be quiet!

be quiet! Straight Power 11 550W

Serial Number 281S7420001905

Lab ID 281

Certification ID 25281

Test Result Report ID: 20PS281A

Certificate Issue Date: Jan 25, 2018

Scheme: ETA-EMI PSU

115V



230V

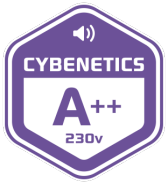


Scheme: LAMBDA PSU

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	be quiet!
Model	Straight Power 11 550W
OEM/ODM	FSP
Serial Number	281S7420001905
Product Specifications	
Manufacturer-Provided Information	
Rated Voltage (Vrms)	100-240
Rated Current (Arms)	8-4
Rated Frequency (Hz)	50-60

Rated Power (W)	550
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	281
Date of receipt	Jan 18, 2018
Testing Date	Jan 23, 2018
Report Issued Date	Jan 25, 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
6+2 pin PCIe (600mm)	2	2	18AWG	No
SATA (550mm+150mm+150mm)	1	3	18AWG	No
SATA (550mm+150mm+150mm+150mm)	1	4	18AWG	No
SATA (550mm+150mm+150mm) / 4 pin Molex (+150mm)	1	3 / 1	18AWG	No
SATA (550mm+150mm) / 4 pin Molex (+150mm+150mm)	1	2 / 2	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	24	24	18	18	20	20	3	0.3
				45.8					
	Watts	130		549.6				15	3.6
Total Max. Power (W)		550							

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)	88.981%
Average Noise Output (>1450 Load Combinations)	13.54dBA
Average PF (>1450 Load Combinations)	0.993
Efficiency With 10W (≤500W) or 2% (>500W) Load	-
Standby Power Consumption	0.0344W
Non-Accredited	
12V Ripple (Full Load)	22.22mV
5V Ripple (Full Load)	8.14mV
3.3V Ripple (Full Load)	14.87mV
5VSB Ripple (Full Load)	18.98mV

12V Load Regulation	0.67%
5V Load Regulation	1.99%
3.3V Load Regulation	2.99%
5VSB Load Regulation	3.42%
Inrush Current	29.212A

230V

Accredited		
Average Efficiency (>1450 load combinations)	91.159%	
Average Noise Output (>1450 Load Combinations)	13.27dBA	
Average PF (>1450 Load Combinations)	0.967	
Efficiency With 10W (≤500W) or 2% (>500W) Load	-	
Standby Power Consumption	0.0888W	
Non-Accredited		
12V Ripple (Full Load)	22.67mV	
5V Ripple (Full Load)	7.19mV	
3.3V Ripple (Full Load)	13.34mV	
5VSB Ripple (Full Load)	18.71mV	
12V Load Regulation	0.68%	
5V Load Regulation	1.95%	
3.3V Load Regulation	2.96%	
5VSB Load Regulation	3.44%	
Inrush Current	44.624A	
Hold-Up Time & PWR_OK Signal	16.20ms	
AC Loss to PWR_OK Hold Up Time	14.60ms	
PWR_OK Inactive to DC Loss Delay	1.60ms	
OPP (0.00°C / 0.00°C)	-	-

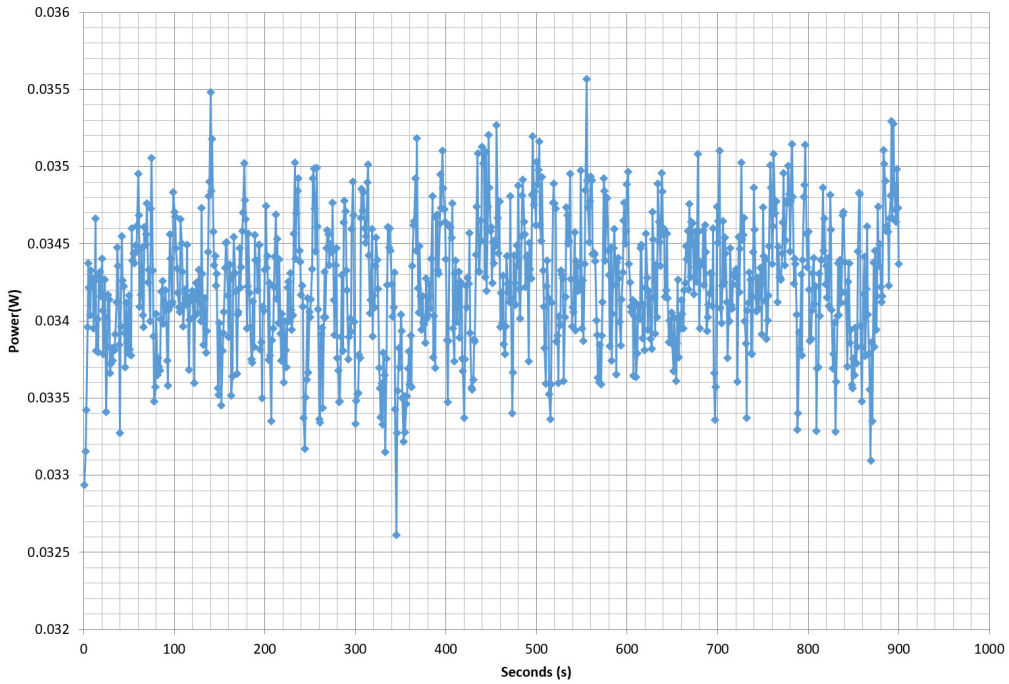
Hold-Up Time & PWR_OK Signal

Hold-Up Time (ms)	16.2
AC Loss to PWR_OK Hold Up Time (ms)	14.6
PWR_OK Inactive to DC Loss Delay (ms)	1.6

