High Power HP1-H850GD-F14C

Serial Number

Lab ID HP85001773

Certification ID 251773

Test Result Report ID: 20PS1773A

Certificate Issue Date: Dec 30, 2020

Scheme: ETA-EMI PSU

115V



230V



Scheme: LAMBDA PSU

115V



230V





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	High Power
Model	HP1-H850GD-F14C
OEM/ODM	High Power
Serial Number	
Product Specifications	
Manufacturer-Provided Information	
Rated Voltage (Vrms)	100-240
Rated Current (Arms)	12-8
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	135mm Double Ball Bearing Fan (RL4Z B1352512HH)
Semi-Passive Operation	✗
Cybenetics Testing Information	
Lab ID	HP85001773
Date of receipt	Dec 22, 2020
Testing Date	Dec 30, 2020
Report Issued Date	Dec 30, 2020
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 (600mm)	1	1	18AWG	No
4+4 pin EPS12V (650mm)	3	3	18AWG	No
6+2 pin PCIe (600mm)	2	2	18AWG	No
6+2 pin PCIe (600mm+150mm)	1	2	18AWG	No
SATA (450mm+150mm+150mm+150mm)	3	12	18AWG	No
4 pin Molex (450mm+150mm+150mm)	1	3	18AWG	No

Power Specifications

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	22	22	70.8	3	0.3
	Watts	120		850	15	3.6
Total Max. Power (W)		850				

Parts Description

General Data	-
Manufacturer (OEM)	High Power
PCB Type	Double Sided
Primary Side	-
Transient Filter	4x Y caps, 2x X caps, 2x CM chokes, 1x MOV, 1x MPS HF81 (Discharge IC)
Inrush Protection	NTC Thermistor & Relay
Bridge Rectifier(s)	1x HY GBU1506L (600V, 15A @ 100°C)
APFC MOSFETs	2x Infineon IPW60R125P6 (650V, 19A @ 100°C, Rds(on): 0.125Ohm)
APFC Boost Diode	1x Infineon IDH08G65C5 (650V, 8A @ 145°C)
Bulk Cap(s)	2x Nichicon (400V, 560uF each or 1,120uF combined, 2,000h @ 105°C, GG)
Main Switchers	2x Infineon IPA60R180P7 (650V, 11A @ 100°C, Rds(on): 0.18Ohm)
APFC Controller	Infineon ICE3PCS01G
Resonant Controller	Champion CM6901X
Topology	Primary side: APFC, Half-Bridge & LLC converter Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	-
+12V MOSFETs	4x Toshiba TPHR8504PL (40V, 150A, Rds(on): 0.85mOhm)
5V & 3.3V	DC-DC Converters: 4x PWM Controllers: ANPEC APW7159C
Filtering Capacitors	Electrolytic: 8x Nippon Chemi-Con (4-10,000h @ 105°C, KY), 3x Rubycon (3-6,000h @ 105°C, YXG), 1x Nichicon (4-10,000h @ 105°C, HE) Polymer: 9x United Chemi-Con, 12x FPCAP
Supervisor IC	Weltrend WT2527RA (OCP, OVP, UVP, SCP, PG)
Fan Model	Globe Fan RZ4L B1352512HH (135mm, 12V, 0.45A, Double Ball Bearing Fan)
5VSB Circuit	-

Rectifier	1x IPS ITA04N65R (650V, 4A, Rds(on): 2.8Ohm) MOSFET
Standby PWM Controller	SI8016HSP8
-12V	-
Rectifier	KEC KIA7912PI

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	✓
ALPM (Alternative Low Power Mode) compatible	✓

Performance Summary

115V

Accredited	
Average Efficiency (>1450 load combinations)	89.145%
Average Noise Output (>1450 Load Combinations)	31.92dBA
Average PF (>1450 Load Combinations)	0.991
Efficiency With 10W (≤500W) or 2% (>500W) Load	63.821%
Standby Power Consumption	0.0339W
Non-Accredited	
12V Ripple (Full Load)	24.09mV
5V Ripple (Full Load)	13.92mV
3.3V Ripple (Full Load)	18.48mV
5VSB Ripple (Full Load)	11.62mV
12V Load Regulation	0.13%
5V Load Regulation	0.41%
3.3V Load Regulation	0.60%
5VSB Load Regulation	3.69%

