be quiet!

be quiet! Straight Power 11 1000W

Serial Number 285S7330000095

Lab ID 277

Certification ID 25277

Test Result Report ID: 20PS277A

Certificate Issue Date: Jan 24, 2018

115V 230V

Scheme: ETA-EMI PSU





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	be quiet!
Model	Straight Power 11 1000W
OEM/ODM	FSP
Serial Number	285S7330000095
Product Specifications	
Manufacturer-Provided Information	
Rated Voltage (Vrms)	100-240
Rated Current (Arms)	13-6.5
Rated Frequency (Hz)	50-60

Rated Power (W)	1000
Operating Temperature (Continuous Full Load) (°C)	
Type	ATX12V
Cable Design	Fully Modular
Warranty	-
Cybenetics Measurements	
Dimensions (W x H x D)	
Weight	
Cooling	135mm Fluid Dynamic Bearing Fan (SIW3-13525-HF-26)
Semi-Passive Operation	✗
Cybenetics Testing Information	
Lab ID	277
Date of receipt	Jan 12, 2018
Testing Date	Jan 21, 2018
Report Issued Date	Jan 24, 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 (600mm)	1	1	18-22AWG	No
4+4 pin EPS12V (700mm)	1	1	16AWG	No
8 pin EPS12V (700mm)	1	1	16AWG	No
6+2 pin PCIe (2x600mm)	3	6	18AWG	No
SATA (550mm+150mm+150mm)	1	3	18AWG	No
SATA (550mm+150mm+150mm+150mm)	1	4	18AWG	No
SATA (550mm+150mm) / 4 pin Molex (+150mm+150mm)	2	4 / 4	18AWG	No
FDD Adapter (+150mm)	1	1	22AWG	No

AC Power Cord (1380mm) - C13 coupler	1	1	18AWG	-

Power Specifications

Rail		3.3V	5V	12V1	12V2	12V3	12V4	5VSB	-12V
Max. Power	Amps	25	25	22	22	30	30	3	0.5
				83.3					
	Watts	150		999.6				15	6
Total Max. Power (W)		1000							

Parts Description

General Data	
Manufacturer (OEM)	FSP
Platform Model	no info (platform exclusively used by be quiet!)
Primary Side	
Transient Filter	4x Y caps, 2x X caps, 2x CM chokes, 1x MOV
Inrush Protection	NTC Thermistor & Relay
Bridge Rectifier(s)	2x GBJ2506 (600V, 25A @ 100°C)
APFC MOSFETS	3x STMicroelectronics STF28N60M2 (600V, 14A @ 100°C, 0.15Ohm)
APFC Boost Diode	1x ROHM SCS308AP (600V, 8A @ 135°C)
Hold-up Cap(s)	2x Nichicon (420V, 470uF, 3000h @ 105°C, GN)
Main Switchers	2x STMicroelectronics STF33N60M2 (650V, 16A @ 100°C, 0.125Ohm)
APFC Controller	Infineon ICE2PCS02
Resonant Controller	Champion CM6901
Topology	Primary side: Half-Bridge & LLC Resonant Controller Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	
+12V MOSFETS	6x Toshiba TPHR85 04PL (SOP Advance Series, 40V, 150A @ 25°C, 0.85Ohm)
5V & 3.3V	DC-DC Converters: 6x DMN3009SK3 (30V, 60A @ 70°C, 5.5mOhm) PWM Controller: 1x Anpec APW7159C
Filtering Capacitors	Electrolytics: Nippon Chemi-Con (1-5,000 @ 105°C, KZE), Rubycon (6-10,000 @ 105°C, ZLH), Rubycon (3-6,000 @ 105°C, ZLH), Rubycon (4-10,000 @ 105°C, YXF), Polymers: FPCAP, Chemi-Con

Supervisor IC	Weltrend WT7579 (OVP, UVP, SCP, PG)
Fan Model	BQ SIW3-13525-HF-26 (135mm, 12V, 0.56A, 2600RPM, Fluid Dynamic Bearing)
5VSB Circuit	
Rectifier	1x DMN6040SK3 (30V, 13A @ 100°C, 40mOhm)
Standby PWM Controller	Power Integrations InnoSwitch-EP INN2603K

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)	88.470%
Average Noise Output (>1450 Load Combinations)	34.02dBA
Average PF (>1450 Load Combinations)	0.995
Efficiency With 10W (≤500W) or 2% (>500W) Load	-
Standby Power Consumption	0.0444W
Non-Accredited	
12V Ripple (Full Load)	34.51mV
5V Ripple (Full Load)	13.37mV
3.3V Ripple (Full Load)	19.49mV
5VSB Ripple (Full Load)	18.58mV
12V Load Regulation	0.78%
5V Load Regulation	1.78%
3.3V Load Regulation	2.86%
5VSB Load Regulation	2.69%

