



Antec HCG850 Gold (#2)

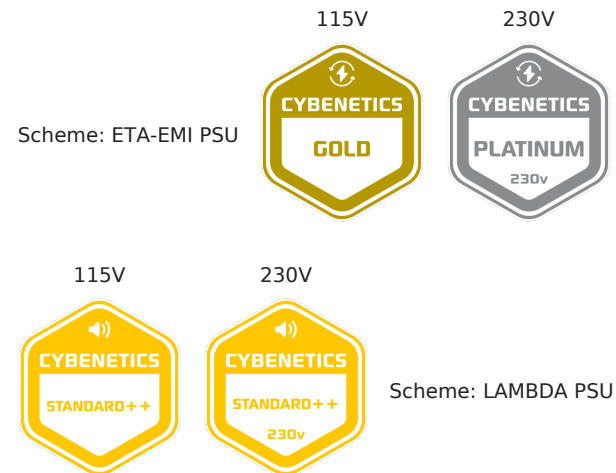
Serial Number HCG850GSN180903132

Lab ID 353

Certification ID 25353

Test Result Report ID:

Certificate Issue Date: Apr 18, 2018



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	Antec
Model	HCG850 Gold (#2)
OEM/ODM	Seasonic
Serial Number	HCG850GSN180903132
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 Fluid Dynamic Bearing Fan (HA1225H12F-Z)
Semi-Passive Operation	✓ (selectable)
Cybenetics Testing Information	
Lab ID	353
Date of receipt	Apr 10, 2018
Testing Date	Apr 15, 2018
Report Issued Date	Apr 18, 2018
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 (610mm)	1	1	18-22AWG	Yes
4+4 pin EPS12V (660mm)	2	2	18AWG	Yes
6+2 pin PCIe (680mm+80mm)	3	6	18AWG	Yes
SATA (460mm+110mm+110mm+110mm)	2	8	18AWG	No
SATA (460mm+110mm)	1	2	18AWG	No
4 pin Molex (460mm+120mm+120mm)	1	3	18AWG	No
4 pin Molex (350mm+120mm)	1	2	18AWG	No
FDD Adapter (+110mm)	1	1	22AWG	No

AC Power Cord (1370mm) - C13 coupler	1	1	18AWG	-
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Power Specifications

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	20	20	70	3	0.3
	Watts	100		840	15	3.6
Total Max. Power (W)		850				

Parts Description

General Data	
Manufacturer (OEM)	Seasonic
Platform Model	FX
Primary Side	
Transient Filter	4x Y caps, 2x X caps, 2x CM chokes, 1x MOV, 1x CM02X
Inrush Protection	NTC Thermistor & Diode
Bridge Rectifier(s)	2x GBU1508 (800V, 15A @ 100°C)
APFC MOSFETS	2x Infineon IPW50R190CE (550V, 15.7A @ 100°C, 0.19Ohm)
APFC Boost Diode	1x STMicroelectronics STTH8S06D (600V, 8A @ 125°C)
Hold-up Cap(s)	1x Nichicon (400V, 680uF, 2000h @ 105°C, GG)
Main Switchers	4x UTC GPT13N50DG (500V, 13A @ 100°C, 0.49Ohm)
APFC Controller	Champion CM6500UNX
Resonant Controller	Champion CM6901T6X
Topology	Primary side: Full-Bridge & LLC Resonant Controller Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	
+12V MOSFETS	4x Nexperia PSMN2R6-40YS (40V, 100A @ 25°C, 2.8mOhm)
5V & 3.3V	DC-DC Converters: 6x Infineon BSC0906NS (30V, 40A @ 100°C, 4.5mOhm) PWM Controller: Anpec APW7159
Filtering Capacitors	Electrolytics: Chemi-Con (1-5,000 @ 105°C, KZE), Chemi-Con (4-10,000 @ 105°C, KY), 2x Nichicon (2-5,000 @ 105°C, HD), 1x Rubycon (3-6,000 @ 105°C,YXG) Polymers: Chemi-Con, FPCAP
Supervisor IC	Weltrend WT7527V (OVP, UVP, OCP, SCP, PG)
Fan Model	Hong Hua HA1225H12F-Z (120mm, 12V, 0.58A, 2200 RPM, Fluid Dynamic Bearing)

5VSB Circuit	
Standby PWM Controller	Excelliance EM8569

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)	88.842%
Average Noise Output (>1450 Load Combinations)	32.96dBA
Average PF (>1450 Load Combinations)	0.986
Efficiency With 10W (≤500W) or 2% (>500W) Load	-
Standby Power Consumption	0.0485W
Non-Accredited	
12V Ripple (Full Load)	19.36mV
5V Ripple (Full Load)	13.49mV
3.3V Ripple (Full Load)	11.97mV
5VSB Ripple (Full Load)	11.67mV
12V Load Regulation	0.10%
5V Load Regulation	0.20%
3.3V Load Regulation	0.42%
5VSB Load Regulation	2.50%
Inrush Current	27.652A