Inrush Current	24.840A

230V

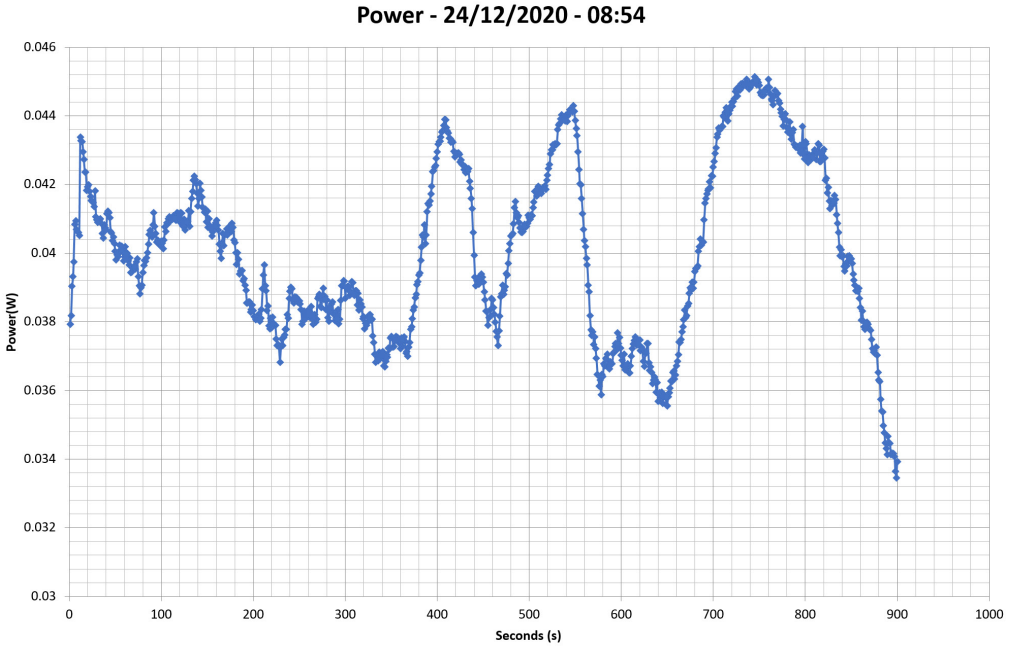
Accredited		
Average Efficiency (>1450 load combinations)		90.825%
Average Noise Output (>1450 Load Combinations)		32.57dBA
Average PF (>1450 Load Combinations)		0.963
Efficiency With 10W (≤500W) or 2% (>500W) Load		-
Standby Power Consumption		0.1189W
Non-Accredited		
12V Ripple (Full Load)		22.46mV
5V Ripple (Full Load)		14.06mV
3.3V Ripple (Full Load)		19.15mV
5VSB Ripple (Full Load)		11.57mV
12V Load Regulation		0.13%
5V Load Regulation		0.41%
3.3V Load Regulation		0.60%
5VSB Load Regulation		3.67%
Inrush Current		52.040A
Hold-Up Time & PWR_OK Signal		19.60ms
AC Loss to PWR_OK Hold Up Time		18.80ms
PWR_OK Inactive to DC Loss Delay		0.80ms
PSU Timings: T1 (20% / 100%)	48.0ms	48.0ms
PSU Timings: T3 (20% / 100%)	129.0ms	126.0ms
OPP (25.00°C / 43.90°C)	149.41%	149.41%

Hold-Up Time & PWR_OK Signal

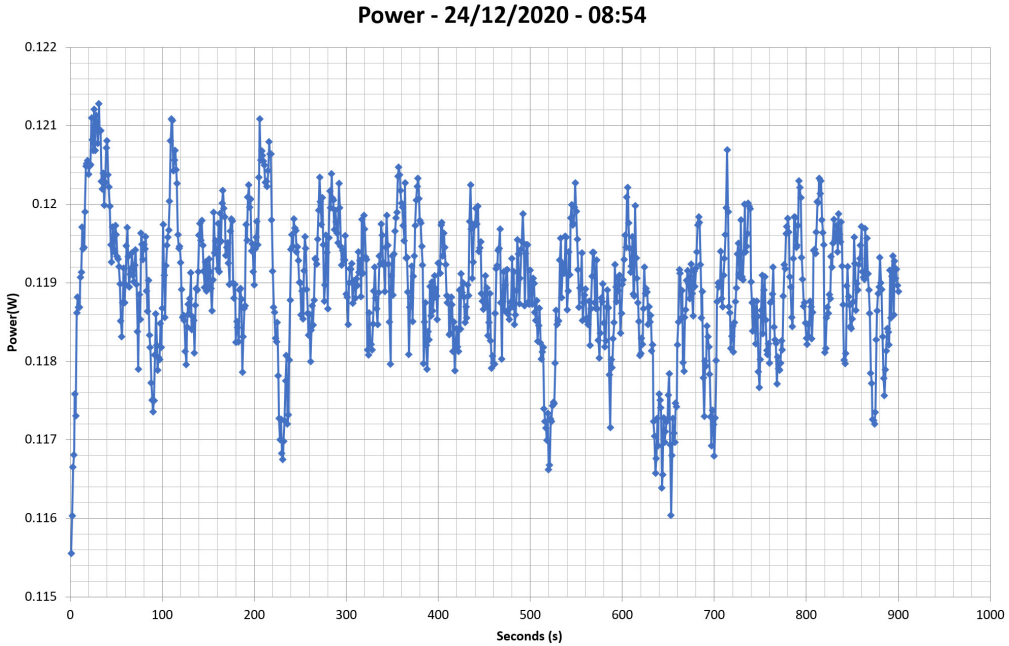
Hold-Up Time (ms)	19.6
AC Loss to PWR_OK Hold Up Time (ms)	18.8
PWR_OK Inactive to DC Loss Delay (ms)	0.8