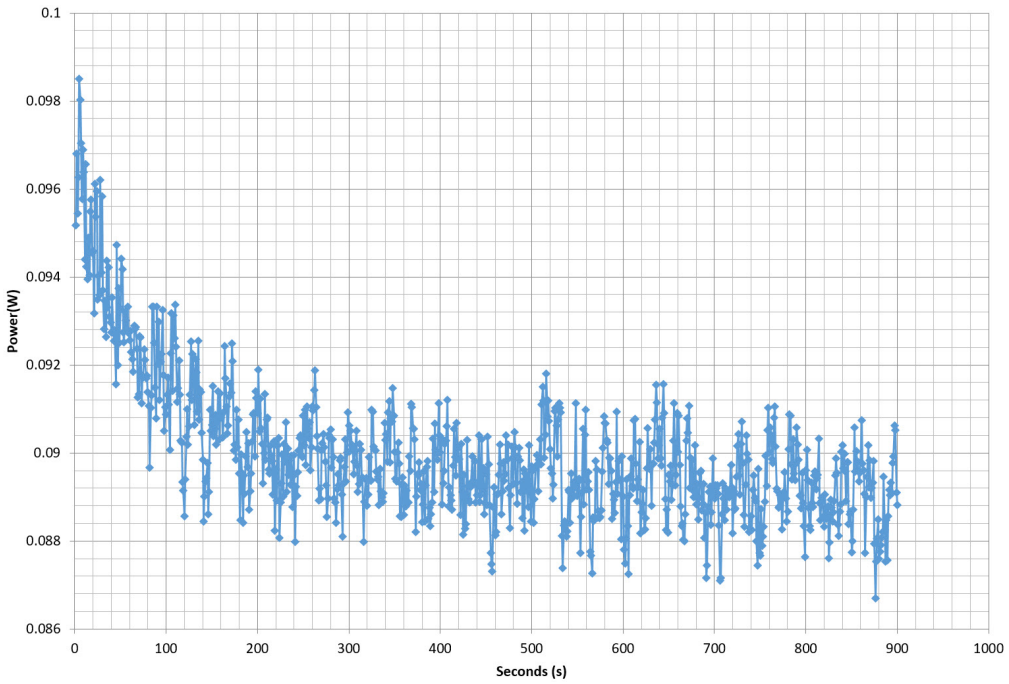
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Graphs