230V

Accredited		
Average Efficiency (>1450 load combinations)	91.235%	
Average Noise Output (>1450 Load Combinations)	30.35dBA	
Average PF (>1450 Load Combinations)	0.949	
Efficiency With 10W (≤500W) or 2% (>500W) Load	-	
Standby Power Consumption	0.0815W	
Non-Accredited		
12V Ripple (Full Load)	22.19mV	
5V Ripple (Full Load)	13.39mV	
3.3V Ripple (Full Load)	12.08mV	
5VSB Ripple (Full Load)	9.63mV	
12V Load Regulation	0.10%	
5V Load Regulation	0.24%	
3.3V Load Regulation	0.45%	
5VSB Load Regulation	2.46%	
Inrush Current	62.050A	
Hold-Up Time & PWR_OK Signal	20.90ms	
AC Loss to PWR_OK Hold Up Time	16.30ms	
PWR_OK Inactive to DC Loss Delay	4.60ms	
OPP (0.00°C / 0.00°C)	-	

Hold-Up Time & PWR_OK Signal

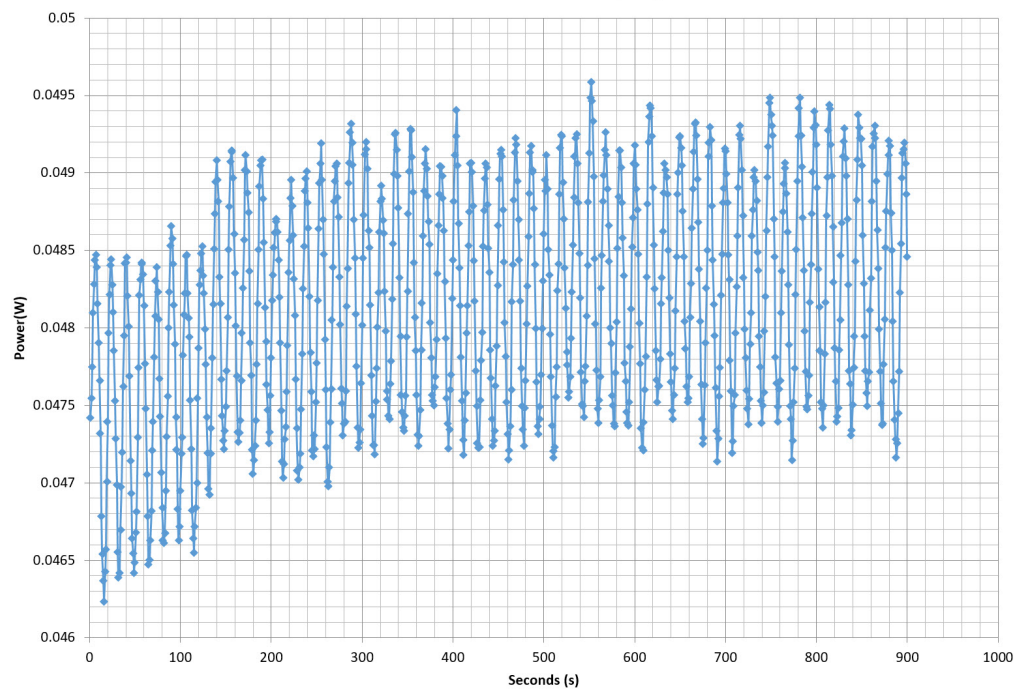
Hold-Up Time (ms)	20.9
AC Loss to PWR_OK Hold Up Time (ms)	16.3
PWR_OK Inactive to DC Loss Delay (ms)	4.6