Graphs

115V

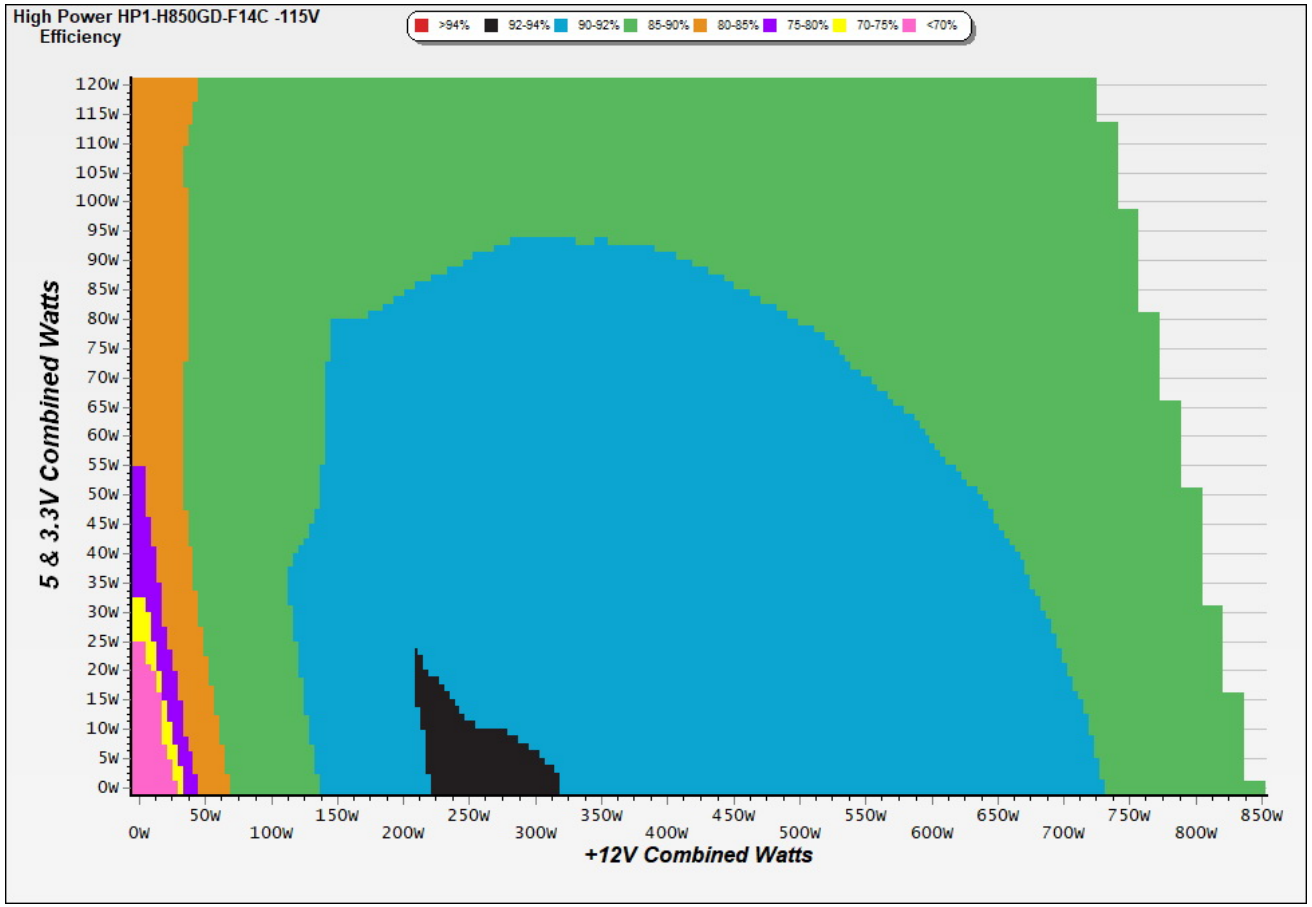


230V



Efficiency Graph

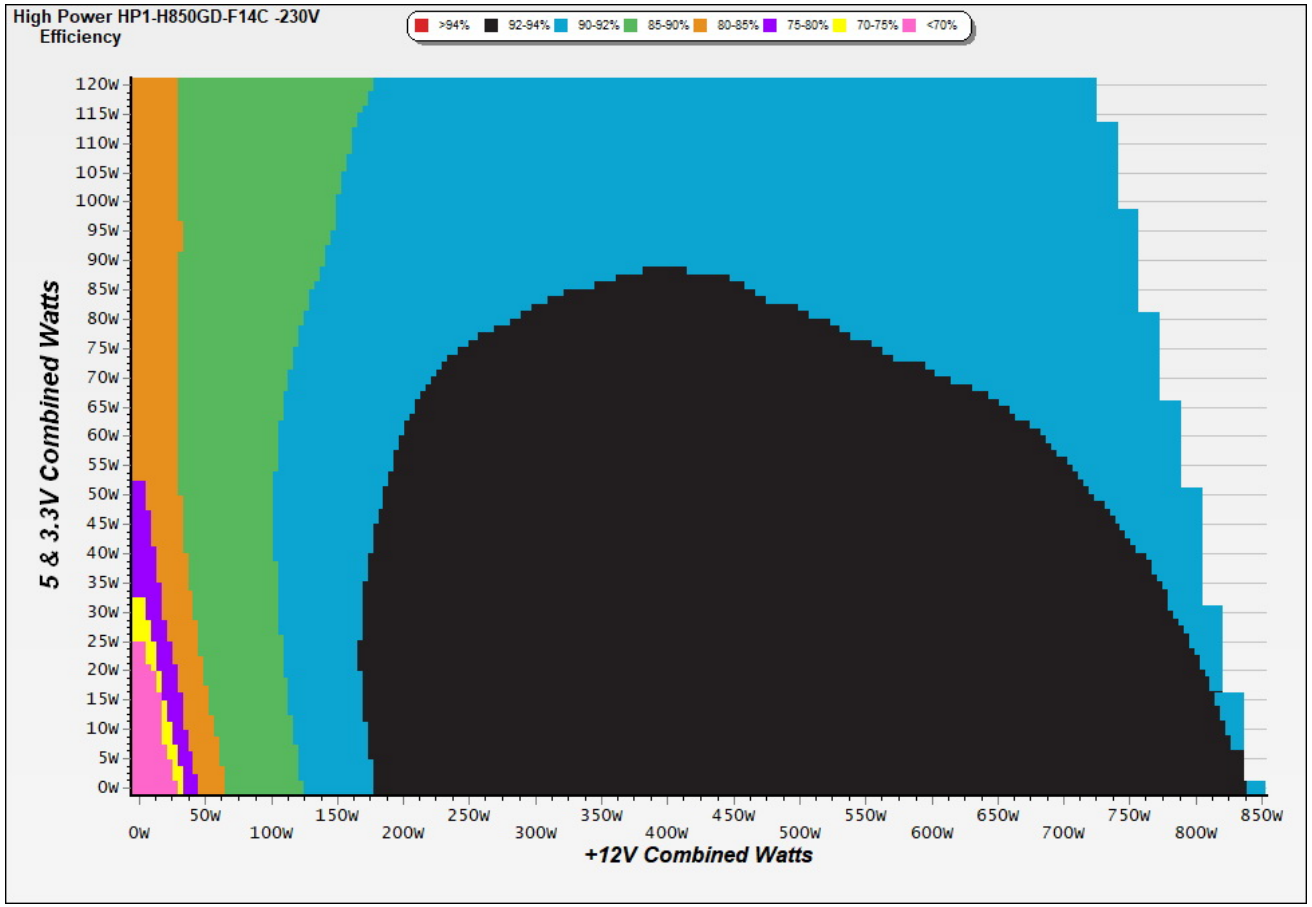
115V