115V

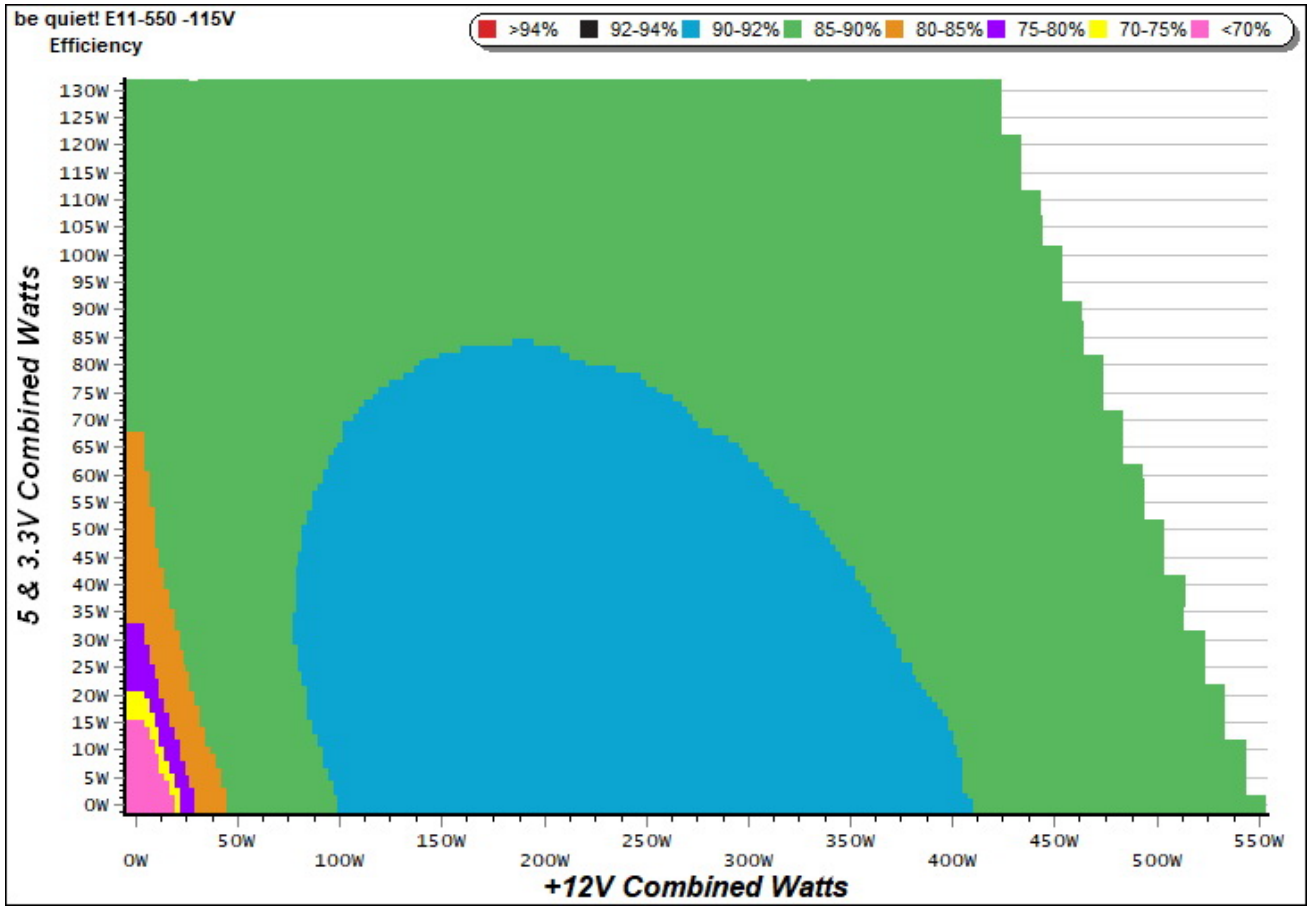


230V



Efficiency Graph

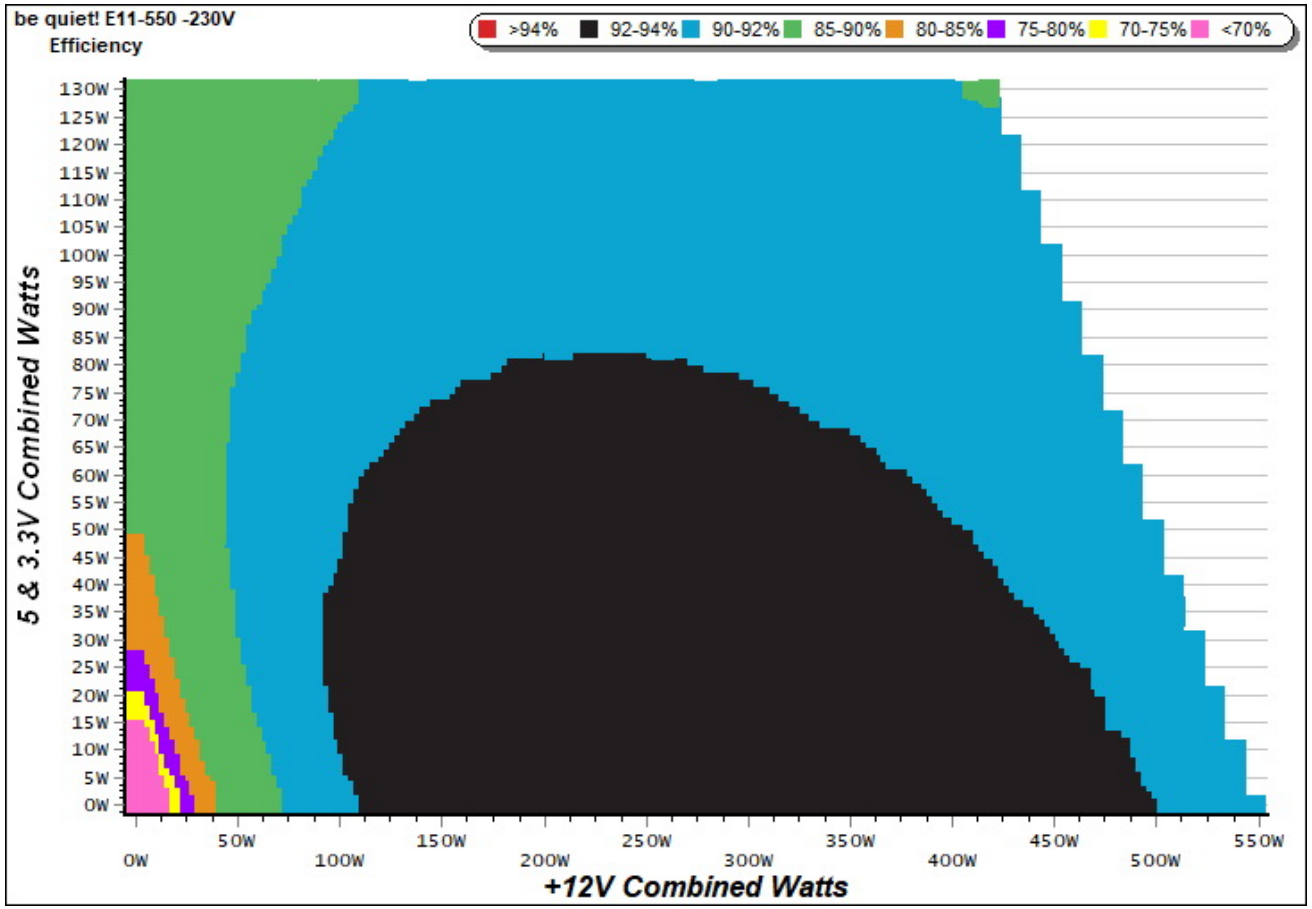
115V



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

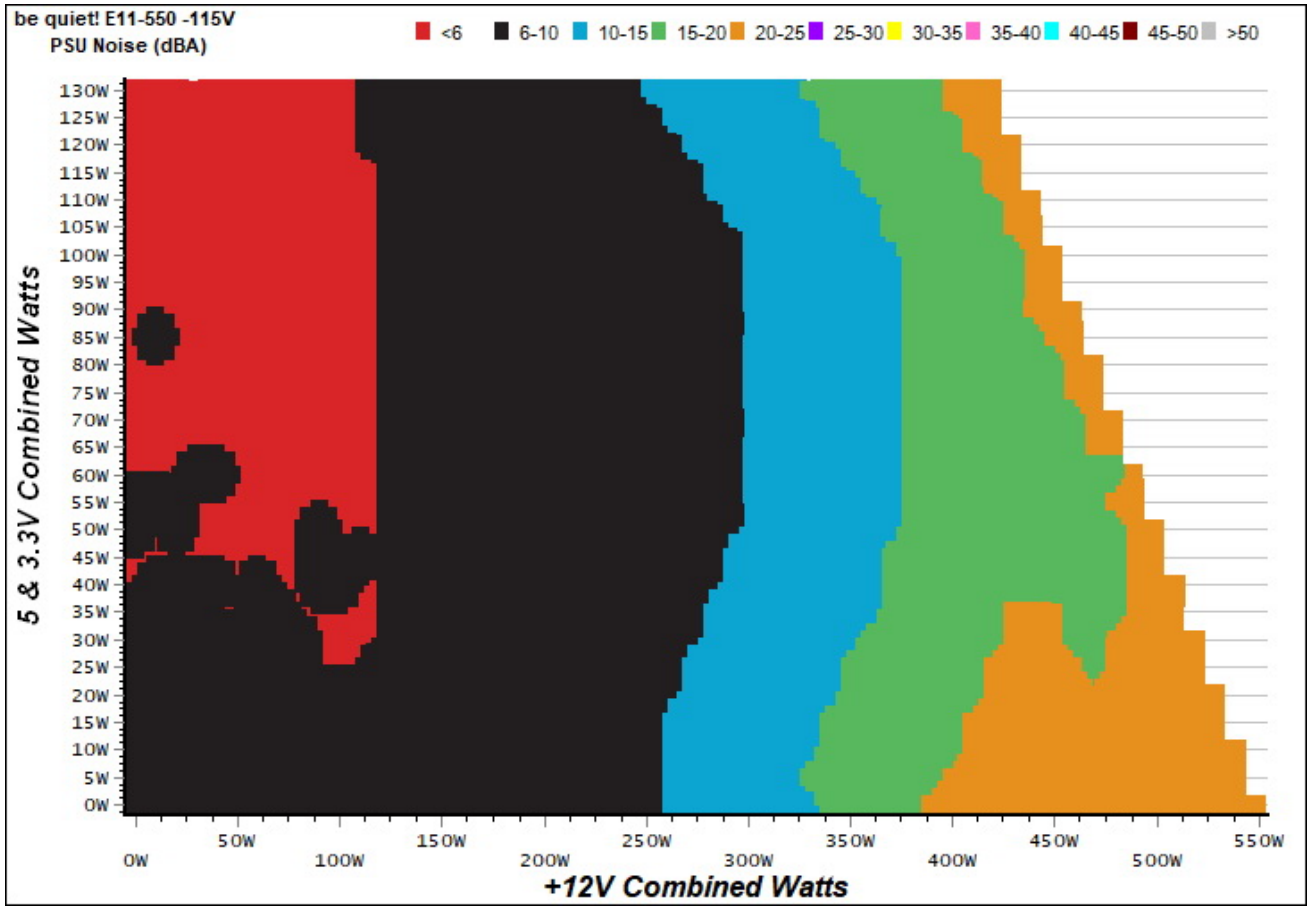


INFO