Graphs

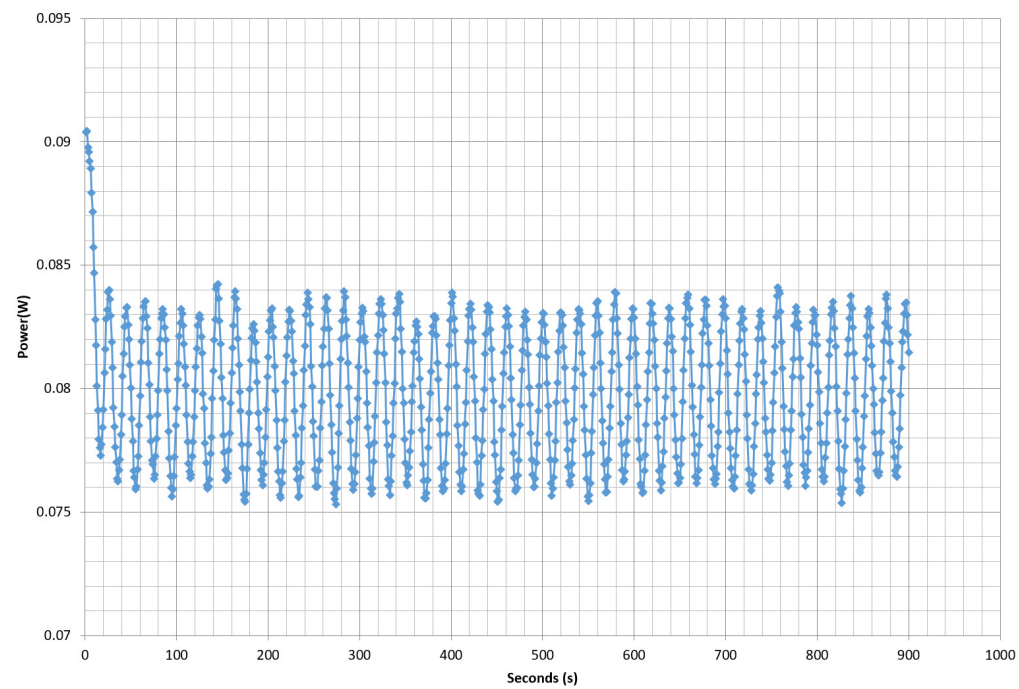
115V

Power - HCG850GSN180903132 - 12/04/2018 - 10:51



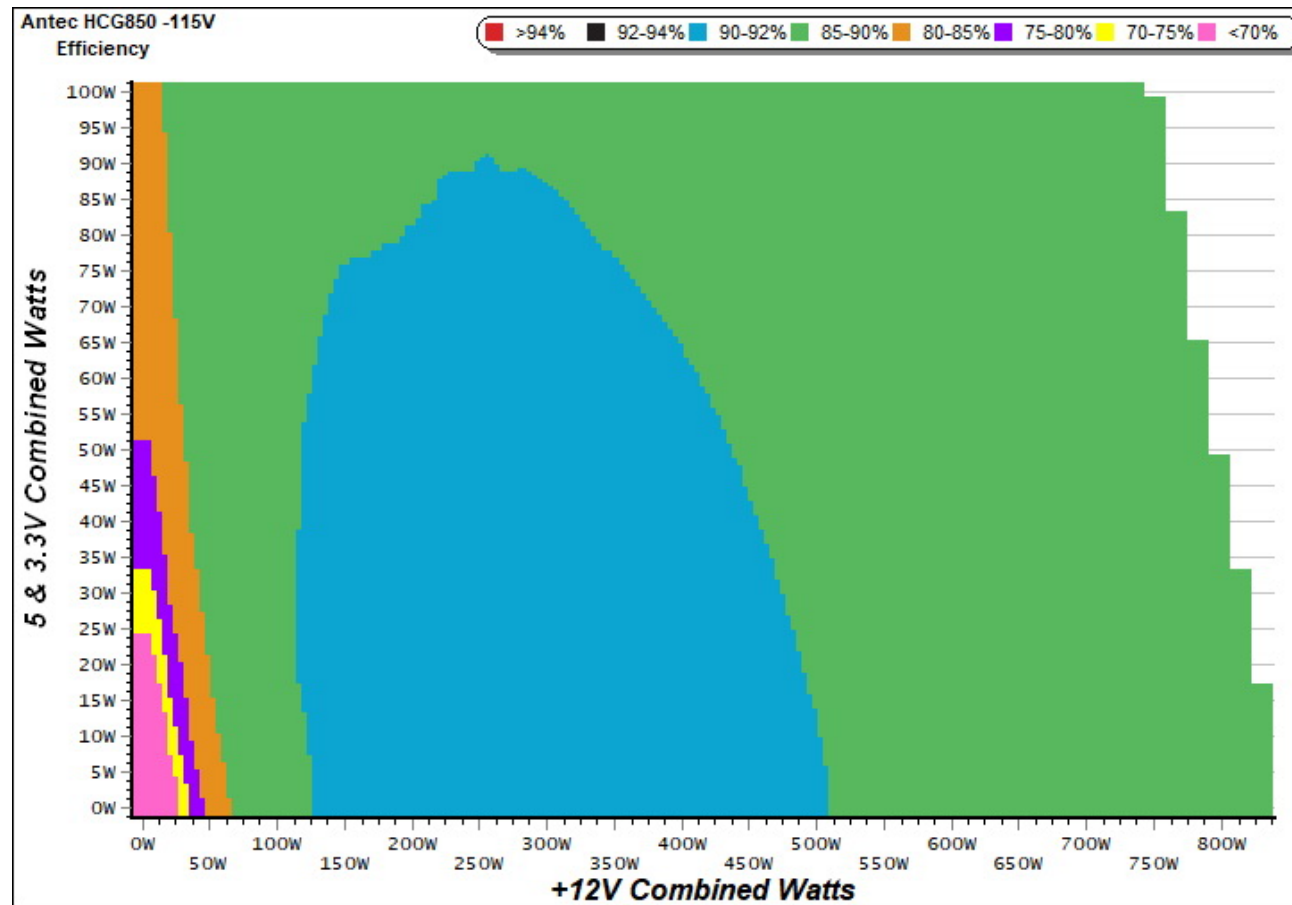
230V

Power - HCG850GSN180903132 - 12/04/2018 - 10:34



Efficiency Graph

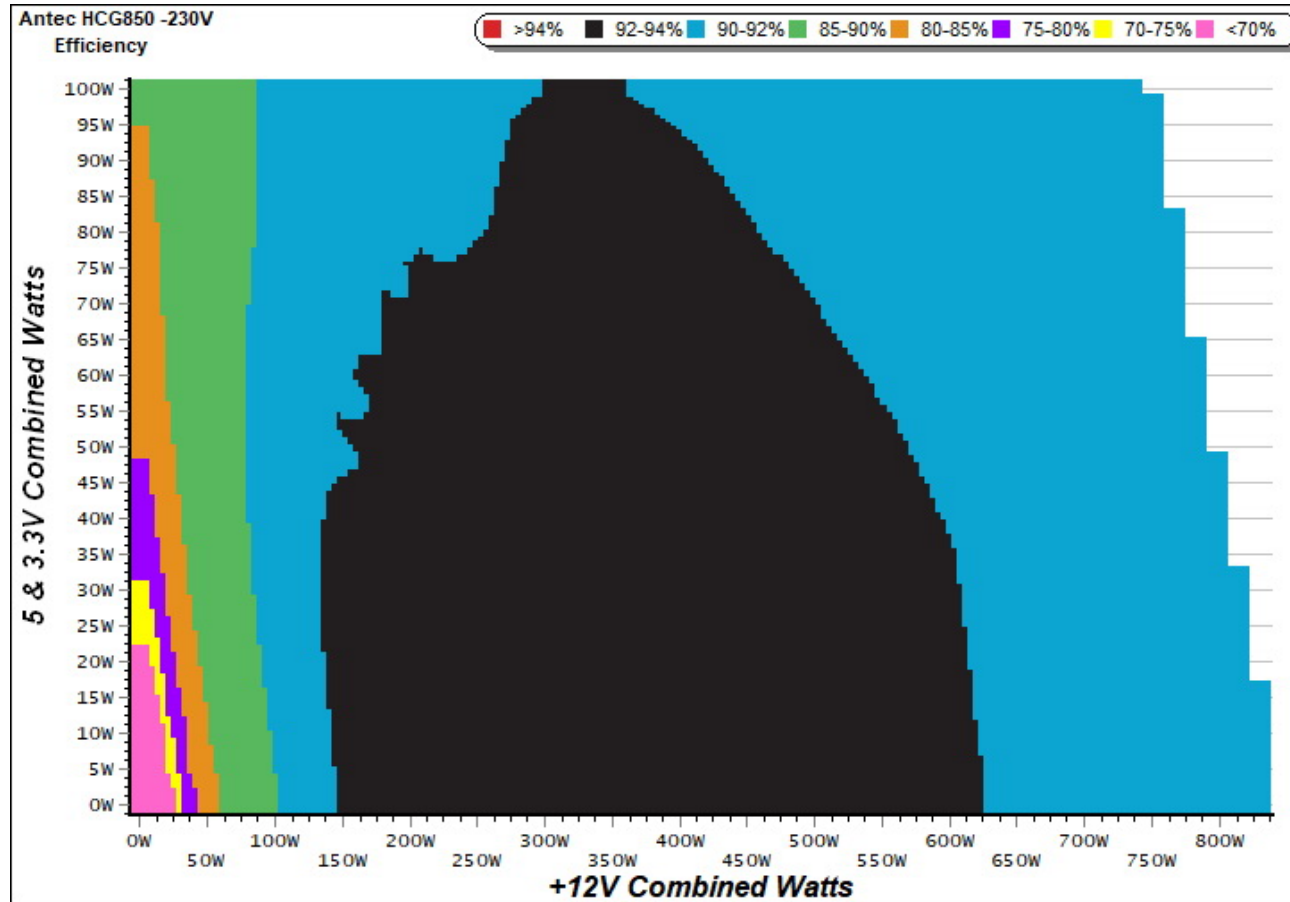
115V



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