Inrush Current	30.735A

230V

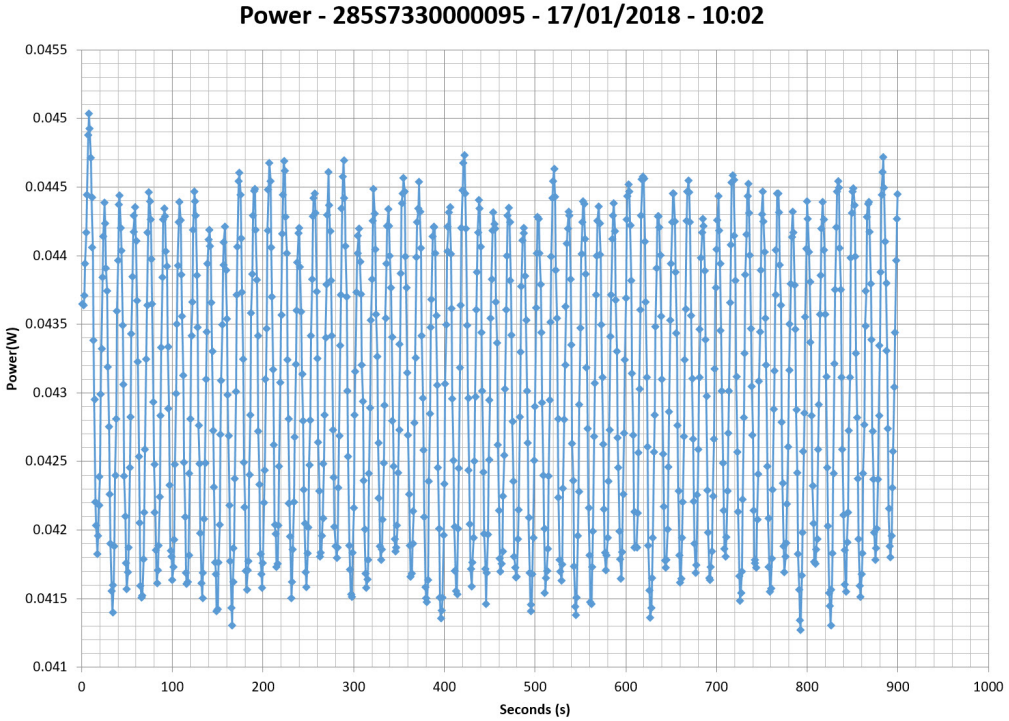
Accredited		
Average Efficiency (>1450 load combinations)	90.871%	
Average Noise Output (>1450 Load Combinations)	34.14dBA	
Average PF (>1450 Load Combinations)	0.976	
Efficiency With 10W (≤500W) or 2% (>500W) Load	-	
Standby Power Consumption	0.1055W	
Non-Accredited		
12V Ripple (Full Load)	31.25mV	
5V Ripple (Full Load)	13.29mV	
3.3V Ripple (Full Load)	19.08mV	
5VSB Ripple (Full Load)	17.41mV	
12V Load Regulation	0.76%	
5V Load Regulation	1.77%	
3.3V Load Regulation	2.81%	
5VSB Load Regulation	2.65%	
Inrush Current	61.916A	
Hold-Up Time & PWR_OK Signal	20.10ms	
AC Loss to PWR_OK Hold Up Time	17.90ms	
PWR_OK Inactive to DC Loss Delay	2.20ms	
OPP (0.00°C / 0.00°C)	-	-

Hold-Up Time & PWR_OK Signal

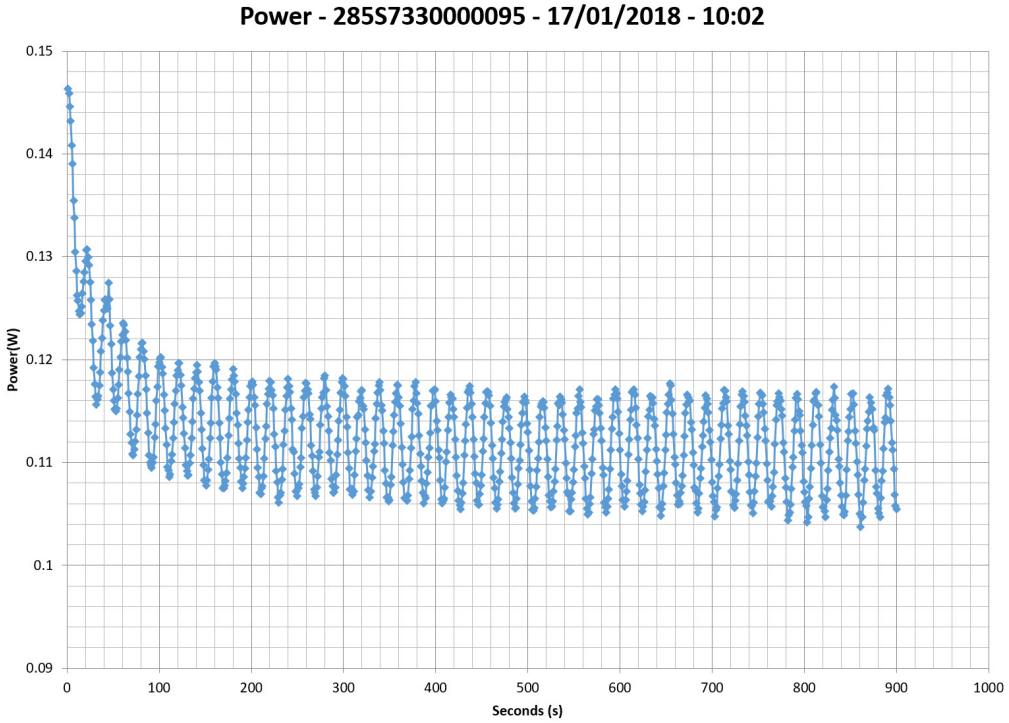
Hold-Up Time (ms)	20.1
AC Loss to PWR_OK Hold Up Time (ms)	17.9
PWR_OK Inactive to DC Loss Delay (ms)	2.2