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

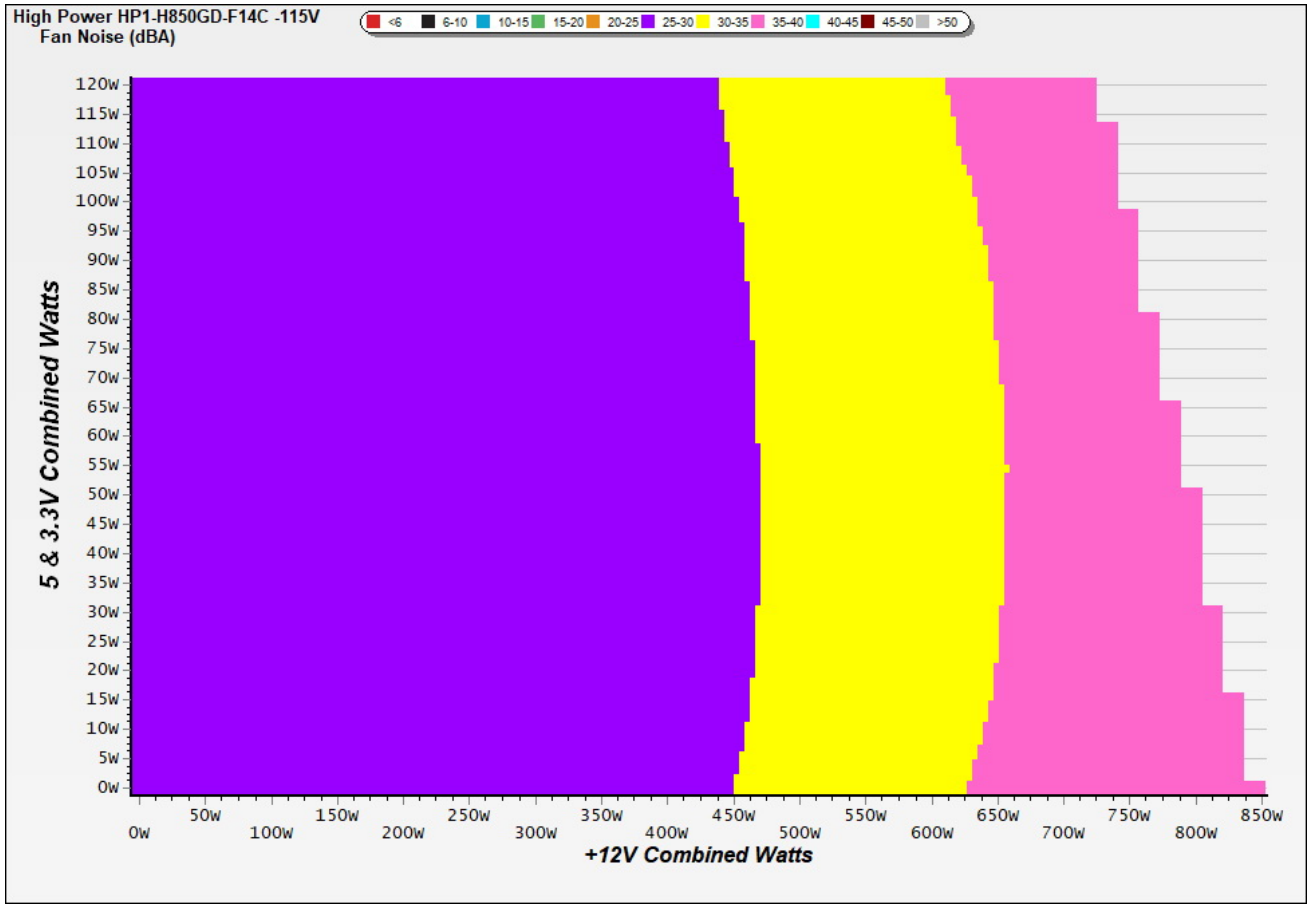


INFO

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