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

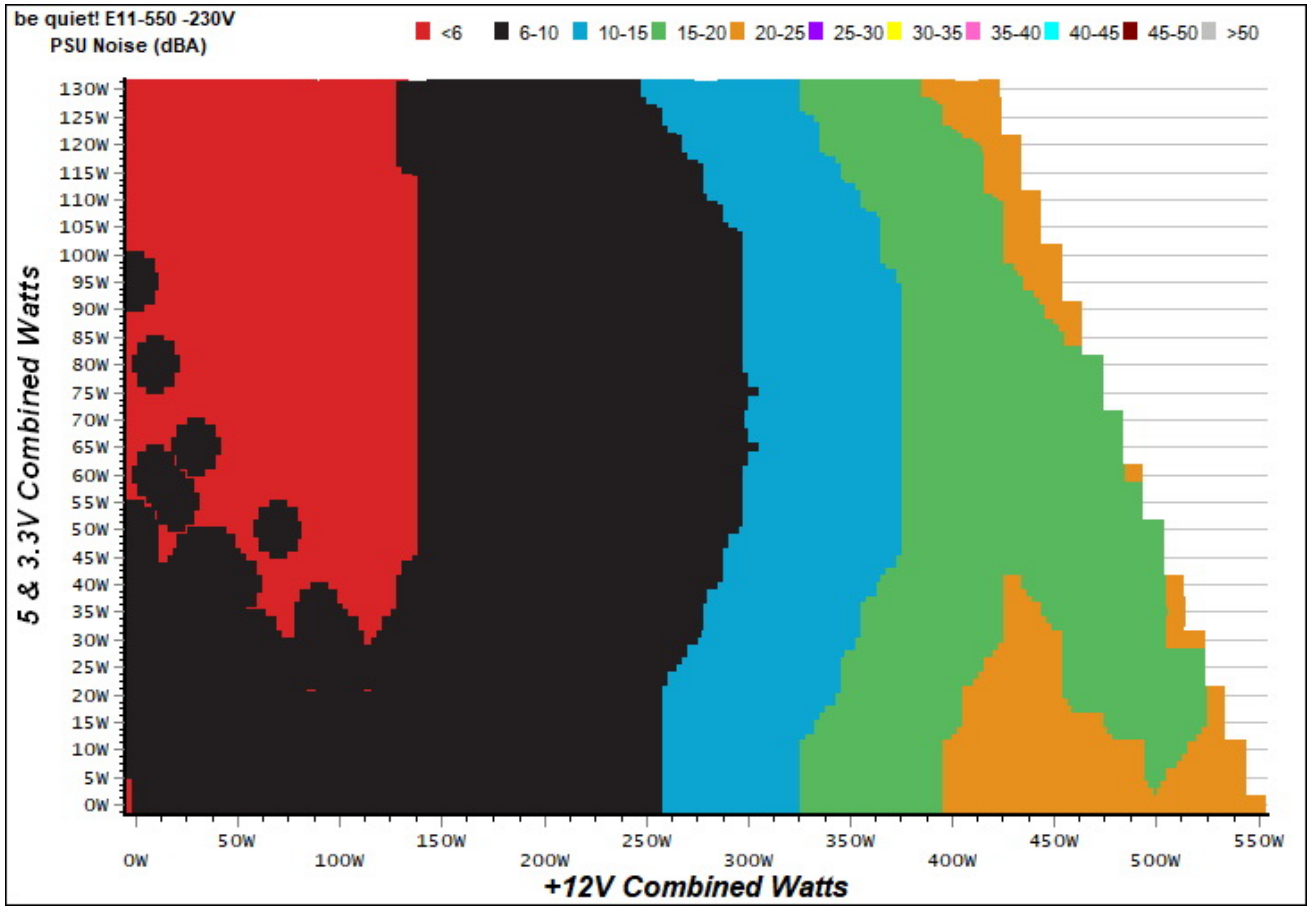
115V



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

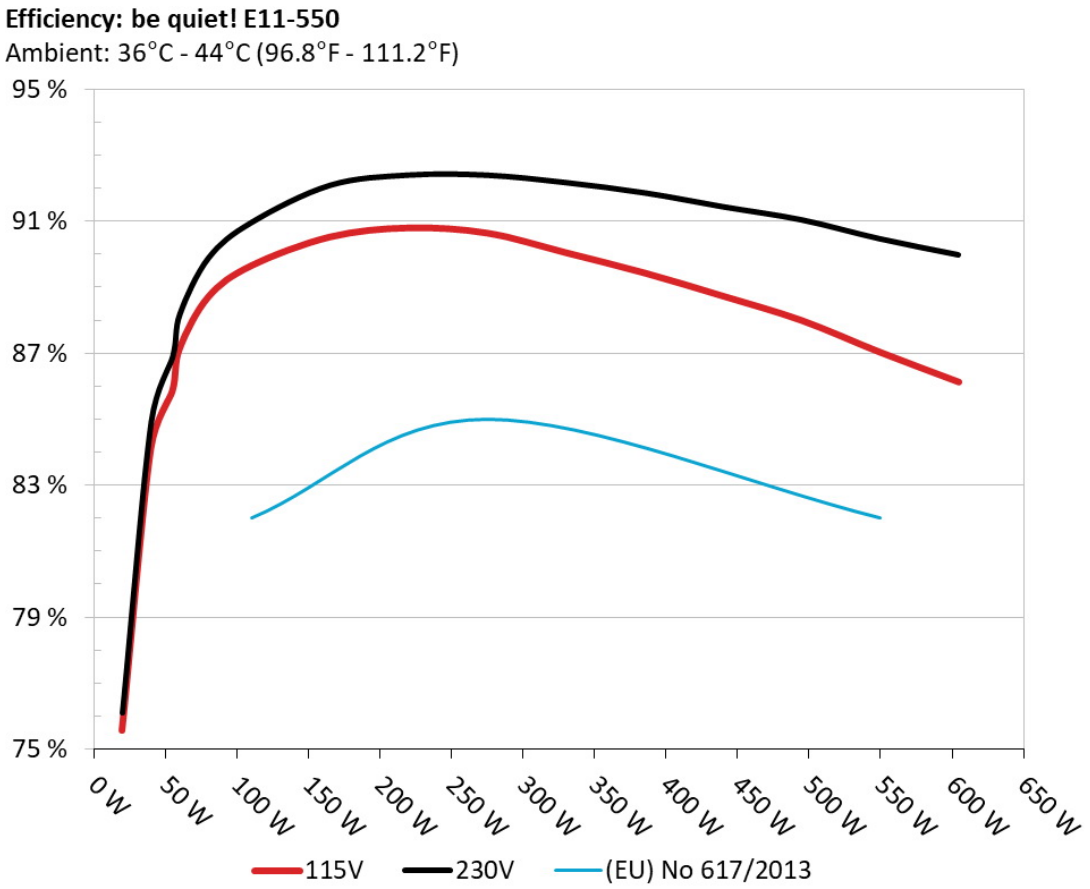


INFO

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