Graphs

115V

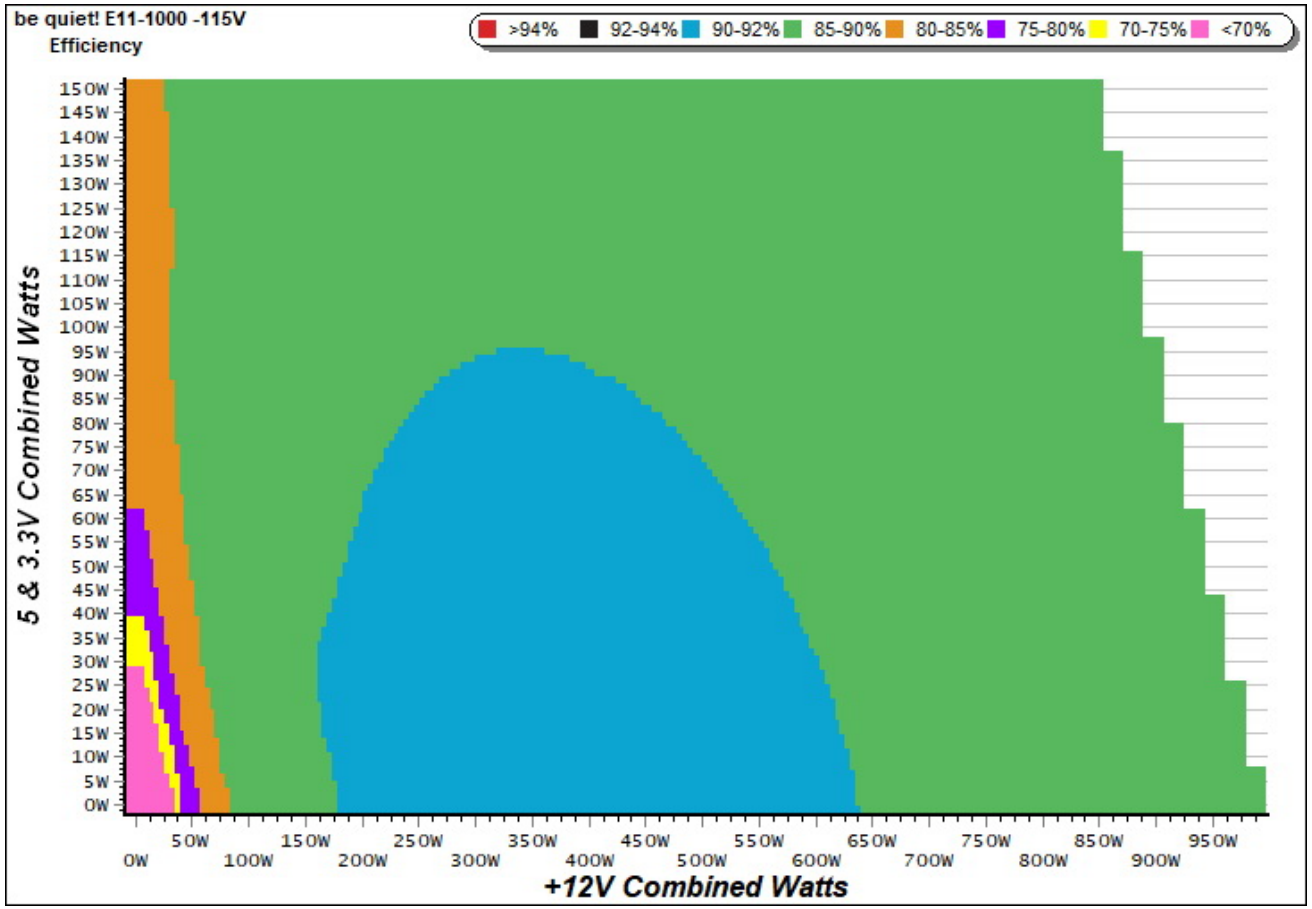


230V



Efficiency Graph

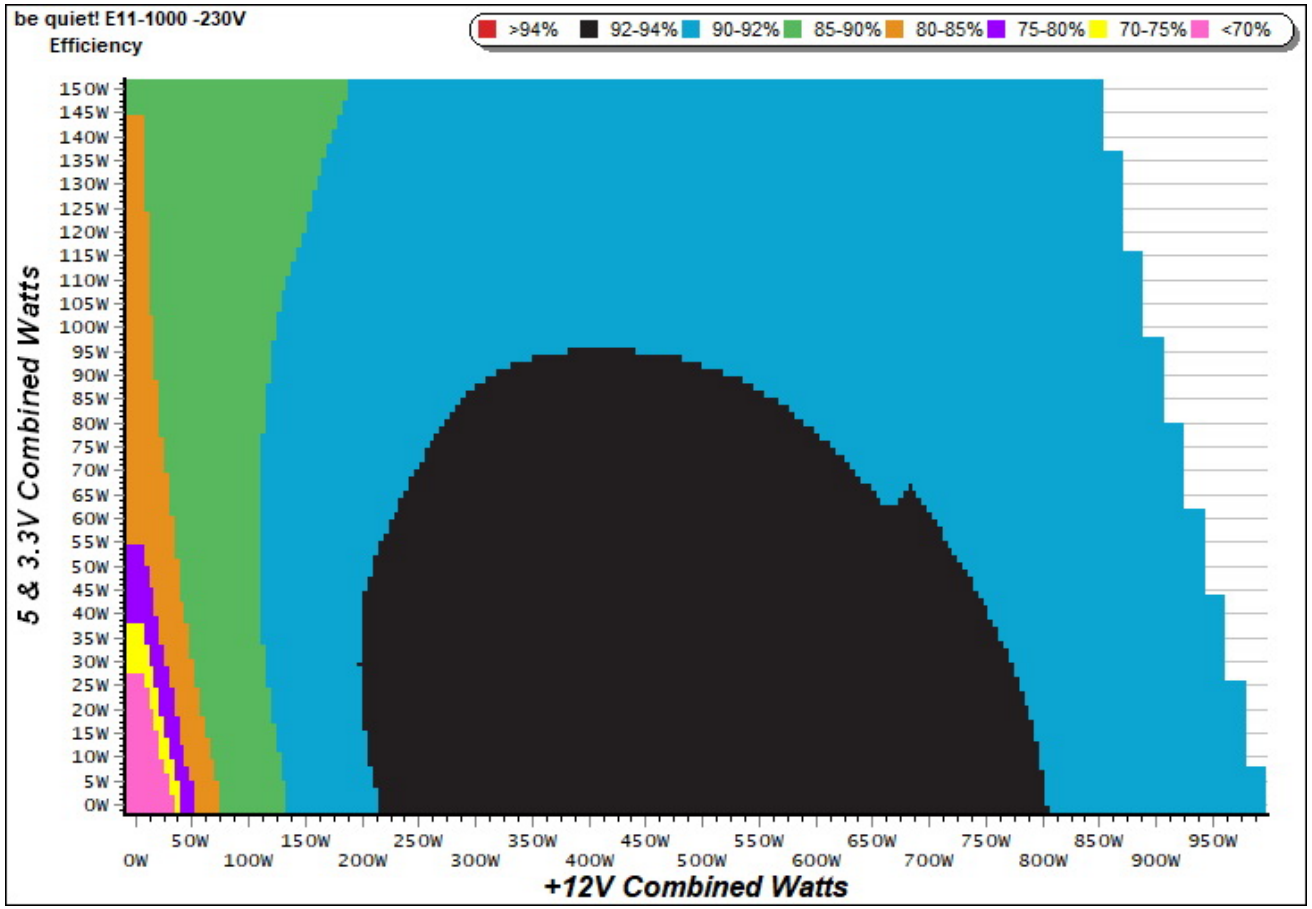
115V