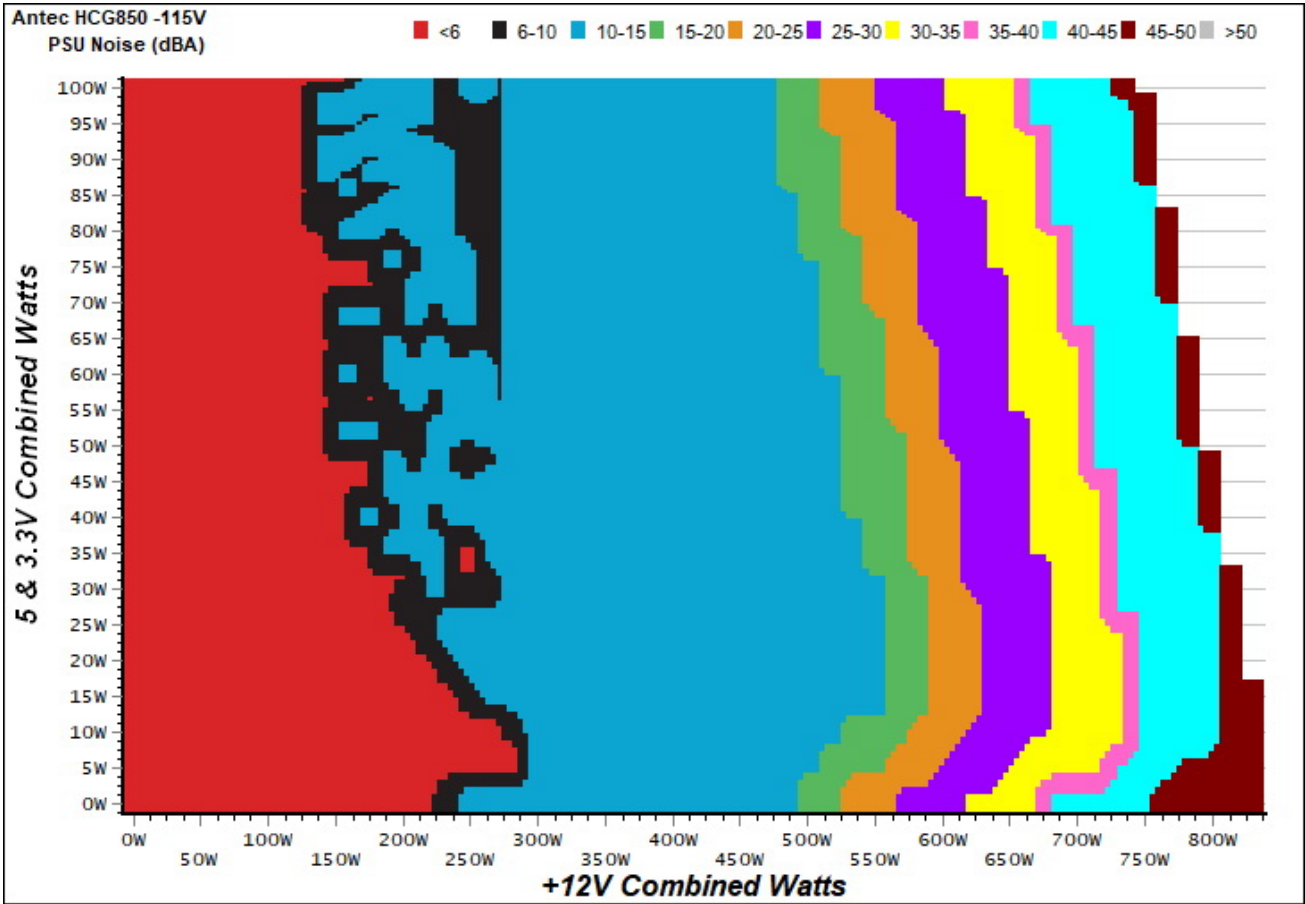


INFO

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

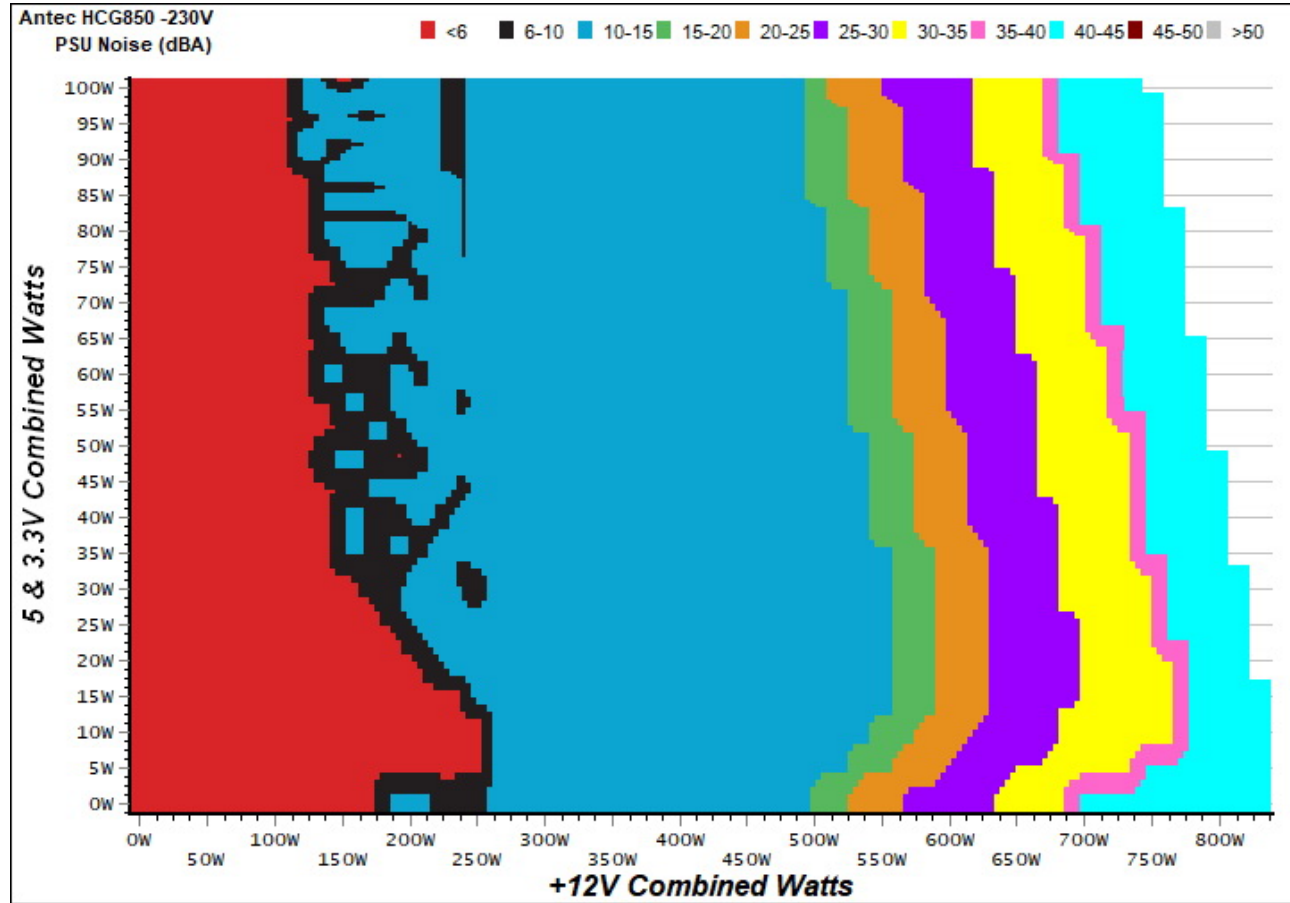
115V



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

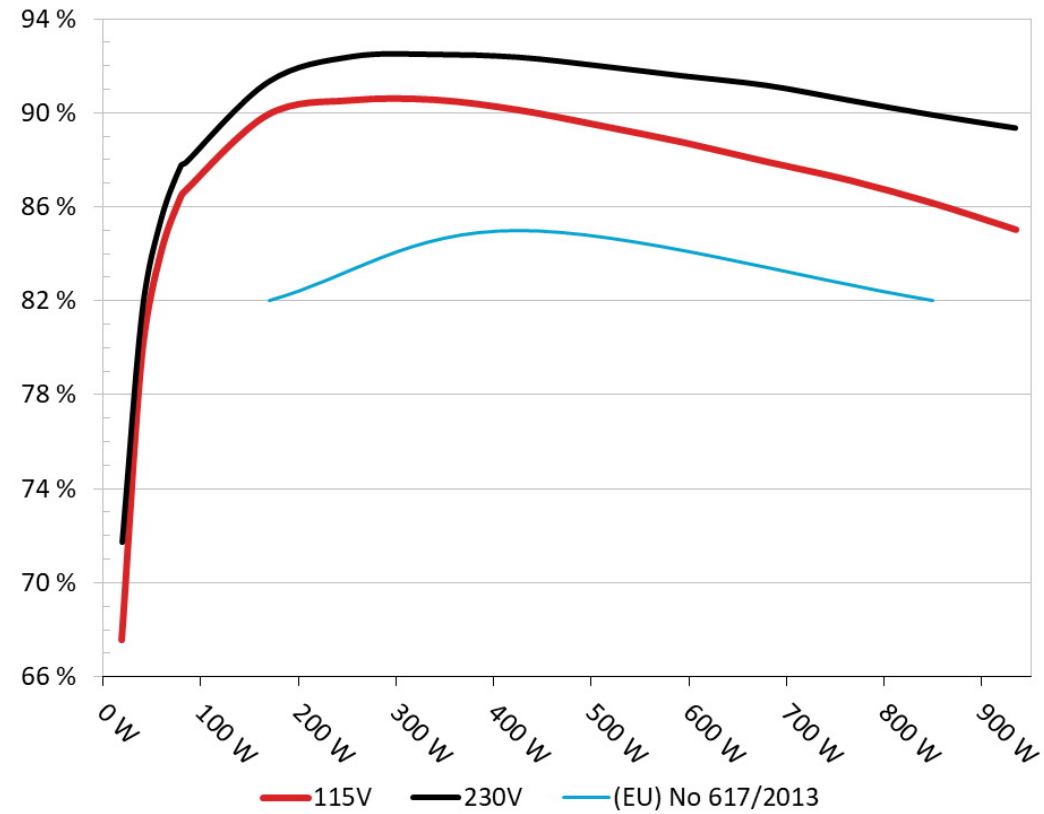
The PSU's noise in its entire operational range and under 30-32 °C ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails.