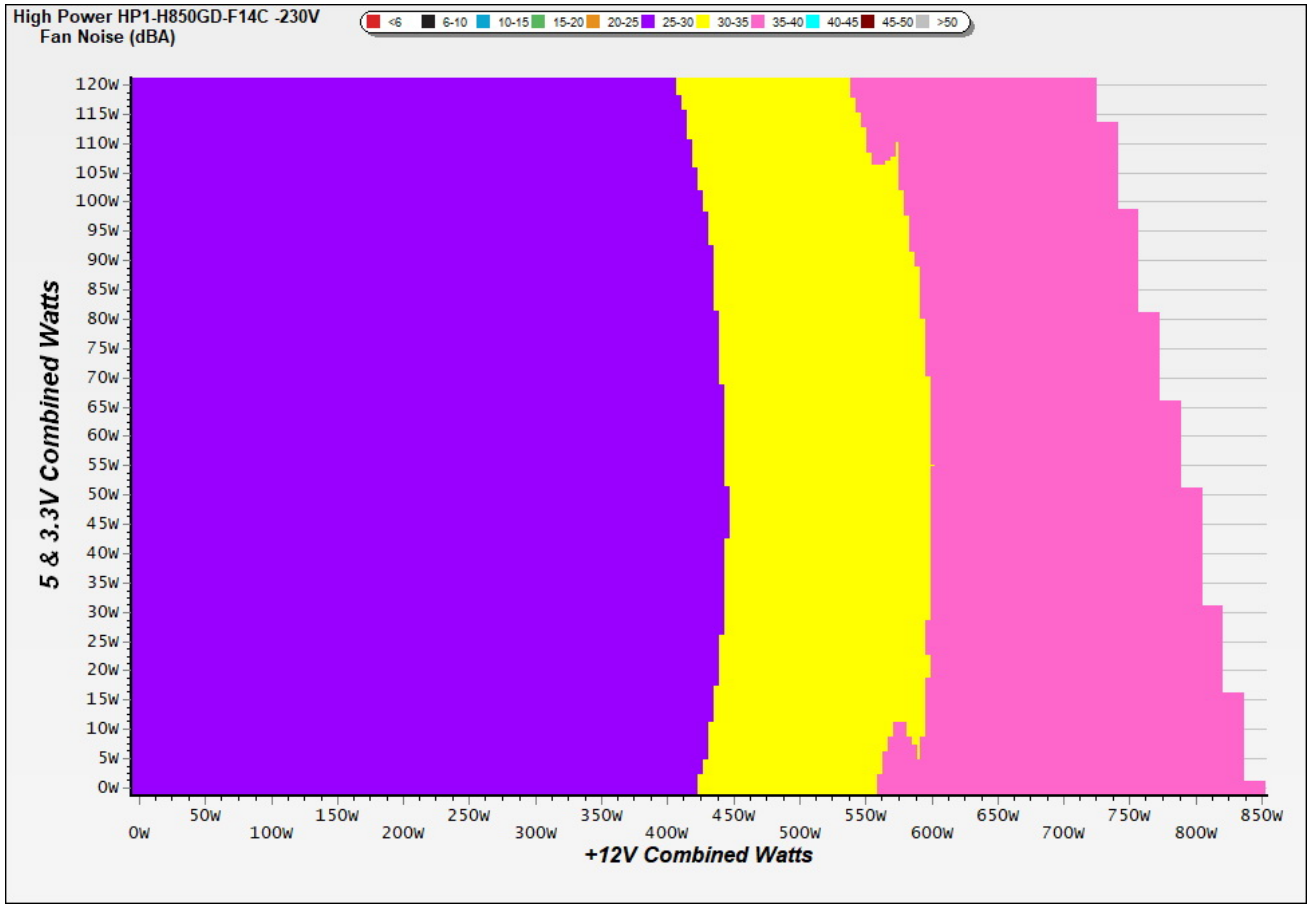
115V



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

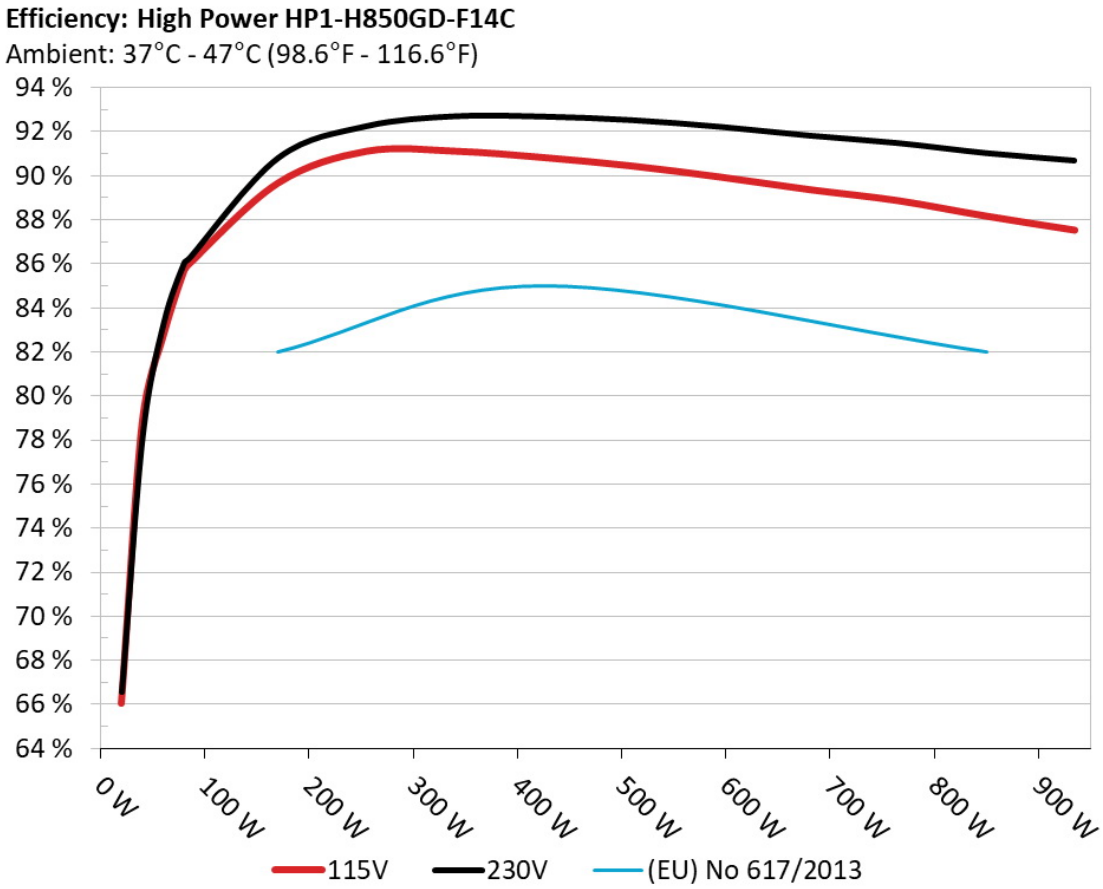