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

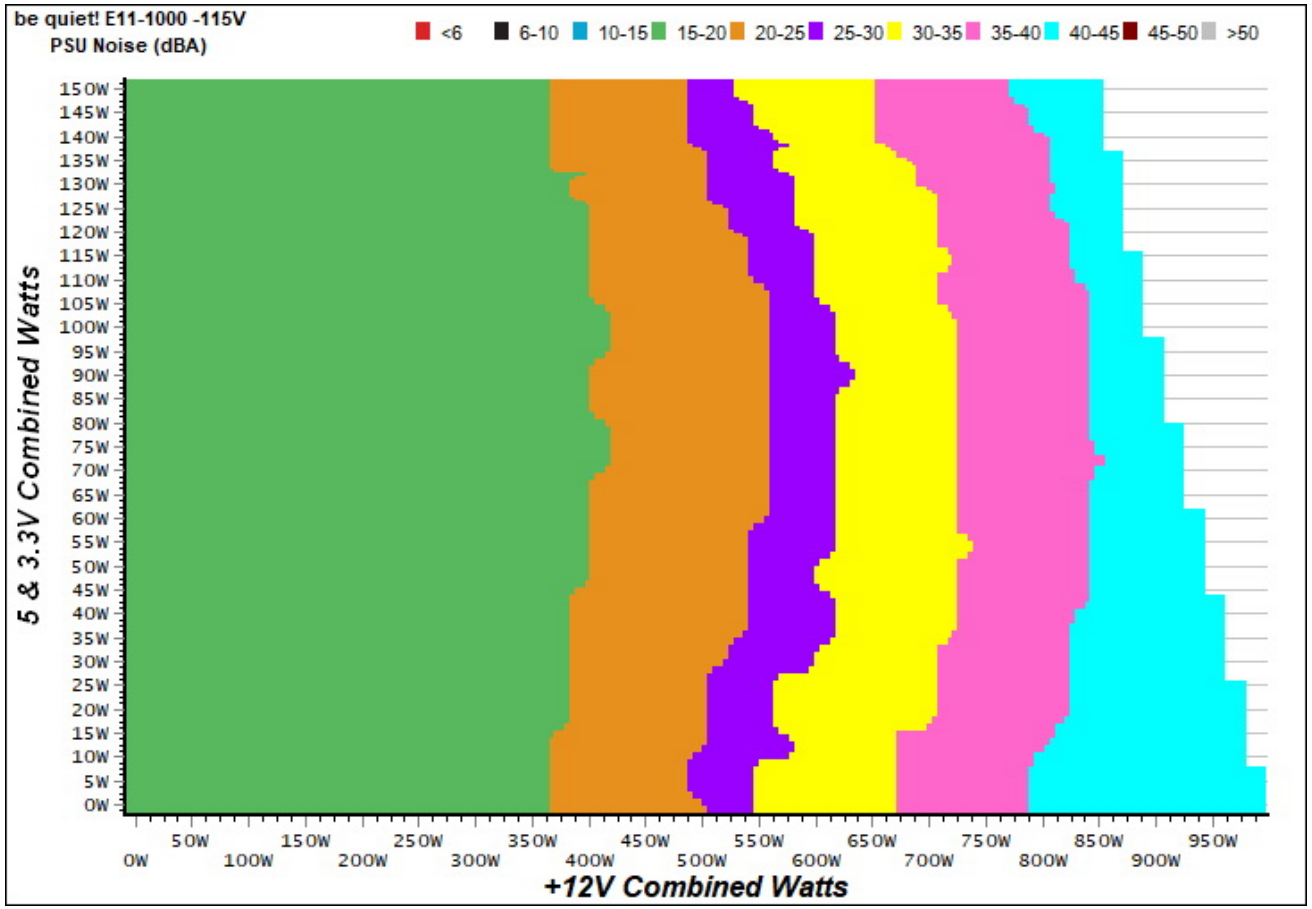


INFO

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