Indicative Performance

Efficiency under high ambient temperature

Efficiency: Antec HCG850

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

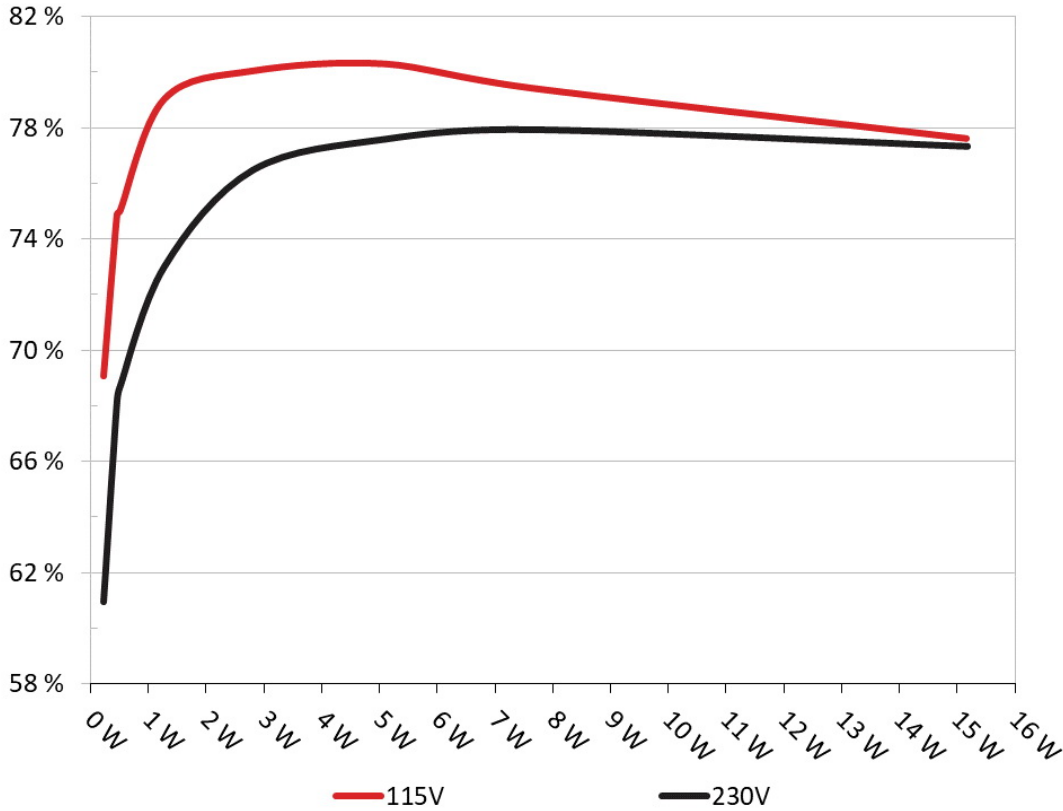


INFO

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: Antec HCG850
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	0.231	69.085%	0.025
	5.128V	0.273		115.37V
2	0.090A	0.462	74.880%	0.043
	5.127V	0.529		115.37V
3	0.550A	2.815	80.040%	0.166
	5.117V	3.517		115.35V
4	1.000A	5.108	80.289%	0.214
	5.107V	6.362		115.36V
5	1.500A	7.644	79.418%	0.260
	5.095V	9.625		115.35V
6	3.000A	15.163	77.612%	0.338
	5.054V	19.537		115.34V