INFO

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

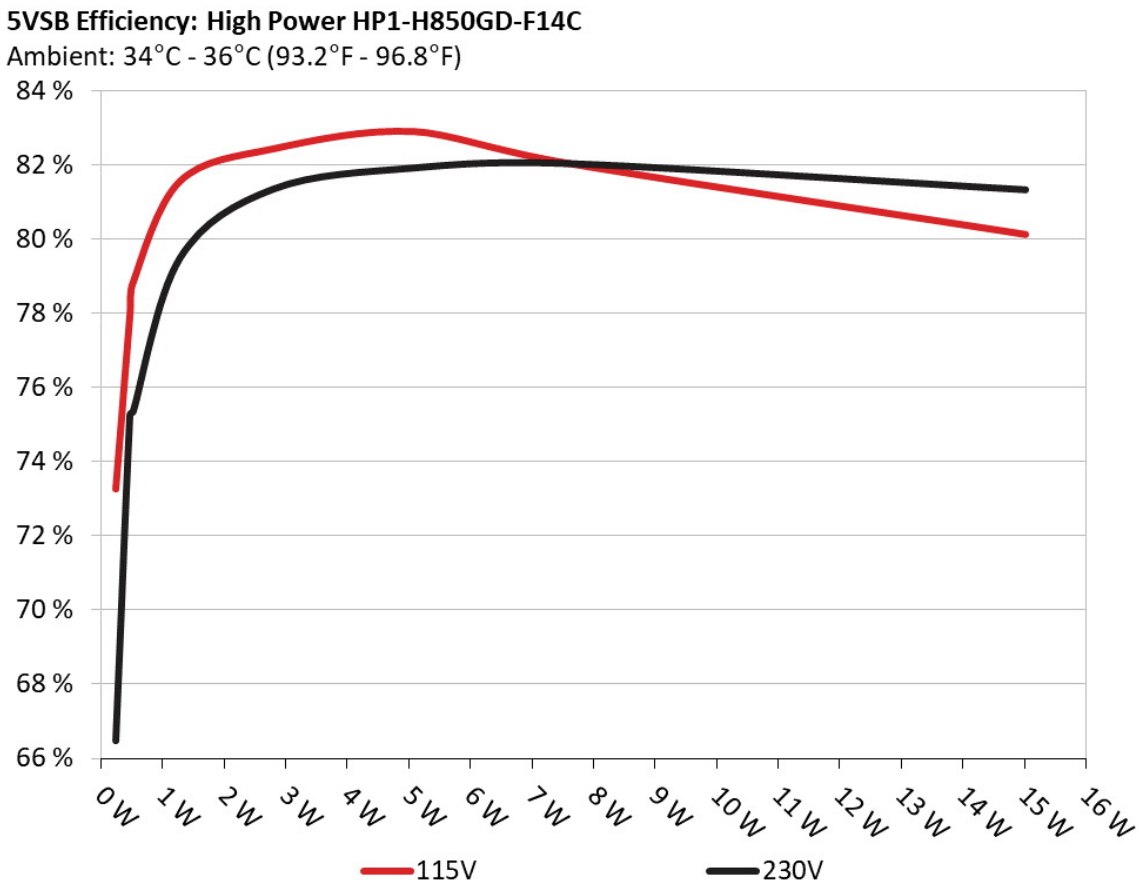
Efficiency under high ambient temperature