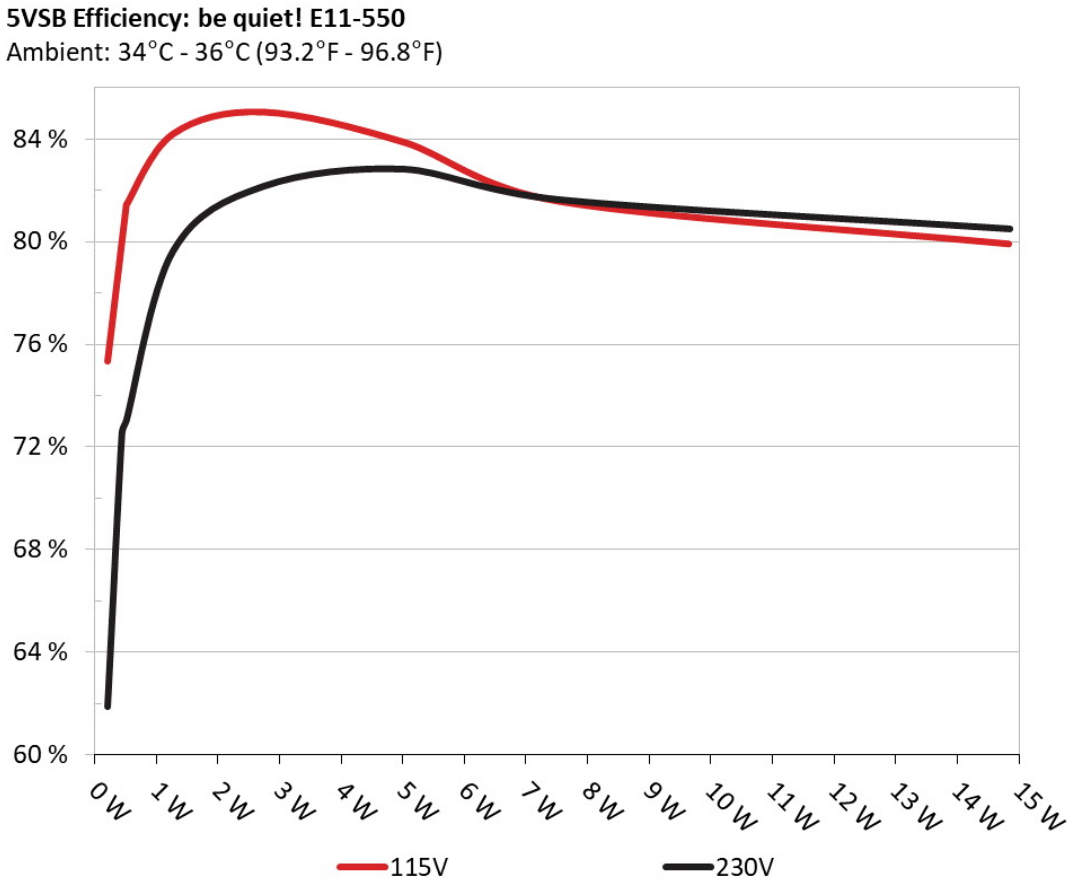
Efficiency under high ambient temperature



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	0.042A	0.211	75.357%	0.040
	5.069V	0.280		115.04V
2	0.087A	0.443	81.434%	0.075
	5.068V	0.544		115.05V
3	0.542A	2.736	85.048%	0.295
	5.045V	3.217		115.04V
4	1.002A	5.039	83.858%	0.378
	5.028V	6.009		115.04V
5	1.502A	7.524	81.579%	0.423
	5.010V	9.223		115.04V
6	3.002A	14.836	79.918%	0.480
	4.942V	18.564		115.04V