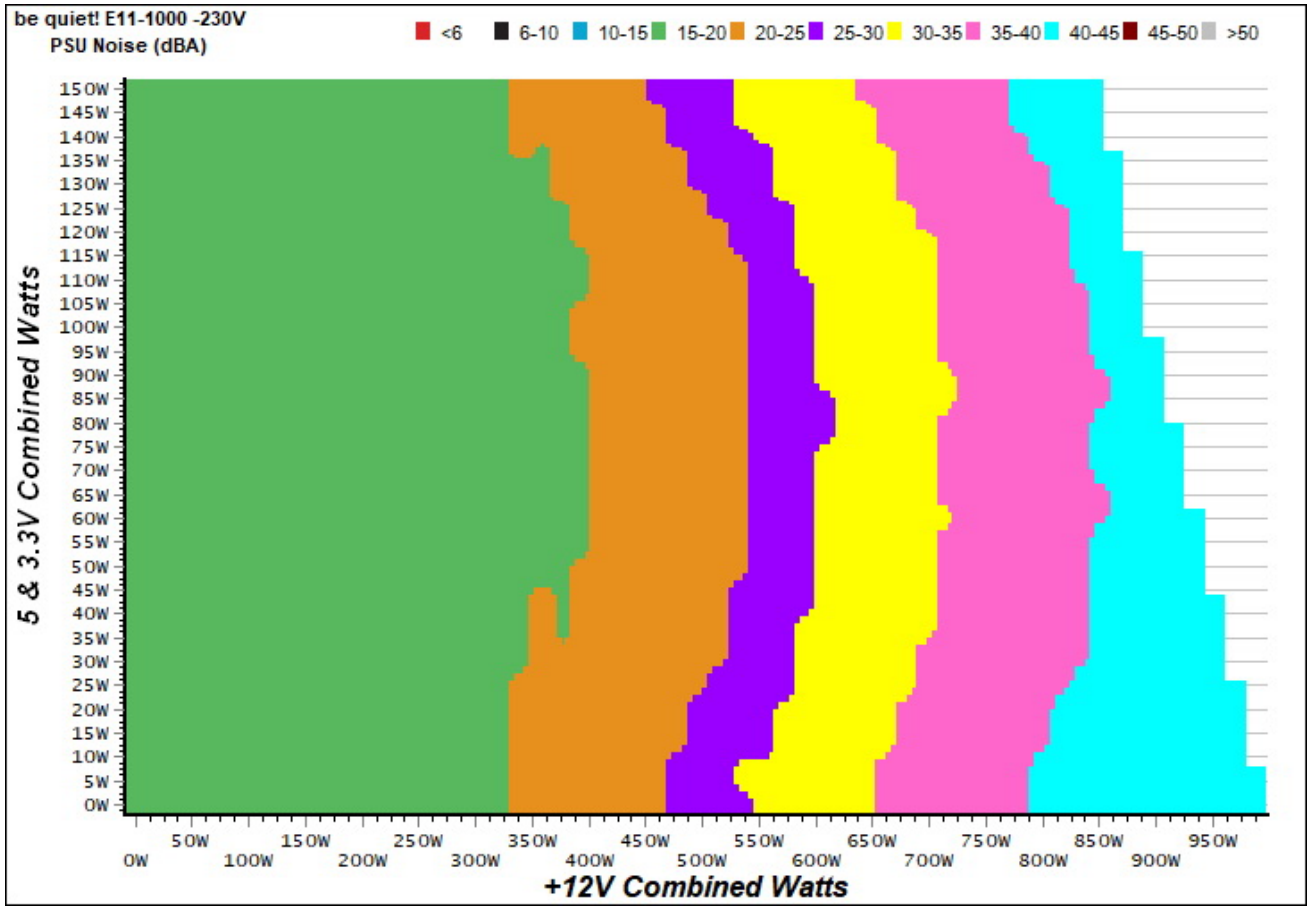
115V



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

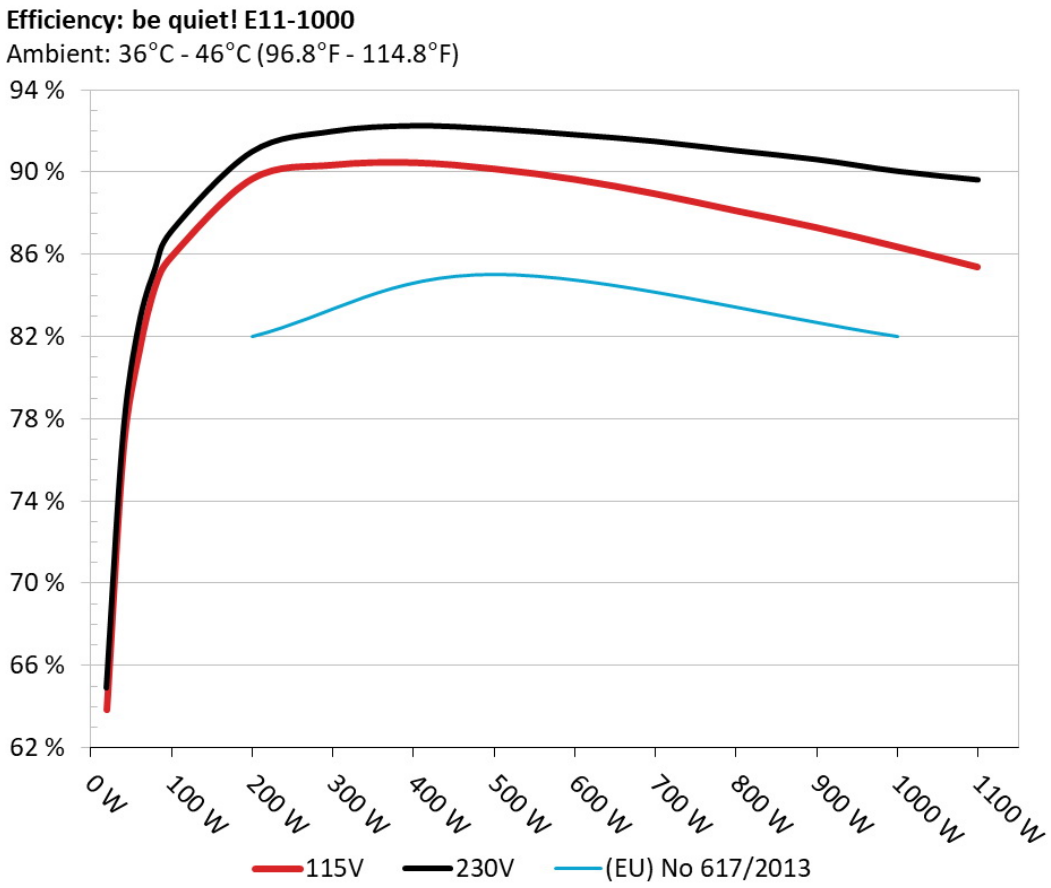