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	0.230	73.248%	0.035
	5.104V	0.314		115.14V
2	0.090A	0.459	77.929%	0.064
	5.102V	0.589		115.14V
3	0.550A	2.798	82.440%	0.270
	5.088V	3.394		115.14V
4	1.000A	5.073	82.906%	0.358
	5.073V	6.119		115.14V
5	1.500A	7.586	82.046%	0.408
	5.058V	9.246		115.14V
6	2.999A	15.024	80.124%	0.473
	5.009V	18.751		115.14V

230V

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.230	66.474%	0.012
	5.104V	0.346		230.27V
2	0.090A	0.459	75.246%	0.021
	5.103V	0.610		230.27V
3	0.550A	2.798	81.337%	0.111
	5.088V	3.440		230.27V
4	1.000A	5.073	81.902%	0.181
	5.074V	6.194		230.27V
5	1.500A	7.586	82.020%	0.239
	5.058V	9.249		230.27V
6	2.999A	15.026	81.314%	0.336
	5.010V	18.479		230.27V

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	5.289A	1.974A	1.993A	0.988A	84.950	86.009%	927	27.5	40.41°C	0.973
	11.978V	5.066V	3.309V	5.063V	98.769				43.88°C	115.16V
2	11.607A	2.963A	2.994A	1.189A	170.008	89.680%	974	32.0	41.02°C	0.986
	11.985V	5.063V	3.306V	5.046V	189.572				45.13°C	115.16V
3	18.274A	3.458A	3.495A	1.391A	255.006	91.129%	1003	29.2	41.36°C	0.995
	11.982V	5.061V	3.304V	5.031V	279.829				46.48°C	115.15V
4	24.944A	3.953A	3.999A	1.595A	340.006	91.134%	1089	33.0	41.90°C	0.994
	11.979V	5.059V	3.302V	5.015V	373.084				47.70°C	115.15V
5	31.242A	4.945A	5.001A	1.800A	424.720	90.845%	1150	33.7	42.32°C	0.994
	11.978V	5.056V	3.300V	4.999V	467.523				48.87°C	115.15V
6	37.530A	5.937A	6.003A	2.000A	509.229	90.465%	1239	36.3	42.45°C	0.995
	11.976V	5.054V	3.298V	4.983V	562.902				49.89°C	115.14V
7	43.882A	6.932A	7.011A	2.215A	594.571	89.958%	1307	37.6	43.29°C	0.996
	11.974V	5.052V	3.296V	4.966V	660.943				51.58°C	115.14V
8	50.237A	7.924A	8.014A	2.424A	679.880	89.388%	1384	39.0	43.57°C	0.996
	11.973V	5.049V	3.293V	4.948V	760.595				52.82°C	115.13V
9	56.990A	8.419A	8.506A	2.429A	764.764	88.889%	1462	40.8	45.17°C	0.996
	11.972V	5.047V	3.291V	4.939V	860.354				55.50°C	115.12V
10	63.485A	8.919A	9.027A	3.056A	849.600	88.182%	1524	42.1	45.95°C	0.997
	11.970V	5.045V	3.289V	4.908V	963.463				56.82°C	115.11V
11	70.573A	8.921A	9.031A	3.062A	934.371	87.547%	1577	43.2	46.73°C	0.997
	11.969V	5.043V	3.288V	4.899V	1067.285				58.46°C	115.11V
CL1	0.116A	13.999A	13.998A	0.000A	118.488	81.201%	1217	36.5	42.28°C	0.980
	11.986V	5.061V	3.304V	5.075V	145.919				49.03°C	115.17V

CL2	70.815A	0.999A	0.999A	1.000A	860.979	88.884%	1500	41.3	46.16°C	0.997
	11.970V	5.049V	3.295V	4.988V	968.655				56.55°C	115.11V