230V

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.231	60.950%	0.013
	5.128V	0.379		230.93V
2	0.090A	0.462	68.142%	0.023
	5.127V	0.678		230.93V
3	0.550A	2.814	76.467%	0.116
	5.116V	3.680		230.75V
4	1.000A	5.107	77.579%	0.190
	5.106V	6.583		230.92V
5	1.500A	7.644	77.920%	0.251
	5.095V	9.810		230.92V
6	3.000A	15.181	77.320%	0.353
	5.060V	19.634		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	5.225A	1.985A	1.990A	0.981A	84.861	86.711%	0	<6.0	45.45°C	0.968
	12.108V	5.037V	3.315V	5.099V	97.866				38.87°C	115.26V
2	11.436A	2.979A	2.990A	1.179A	169.366	89.944%	480	9.6	39.15°C	0.988
	12.107V	5.037V	3.313V	5.089V	188.301				46.26°C	115.15V
3	18.046A	3.476A	3.472A	1.379A	254.484	90.550%	505	11.3	40.61°C	0.990
	12.107V	5.035V	3.311V	5.078V	281.041				48.12°C	115.14V
4	24.658A	3.972A	3.989A	1.579A	339.689	90.571%	512	11.5	41.23°C	0.990
	12.105V	5.035V	3.310V	5.067V	375.051				48.93°C	115.01V
5	30.938A	4.968A	4.986A	1.780A	425.012	90.140%	518	11.6	42.14°C	0.990
	12.105V	5.034V	3.309V	5.056V	471.503				50.17°C	114.89V
6	37.157A	5.963A	5.986A	1.983A	509.526	89.468%	732	19.4	42.88°C	0.990
	12.103V	5.033V	3.308V	5.044V	569.505				51.12°C	114.87V
7	43.443A	6.959A	6.989A	2.186A	594.810	88.750%	1020	27.5	43.24°C	0.991
	12.101V	5.030V	3.305V	5.034V	670.207				52.00°C	114.75V
8	49.731A	7.957A	7.991A	2.391A	680.169	87.928%	1545	37.5	44.28°C	0.991
	12.100V	5.029V	3.304V	5.021V	773.550				53.41°C	114.71V
9	56.422A	8.456A	8.480A	2.394A	765.114	87.137%	2092	47.3	45.66°C	0.992
	12.098V	5.028V	3.302V	5.014V	878.058				55.10°C	114.57V
10	62.844A	8.956A	8.999A	3.005A	849.895	86.166%	2115	49.0	45.93°C	0.992
	12.096V	5.027V	3.301V	4.994V	986.351				55.84°C	114.43V
11	69.859A	8.957A	9.004A	3.008A	934.671	85.043%	2135	49.1	46.41°C	0.993
	12.095V	5.026V	3.299V	4.988V	1099.054				56.72°C	114.39V
CL1	0.146A	12.001A	12.000A	0.000A	101.949	84.996%	515	11.5	43.10°C	0.980
	12.110V	5.034V	3.314V	5.109V	119.946				52.14°C	115.22V

CL2	70.004A	1.002A	1.003A	1.000A	860.169	86.526%	2125	49.1	45.40°C	0.992
	12.096V	5.031V	3.302V	5.048V	994.120				55.15°C	114.42V

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	5.232A	1.985A	1.992A	0.981A	84.956	87.874%	0	<6.0	46.80°C	0.798
	12.108V	5.039V	3.315V	5.098V	96.679				39.20°C	230.90V
2	11.445A	2.979A	2.988A	1.179A	169.457	91.303%	520	10.1	40.07°C	0.920
	12.106V	5.037V	3.313V	5.088V	185.598				48.41°C	230.84V
3	18.053A	3.478A	3.473A	1.379A	254.563	92.374%	502	11.3	41.03°C	0.955
	12.106V	5.035V	3.311V	5.077V	275.580				49.65°C	230.60V
4	24.665A	3.973A	3.990A	1.579A	339.753	92.466%	510	11.6	41.73°C	0.969
	12.104V	5.034V	3.310V	5.067V	367.437				50.65°C	230.81V
5	30.948A	4.969A	4.986A	1.781A	425.077	92.350%	522	11.7	42.28°C	0.975
	12.103V	5.033V	3.309V	5.056V	460.291				51.69°C	230.74V
6	37.166A	5.963A	5.988A	1.984A	509.602	91.974%	732	19.4	43.01°C	0.980
	12.102V	5.033V	3.307V	5.043V	554.074				52.61°C	230.67V
7	43.451A	6.960A	6.990A	2.186A	594.919	91.550%	1160	30.1	43.92°C	0.982
	12.101V	5.031V	3.305V	5.033V	649.828				53.80°C	230.61V
8	49.743A	7.957A	7.994A	2.391A	680.263	91.147%	1630	40.1	44.75°C	0.984
	12.099V	5.029V	3.303V	5.020V	746.335				55.31°C	230.46V
9	56.432A	8.457A	8.483A	2.394A	765.186	90.511%	2060	46.0	45.28°C	0.985
	12.097V	5.027V	3.302V	5.014V	845.409				56.59°C	230.56V
10	62.854A	8.955A	9.001A	3.005A	850.009	89.894%	2120	49.1	46.34°C	0.986
	12.096V	5.027V	3.300V	4.994V	945.565				58.14°C	230.49V
11	69.867A	8.957A	9.003A	3.009A	934.785	89.337%	2140	49.1	47.12°C	0.987
	12.095V	5.027V	3.300V	4.987V	1046.353				59.49°C	230.24V
CL1	0.148A	12.004A	12.000A	0.000A	102.013	86.077%	518	11.6	42.29°C	0.848
	12.109V	5.035V	3.315V	5.108V	118.513				51.83°C	230.84V