INFO

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

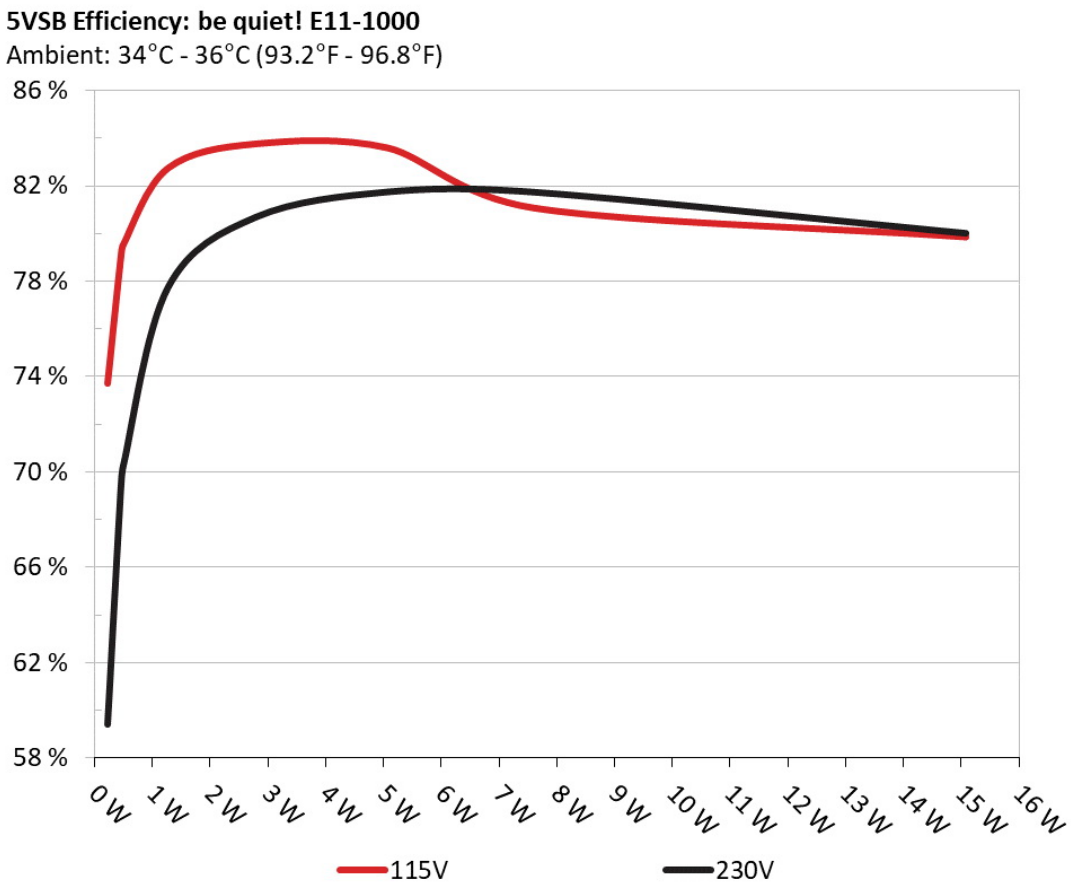
Efficiency under high ambient temperature