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	5.288A	1.975A	1.995A	0.987A	84.949	86.272%	924	27.5	40.16°C	0.830
	11.979V	5.066V	3.309V	5.063V	98.466				43.25°C	230.28V
2	11.606A	2.962A	2.995A	1.189A	169.997	90.816%	961	29.2	41.69°C	0.933
	11.985V	5.063V	3.306V	5.047V	187.188				45.48°C	230.28V
3	18.273A	3.458A	3.495A	1.391A	254.994	92.259%	1013	29.6	41.87°C	0.962
	11.982V	5.061V	3.304V	5.031V	276.388				46.19°C	230.28V
4	24.941A	3.953A	3.998A	1.595A	339.995	92.709%	1112	32.8	42.07°C	0.978
	11.980V	5.059V	3.303V	5.015V	366.732				47.26°C	230.29V
5	31.239A	4.945A	4.998A	1.800A	424.680	92.693%	1166	34.0	42.55°C	0.985
	11.978V	5.057V	3.300V	4.999V	458.156				48.52°C	230.29V
6	37.526A	5.938A	6.004A	2.000A	509.189	92.535%	1239	36.3	42.78°C	0.989
	11.976V	5.054V	3.298V	4.983V	550.265				49.44°C	230.29V
7	43.880A	6.931A	7.012A	2.214A	594.484	92.231%	1232	36.3	43.30°C	0.991
	11.973V	5.051V	3.295V	4.966V	644.562				50.80°C	230.28V
8	50.237A	7.925A	8.014A	2.424A	679.837	91.831%	1378	39.0	44.29°C	0.993
	11.972V	5.049V	3.293V	4.949V	740.314				52.38°C	230.28V
9	56.987A	8.417A	8.504A	2.429A	764.729	91.495%	1464	41.0	44.39°C	0.995
	11.972V	5.048V	3.292V	4.939V	835.816				53.79°C	230.29V
10	63.485A	8.918A	9.024A	3.055A	849.580	91.039%	1517	41.7	45.29°C	0.997
	11.970V	5.045V	3.289V	4.908V	933.207				55.40°C	230.29V
11	70.577A	8.922A	9.031A	3.060A	934.259	90.700%	1538	42.6	46.53°C	0.997
	11.967V	5.042V	3.287V	4.900V	1030.058				58.34°C	230.28V
CL1	0.116A	13.998A	13.997A	0.000A	118.494	81.914%	1200	35.5	42.79°C	0.896
	11.986V	5.062V	3.304V	5.075V	144.657				48.90°C	230.30V

CL2	70.813A	0.998A	1.000A	1.000A	860.954	91.701%	1499	41.3	45.83°C	0.996
	11.970V	5.050V	3.294V	4.988V	938.872				55.56°C	230.29V

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	1.239A	0.493A	0.496A	0.196A	19.978	66.045%	904	26.4	0.848
	11.976V	5.068V	3.310V	5.096V	30.249				115.16V
2	2.477A	0.987A	0.999A	0.393A	39.967	78.796%	903	26.4	0.930
	11.975V	5.066V	3.309V	5.088V	50.722				115.16V
3	3.720A	1.480A	1.494A	0.591A	59.998	82.728%	911	26.6	0.956
	11.977V	5.066V	3.309V	5.079V	72.524				115.16V
4	4.956A	1.973A	1.996A	0.789A	79.949	85.686%	914	26.8	0.972
	11.976V	5.065V	3.308V	5.070V	93.305				115.16V

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	1.238A	0.493A	0.498A	0.196A	19.976	66.580%	913	26.8	0.497
	11.978V	5.069V	3.312V	5.097V	30.003				230.28V
2	2.477A	0.987A	0.996A	0.393A	39.965	78.176%	910	26.6	0.651
	11.977V	5.067V	3.310V	5.088V	51.122				230.29V
3	3.720A	1.479A	1.495A	0.591A	59.996	83.290%	910	26.6	0.753
	11.977V	5.066V	3.309V	5.079V	72.033				230.28V
4	4.956A	1.973A	1.994A	0.789A	79.948	86.060%	918	27.1	0.817
	11.977V	5.065V	3.308V	5.070V	92.898				230.27V

The results above are not used in the certification process

Ripple Measurements

115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	7.10mV	8.20mV	8.10mV	5.10mV	Pass
20% Load	12.90mV	8.90mV	8.60mV	5.10mV	Pass
30% Load	15.80mV	10.40mV	9.50mV	6.60mV	Pass
40% Load	9.80mV	9.50mV	9.70mV	6.20mV	Pass
50% Load	10.60mV	9.70mV	10.30mV	6.70mV	Pass
60% Load	12.00mV	10.60mV	11.00mV	7.60mV	Pass
70% Load	13.60mV	13.40mV	12.80mV	8.20mV	Pass
80% Load	14.90mV	11.50mV	16.20mV	8.80mV	Pass
90% Load	16.50mV	13.60mV	17.90mV	9.70mV	Pass
100% Load	24.10mV	13.90mV	18.50mV	11.60mV	Pass
110% Load	26.70mV	15.50mV	21.80mV	12.50mV	Pass
Crossload1	17.30mV	11.80mV	15.60mV	16.20mV	Pass
Crossload2	23.60mV	11.90mV	13.40mV	10.60mV	Pass

The results above are not used in the certification process

230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	11.90mV	8.20mV	7.70mV	5.10mV	Pass
20% Load	12.10mV	8.60mV	8.50mV	5.10mV	Pass
30% Load	10.00mV	9.10mV	9.00mV	5.70mV	Pass
40% Load	8.80mV	9.30mV	9.80mV	6.00mV	Pass
50% Load	10.40mV	10.00mV	10.20mV	6.60mV	Pass
60% Load	10.90mV	10.70mV	11.30mV	8.10mV	Pass
70% Load	17.60mV	13.30mV	13.00mV	8.90mV	Pass
80% Load	18.90mV	11.60mV	18.10mV	9.80mV	Pass

Test	12V	5V	3.3V	5VSB	Pass/Fail
90% Load	20.90mV	13.10mV	18.00mV	10.50mV	Pass
100% Load	22.50mV	14.10mV	19.20mV	11.60mV	Pass
110% Load	24.90mV	15.60mV	22.40mV	12.10mV	Pass
Crossload1	14.90mV	11.40mV	16.30mV	6.20mV	Pass
Crossload2	22.30mV	12.40mV	13.50mV	10.50mV	Pass

The results above are not used in the certification process

High Power HP1-H850GD-F14C



Top side



Power specifications label