230V

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.042A	0.211	61.877%	0.015
	5.070V	0.341		230.17V
2	0.087A	0.443	72.504%	0.026
	5.069V	0.611		230.17V
3	0.542A	2.736	82.137%	0.129
	5.047V	3.331		230.16V
4	1.002A	5.033	82.807%	0.206
	5.023V	6.078		230.17V
5	1.502A	7.529	81.624%	0.266
	5.013V	9.224		230.17V
6	3.002A	14.847	80.485%	0.355
	4.946V	18.447		230.17V

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	2.766A	1.994A	1.956A	0.996A	54.835	85.847%	240	6.0	37.91°C	0.969
	12.013V	5.023V	3.369V	5.021V	63.875				45.92°C	115.06V
2	6.576A	2.990A	2.945A	1.196A	109.806	89.636%	240	6.0	38.12°C	0.990
	12.004V	5.013V	3.359V	5.005V	122.502				46.34°C	115.03V
3	10.741A	3.497A	3.463A	1.401A	164.945	90.510%	240	6.0	39.03°C	0.993
	11.996V	5.004V	3.349V	4.996V	182.239				47.56°C	115.02V
4	14.900A	4.005A	3.950A	1.605A	219.806	90.786%	350	7.7	39.96°C	0.995
	11.988V	4.993V	3.339V	4.983V	242.114				48.90°C	115.02V
5	18.727A	5.014A	4.954A	1.810A	274.789	90.630%	490	11.6	40.19°C	0.996
	11.979V	4.981V	3.329V	4.968V	303.199				49.42°C	115.03V
6	22.556A	6.036A	5.967A	2.016A	329.718	90.037%	632	13.3	40.91°C	0.997
	11.968V	4.969V	3.316V	4.954V	366.203				50.41°C	115.03V
7	26.389A	7.054A	6.985A	2.226A	384.671	89.424%	800	18.1	41.53°C	0.997
	11.960V	4.959V	3.305V	4.938V	430.164				51.33°C	115.02V
8	30.235A	8.089A	8.014A	2.435A	439.679	88.720%	968	23.3	42.44°C	0.997
	11.949V	4.948V	3.293V	4.922V	495.582				52.99°C	115.06V
9	34.512A	8.608A	8.558A	2.440A	494.746	87.982%	1133	27.7	43.19°C	0.997
	11.942V	4.938V	3.284V	4.915V	562.328				54.15°C	115.05V
10	38.531A	9.135A	9.074A	3.071A	549.579	87.019%	1295	32.3	43.72°C	0.997
	11.935V	4.928V	3.273V	4.883V	631.562				55.56°C	115.04V
11	43.170A	9.152A	9.094A	3.074A	604.508	86.120%	1400	33.5	44.20°C	0.997
	11.925V	4.919V	3.265V	4.878V	701.935				56.42°C	115.04V
CL1	0.103A	16.028A	16.005A	0.005A	133.976	84.665%	1012	25.4	42.18°C	0.992
	11.989V	4.969V	3.316V	5.040V	158.242				51.46°C	115.03V

CL2	45.802A	1.001A	1.004A	1.002A	560.138	87.744%	1295	32.3	43.21°C	0.997
	11.940V	4.953V	3.300V	4.981V	638.379				54.15°C	115.04V

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	2.766A	1.994A	1.957A	0.995A	54.831	86.889%	240	6.0	38.95°C	0.819
	12.011V	5.023V	3.370V	5.023V	63.105				46.39°C	230.25V
2	6.576A	2.991A	2.945A	1.196A	109.809	90.946%	240	6.0	39.22°C	0.923
	12.003V	5.013V	3.360V	5.007V	120.741				46.87°C	230.26V
3	10.739A	3.499A	3.460A	1.401A	164.902	92.073%	290	6.5	39.60°C	0.956
	11.994V	5.004V	3.350V	4.995V	179.100				47.57°C	230.26V
4	14.903A	4.006A	3.948A	1.603A	219.785	92.382%	394	8.9	40.09°C	0.972
	11.985V	4.993V	3.339V	4.984V	237.909				48.40°C	230.26V
5	18.723A	5.014A	4.952A	1.810A	274.700	92.378%	540	10.4	40.42°C	0.983
	11.977V	4.981V	3.329V	4.969V	297.365				49.12°C	230.26V
6	22.556A	6.038A	5.967A	2.016A	329.711	92.155%	665	14.1	41.09°C	0.987
	11.967V	4.970V	3.316V	4.954V	357.777				50.12°C	230.26V
7	26.393A	7.056A	6.987A	2.225A	384.681	91.845%	850	17.4	41.40°C	0.990
	11.958V	4.959V	3.305V	4.939V	418.836				50.69°C	230.26V
8	30.227A	8.089A	8.014A	2.435A	439.612	91.424%	1012	25.4	41.72°C	0.992
	11.950V	4.948V	3.293V	4.922V	480.849				51.48°C	230.26V
9	34.507A	8.609A	8.556A	2.440A	494.683	91.026%	1194	29.5	42.72°C	0.992
	11.942V	4.938V	3.284V	4.915V	543.453				52.84°C	230.26V
10	38.534A	9.136A	9.075A	3.070A	549.542	90.452%	1349	32.3	43.56°C	0.993
	11.933V	4.928V	3.273V	4.883V	607.554				54.28°C	230.25V
11	43.158A	9.153A	9.095A	3.074A	604.413	89.968%	1400	33.5	44.75°C	0.993
	11.926V	4.919V	3.265V	4.877V	671.809				55.83°C	230.26V
CL1	0.100A	16.028A	16.004A	0.004A	133.931	86.131%	1070	25.5	42.48°C	0.949
	11.988V	4.969V	3.316V	5.040V	155.496				51.62°C	230.32V

