	1.980A	509.499	92.798%	1085	34.1	42.70°C	0.973
	12.227V	5.044V	3.366V	5.052V	549.040				52.02°C	230.69V
7	43.029A	6.950A	6.876A	2.183A	594.839	92.527%	1310	39.0	43.12°C	0.976
	12.218V	5.037V	3.360V	5.039V	642.880				53.52°C	230.91V
8	49.301A	7.957A	7.873A	2.389A	680.225	92.201%	1285	38.4	43.26°C	0.978
	12.207V	5.028V	3.353V	5.024V	737.760				54.42°C	230.34V
9	55.959A	8.466A	8.364A	2.392A	765.222	91.806%	1560	43.0	44.25°C	0.981
	12.200V	5.022V	3.348V	5.018V	833.524				55.89°C	230.32V
10	62.370A	8.974A	8.886A	3.005A	850.076	91.338%	1745	45.4	45.30°C	0.982
	12.191V	5.016V	3.343V	4.993V	930.692				57.29°C	230.36V
11	69.359A	8.983A	8.896A	3.009A	934.864	90.893%	1830	46.5	46.36°C	0.983
	12.185V	5.011V	3.339V	4.987V	1028.535				59.38°C	230.38V
CL1	0.156A	14.003A	14.002A	0.000A	120.165	85.691%	0	0	47.63°C	0.863
	12.259V	5.064V	3.381V	5.125V	140.230				42.18°C	230.57V
CL2	70.524A	1.004A	1.000A	1.000A	873.507	91.671%	1800	46.0	45.06°C	0.982
	12.195V	5.028V	3.353V	5.066V	952.868				57.20°C	230.33V

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Gigabyte Aorus 850

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	1.175A	0.491A	0.469A	0.194A	19.506	64.755%	0	<6.0	0.453
	12.267V	5.088V	3.403V	5.144V	30.123				230.46V
2	2.415A	0.982A	0.969A	0.389A	39.915	78.525%	0	<6.0	0.595
	12.268V	5.086V	3.401V	5.136V	50.831				230.44V
3	3.590A	1.475A	1.441A	0.585A	59.431	83.856%	0	<6.0	0.700
	12.266V	5.084V	3.399V	5.128V	70.873				230.29V
4	4.831A	1.967A	1.941A	0.781A	79.844	86.387%	0	<6.0	0.776
	12.265V	5.083V	3.398V	5.120V	92.426				230.44V

RIPPLE MEASUREMENTS 230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	3.5 mV	5.5 mV	9.4 mV	4.1 mV	Pass
20% Load	23.0 mV	6.5 mV	9.5 mV	5.4 mV	Pass
30% Load	7.3 mV	5.2 mV	9.3 mV	4.1 mV	Pass
40% Load	5.8 mV	7.0 mV	9.3 mV	5.7 mV	Pass
50% Load	5.6 mV	7.6 mV	9.7 mV	5.1 mV	Pass
60% Load	5.4 mV	7.7 mV	10.4 mV	5.1 mV	Pass
70% Load	5.5 mV	7.9 mV	11.3 mV	5.0 mV	Pass
80% Load	6.1 mV	7.8 mV	10.5 mV	4.7 mV	Pass
90% Load	7.0 mV	9.5 mV	13.1 mV	5.9 mV	Pass
100% Load	10.2 mV	13.9 mV	14.0 mV	7.7 mV	Pass
110% Load	116.4 mV	14.9 mV	15.3 mV	9.7 mV	Pass
Crossload 1	26.3 mV	16.4 mV	16.7 mV	6.2 mV	Pass
Crossload 2	9.5 mV	10.7 mV	13.0 mV	5.9 mV	Pass

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4004 MESA GEITONIA, LIMASSOL, CYPRUS

Anex

Gigabyte Aorus 850

Top side

Power specifications label

CERTIFICATIONS 115V

CYBENETICS PLATINUM

CYBENETICS STANDARD++

CERTIFICATIONS 230V

CYBENETICS PLATINUM 230v

CYBENETICS STANDARD++ 230v