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	73.718%	0.025
	5.109V	0.312		115.26V
2	0.090A	0.460	79.038%	0.046
	5.110V	0.582		115.26V
3	0.550A	2.803	83.772%	0.221
	5.097V	3.346		115.25V
4	1.000A	5.081	83.597%	0.320
	5.082V	6.078		115.25V
5	1.500A	7.610	81.078%	0.386
	5.074V	9.386		115.24V
6	2.999A	15.081	79.861%	0.464
	5.029V	18.884		115.23V

230V

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.230	59.432%	0.011
	5.107V	0.387		230.71V
2	0.090A	0.460	69.382%	0.018
	5.108V	0.663		230.63V
3	0.550A	2.802	80.703%	0.090
	5.095V	3.472		230.70V
4	1.000A	5.082	81.757%	0.151
	5.082V	6.216		230.70V
5	1.500A	7.603	81.744%	0.207
	5.068V	9.301		230.70V
6	2.999A	15.083	80.020%	0.317
	5.029V	18.849		230.69V

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	6.499A	1.984A	1.971A	0.986A	99.922	85.911%	725	19.3	37.58°C	0.977
	12.054V	5.036V	3.345V	5.070V	116.309				45.60°C	115.23V
2	14.011A	2.983A	2.966A	1.185A	199.636	89.681%	830	21.2	38.05°C	0.996
	12.044V	5.027V	3.335V	5.063V	222.608				46.54°C	115.09V
3	21.865A	3.486A	3.455A	1.386A	299.152	90.354%	1002	27.9	38.79°C	0.996
	12.036V	5.018V	3.326V	5.051V	331.088				47.57°C	115.05V
4	29.796A	3.992A	3.978A	1.587A	399.552	90.469%	1252	32.5	39.53°C	0.997
	12.027V	5.010V	3.317V	5.042V	441.644				48.91°C	114.90V
5	37.376A	5.000A	4.990A	1.790A	499.690	90.169%	1570	38.4	40.66°C	0.998
	12.018V	5.000V	3.307V	5.030V	554.169				50.42°C	114.85V
6	44.971A	6.011A	6.006A	1.994A	599.811	89.655%	1920	43.3	41.55°C	0.998
	12.008V	4.991V	3.296V	5.017V	669.023				51.78°C	114.70V
7	52.543A	7.027A	7.027A	2.198A	699.556	88.955%	2200	47.4	42.44°C	0.998
	11.999V	4.981V	3.286V	5.005V	786.413				53.61°C	114.55V
8	60.193A	8.048A	8.059A	2.405A	800.073	88.126%	2495	49.2	43.87°C	0.998
	11.989V	4.972V	3.276V	4.991V	907.879				55.61°C	114.49V
9	68.184A	8.565A	8.574A	2.408A	899.356	87.316%	2495	49.2	44.20°C	0.998
	11.980V	4.963V	3.266V	4.984V	1030.001				57.30°C	114.32V
10	76.051A	9.086A	9.119A	3.023A	999.571	86.380%	2495	49.2	45.48°C	0.998
	11.964V	4.953V	3.256V	4.963V	1157.180				59.56°C	114.29V
11	84.477A	9.101A	9.147A	3.027A	1099.632	85.392%	2495	49.2	45.88°C	0.998
	11.955V	4.945V	3.247V	4.957V	1287.751				60.65°C	114.10V
CL1	0.731A	18.002A	18.000A	0.000A	158.534	83.111%	1885	42.6	41.86°C	0.992
	12.039V	5.004V	3.314V	5.077V	190.750				52.77°C	115.12V

CL2	83.338A	1.000A	1.000A	1.000A	1011.063	86.573%	2495	49.2	45.82°C	0.998
	11.973V	4.968V	3.269V	5.019V	1167.867				60.45°C	114.25V

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	6.506A	1.985A	1.973A	0.987A	100.027	87.139%	835	21.2	38.50°C	0.884
	12.055V	5.036V	3.344V	5.069V	114.790				46.00°C	230.85V
2	14.017A	2.984A	2.969A	1.186A	199.737	91.006%	920	23.8	39.14°C	0.954
	12.045V	5.027V	3.334V	5.062V	219.476				46.95°C	230.76V
3	21.873A	3.488A	3.457A	1.387A	299.242	92.000%	1105	30.6	39.70°C	0.974
	12.035V	5.018V	3.325V	5.049V	325.264				48.21°C	230.68V
4	29.804A	3.993A	3.979A	1.588A	399.628	92.274%	1352	33.6	40.51°C	0.985
	12.026V	5.010V	3.316V	5.041V	433.088				49.67°C	230.70V
5	37.387A	5.000A	4.990A	1.790A	499.740	92.128%	1590	38.6	41.16°C	0.990
	12.016V	5.000V	3.306V	5.029V	542.441				50.83°C	230.63V
6	44.981A	6.010A	6.007A	1.994A	599.835	91.841%	1855	42.4	41.68°C	0.993
	12.006V	4.990V	3.296V	5.017V	653.123				51.69°C	230.55V
7	52.555A	7.028A	7.031A	2.199A	699.557	91.514%	2125	45.1	41.98°C	0.996
	11.996V	4.981V	3.285V	5.004V	764.429				52.28°C	230.48V
8	60.214A	8.048A	8.061A	2.405A	800.075	91.063%	2400	48.5	42.30°C	0.996
	11.985V	4.971V	3.275V	4.991V	878.595				52.94°C	230.41V
9	68.209A	8.566A	8.574A	2.408A	899.372	90.635%	2495	49.2	42.81°C	0.996
	11.976V	4.962V	3.265V	4.985V	992.305				53.75°C	230.42V
10	76.055A	9.088A	9.123A	3.025A	999.778	90.064%	2495	49.2	43.03°C	0.996
	11.966V	4.952V	3.255V	4.960V	1110.073				54.88°C	230.34V
11	84.492A	9.102A	9.146A	3.026A	1099.630	89.643%	2495	49.2	43.36°C	0.997
	11.953V	4.944V	3.247V	4.957V	1226.678				55.57°C	230.28V
CL1	0.728A	18.002A	17.997A	0.000A	158.489	84.440%	1885	42.6	41.96°C	0.944
	12.039V	5.004V	3.314V	5.077V	187.695				49.75°C	230.89V