CL2	45.785A	1.003A	1.003A	1.002A	560.033	91.218%	1361	32.4	44.09°C	0.993
	11.942V	4.953V	3.300V	4.980V	613.947				54.35°C	230.26V

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	1.216A	0.491A	0.471A	0.196A	19.668	75.571%	240	6.0	0.892
	12.019V	5.032V	3.378V	5.056V	26.026				115.08V
2	2.456A	0.990A	0.978A	0.396A	39.784	84.097%	240	6.0	0.953
	12.015V	5.028V	3.374V	5.046V	47.307				115.07V
3	3.699A	1.485A	1.481A	0.596A	59.882	87.128%	240	6.0	0.971
	12.012V	5.023V	3.369V	5.035V	68.729				115.07V
4	4.934A	1.994A	1.961A	0.796A	79.859	88.691%	240	6.0	0.981
	12.009V	5.019V	3.365V	5.024V	90.042				115.05V

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	1.212A	0.493A	0.470A	0.196A	19.627	76.100%	240	6.0	0.551
	12.018V	5.033V	3.379V	5.058V	25.791				230.23V
2	2.456A	0.989A	0.977A	0.396A	39.775	84.919%	240	6.0	0.742
	12.014V	5.029V	3.374V	5.047V	46.839				265.12V
3	3.698A	1.489A	1.481A	0.596A	59.890	88.186%	240	6.0	0.835
	12.011V	5.024V	3.370V	5.036V	67.913				230.24V
4	4.932A	1.994A	1.960A	0.796A	79.831	89.874%	240	6.0	0.884
	12.008V	5.020V	3.367V	5.023V	88.825				230.25V

The results above are not used in the certification process

Ripple Measurements

115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	21.5 mV	5.1 mV	9.4 mV	9.3 mV	Pass
20% Load	16.6 mV	4.3 mV	9.1 mV	10.5 mV	Pass
30% Load	16.2 mV	4.4 mV	9.3 mV	12.4 mV	Pass
40% Load	17.8 mV	5.2 mV	10.8 mV	12.8 mV	Pass
50% Load	16.7 mV	5.3 mV	11.5 mV	13.8 mV	Pass
60% Load	17.9 mV	5.6 mV	11.2 mV	16.0 mV	Pass
70% Load	18.9 mV	6.2 mV	11.7 mV	16.2 mV	Pass
80% Load	19.9 mV	6.3 mV	13.3 mV	15.7 mV	Pass
90% Load	21.0 mV	6.6 mV	13.7 mV	16.6 mV	Pass
100% Load	22.2 mV	8.1 mV	14.9 mV	19.0 mV	Pass
110% Load	23.9 mV	8.1 mV	14.7 mV	18.7 mV	Pass
Crossload 1	16.9 mV	6.4 mV	10.7 mV	7.8 mV	Pass
Crossload 2	22.2 mV	6.8 mV	14.1 mV	13.5 mV	Pass

The results above are not used in the certification process

230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	21.6 mV	5.3 mV	9.3 mV	8.9 mV	Pass
20% Load	14.4 mV	5.1 mV	7.9 mV	10.3 mV	Pass
30% Load	14.6 mV	4.2 mV	8.8 mV	12.2 mV	Pass
40% Load	16.3 mV	4.7 mV	9.9 mV	12.8 mV	Pass
50% Load	16.2 mV	5.7 mV	10.4 mV	13.1 mV	Pass
60% Load	17.1 mV	5.7 mV	10.1 mV	16.1 mV	Pass
70% Load	18.0 mV	5.9 mV	11.0 mV	15.2 mV	Pass
80% Load	19.4 mV	7.0 mV	13.3 mV	16.0 mV	Pass

Test	12V	5V	3.3V	5VSB	Pass/Fail
90% Load	20.4 mV	7.1 mV	12.2 mV	16.4 mV	Pass
100% Load	22.7 mV	7.2 mV	13.3 mV	18.7 mV	Pass
110% Load	24.1 mV	7.9 mV	12.8 mV	19.3 mV	Pass
Crossload 1	13.8 mV	6.5 mV	9.2 mV	7.7 mV	Pass
Crossload 2	22.2 mV	6.5 mV	11.5 mV	13.2 mV	Pass

The results above are not used in the certification process

be quiet! Straight Power 11 550W



Top side



Power specifications label