CL2	70.021A	1.002A	1.000A	1.000A	860.225	90.321%	2125	49.1	45.37°C	0.986
	12.094V	5.031V	3.302V	5.048V	952.404				56.74°C	230.50V

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	1.192A	0.496A	0.481A	0.195A	19.527	67.577%	0	<6.0	0.754
	12.108V	5.039V	3.317V	5.122V	28.896				115.35V
2	2.451A	0.992A	0.996A	0.391A	39.971	79.614%	0	<6.0	0.890
	12.108V	5.034V	3.313V	5.116V	50.206				115.32V
3	3.635A	1.489A	1.477A	0.587A	59.404	84.016%	0	<6.0	0.942
	12.108V	5.035V	3.314V	5.110V	70.706				115.30V
4	4.893A	1.986A	1.992A	0.784A	79.851	86.441%	0	<6.0	0.965
	12.108V	5.037V	3.314V	5.104V	92.376				115.27V

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	1.200A	0.497A	0.483A	0.195A	19.638	71.711%	0	<6.0	0.439
	12.108V	5.043V	3.319V	5.122V	27.385				230.93V
2	2.458A	0.993A	0.998A	0.391A	40.072	81.520%	0	<6.0	0.607
	12.108V	5.037V	3.315V	5.115V	49.156				230.75V
3	3.643A	1.488A	1.479A	0.587A	59.508	85.458%	0	<6.0	0.698
	12.108V	5.038V	3.315V	5.109V	69.634				230.91V
4	4.901A	1.986A	1.990A	0.784A	79.946	87.750%	0	<6.0	0.781
	12.108V	5.039V	3.315V	5.103V	91.107				230.90V

The results above are not used in the certification process

Ripple Measurements

115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	9.0 mV	5.2 mV	4.3 mV	4.1 mV	Pass
20% Load	13.4 mV	6.2 mV	4.9 mV	4.3 mV	Pass
30% Load	16.7 mV	7.2 mV	5.7 mV	4.7 mV	Pass
40% Load	15.8 mV	7.7 mV	6.5 mV	5.1 mV	Pass
50% Load	14.0 mV	9.0 mV	7.4 mV	6.1 mV	Pass
60% Load	13.2 mV	9.6 mV	8.0 mV	6.5 mV	Pass
70% Load	13.9 mV	10.4 mV	8.5 mV	7.1 mV	Pass
80% Load	14.6 mV	11.2 mV	10.6 mV	7.6 mV	Pass
90% Load	15.6 mV	11.9 mV	10.8 mV	8.2 mV	Pass
100% Load	19.4 mV	13.5 mV	12.0 mV	11.7 mV	Pass
110% Load	25.5 mV	14.1 mV	12.2 mV	13.1 mV	Pass
Crossload 1	10.6 mV	11.9 mV	10.2 mV	4.0 mV	Pass
Crossload 2	20.5 mV	8.7 mV	7.0 mV	8.9 mV	Pass

The results above are not used in the certification process

230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	8.8 mV	5.2 mV	4.2 mV	4.0 mV	Pass
20% Load	13.1 mV	6.1 mV	4.9 mV	4.2 mV	Pass
30% Load	16.2 mV	7.1 mV	5.8 mV	4.7 mV	Pass
40% Load	15.4 mV	7.7 mV	6.5 mV	5.0 mV	Pass
50% Load	14.0 mV	9.2 mV	7.4 mV	5.7 mV	Pass
60% Load	13.3 mV	9.5 mV	7.9 mV	5.8 mV	Pass
70% Load	13.2 mV	10.2 mV	9.1 mV	5.9 mV	Pass
80% Load	14.7 mV	11.5 mV	10.7 mV	6.7 mV	Pass

Test	12V	5V	3.3V	5VSB	Pass/Fail
90% Load	16.7 mV	12.2 mV	11.1 mV	7.0 mV	Pass
100% Load	22.2 mV	13.4 mV	12.1 mV	9.6 mV	Pass
110% Load	27.0 mV	13.8 mV	12.3 mV	10.8 mV	Pass
Crossload 1	9.9 mV	11.7 mV	10.5 mV	3.9 mV	Pass
Crossload 2	22.9 mV	8.5 mV	7.4 mV	7.5 mV	Pass

The results above are not used in the certification process

Antec HCG850 Gold (#2)



Top side



Power specifications label

Cybenetics [REDACTED] ETA[REDACTED] LAMBDA[REDACTED] SAFE[REDACTED] DELTA[REDACTED] PHI[REDACTED]

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