CL2	83.333A	1.000A	0.998A	1.000A	1010.745	90.547%	2495	49.2	42.66°C	0.996
	11.970V	4.968V	3.269V	5.019V	1116.261				53.41°C	230.35V

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	1.184A	0.493A	0.475A	0.196A	19.351	63.837%	677	18.2	0.865
	12.053V	5.046V	3.354V	5.100V	30.313				115.33V
2	2.451A	0.989A	0.983A	0.393A	39.824	76.468%	677	18.2	0.936
	12.052V	5.043V	3.352V	5.093V	52.079				115.30V
3	3.643A	1.486A	1.459A	0.590A	59.305	81.240%	677	18.2	0.958
	12.058V	5.041V	3.349V	5.085V	73.000				115.28V
4	4.905A	1.982A	1.970A	0.788A	79.717	84.490%	677	18.2	0.969
	12.056V	5.038V	3.347V	5.080V	94.351				115.25V

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	1.194A	0.495A	0.475A	0.196A	19.481	64.917%	677	18.2	0.520
	12.053V	5.045V	3.353V	5.098V	30.009				230.91V
2	2.460A	0.992A	0.983A	0.393A	39.946	77.158%	677	18.2	0.705
	12.053V	5.042V	3.351V	5.091V	51.772				230.90V
3	3.651A	1.488A	1.464A	0.590A	59.422	82.531%	725	19.3	0.783
	12.057V	5.040V	3.349V	5.084V	72.000				230.88V
4	4.912A	1.985A	1.973A	0.788A	79.827	85.325%	755	20.8	0.841
	12.057V	5.038V	3.346V	5.078V	93.556				230.86V

The results above are not used in the certification process

Ripple Measurements

115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	21.9 mV	5.0 mV	6.8 mV	11.2 mV	Pass
20% Load	17.6 mV	5.0 mV	6.7 mV	10.3 mV	Pass
30% Load	17.9 mV	6.3 mV	7.7 mV	13.5 mV	Pass
40% Load	19.5 mV	6.9 mV	8.5 mV	17.0 mV	Pass
50% Load	21.1 mV	7.9 mV	10.7 mV	18.2 mV	Pass
60% Load	23.8 mV	9.5 mV	13.9 mV	13.6 mV	Pass
70% Load	26.2 mV	11.8 mV	15.1 mV	15.0 mV	Pass
80% Load	29.4 mV	11.8 mV	17.3 mV	15.7 mV	Pass
90% Load	31.8 mV	11.7 mV	18.2 mV	16.3 mV	Pass
100% Load	34.5 mV	13.4 mV	19.5 mV	18.6 mV	Pass
110% Load	37.2 mV	14.4 mV	19.9 mV	20.5 mV	Pass
Crossload 1	18.6 mV	8.7 mV	11.9 mV	7.3 mV	Pass
Crossload 2	34.5 mV	11.1 mV	15.6 mV	17.3 mV	Pass

The results above are not used in the certification process

230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	22.6 mV	4.8 mV	6.3 mV	8.4 mV	Pass
20% Load	15.8 mV	5.0 mV	6.8 mV	10.7 mV	Pass
30% Load	16.1 mV	6.2 mV	7.4 mV	12.9 mV	Pass
40% Load	18.2 mV	7.2 mV	8.7 mV	18.1 mV	Pass
50% Load	19.4 mV	8.6 mV	10.8 mV	13.0 mV	Pass
60% Load	21.4 mV	9.4 mV	14.3 mV	13.9 mV	Pass
70% Load	23.9 mV	11.8 mV	14.6 mV	15.4 mV	Pass
80% Load	26.2 mV	12.2 mV	17.6 mV	13.8 mV	Pass

Test	12V	5V	3.3V	5VSB	Pass/Fail
90% Load	28.7 mV	12.8 mV	19.3 mV	14.8 mV	Pass
100% Load	31.3 mV	13.3 mV	19.1 mV	17.4 mV	Pass
110% Load	34.7 mV	13.5 mV	20.7 mV	17.5 mV	Pass
Crossload 1	17.6 mV	8.7 mV	11.4 mV	7.1 mV	Pass
Crossload 2	31.7 mV	10.8 mV	16.2 mV	16.8 mV	Pass

The results above are not used in the certification process

be quiet! Straight Power 11 1000W



Top side



Power specifications label