Cybenetics

Anex

be quiet! E11-1000

Lab ID#: 277
Receipt Date: -
Test Date: -

Report: 20PS277A
Report Date: Jan 24, 2000

DUT INFORMATION

Brand	be quiet!
Manufacturer (OEM)	FSP
Series	Straight Power 11
Model Number	E11-1000
Serial Number	285S7330000095
DUT Notes	

DUT SPECIFICATIONS

Rated Voltage (Vrms)	100-240
Rated Current (Arms)	13-6.5
Rated Frequency (Hz)	50-60
Rated Power (W)	1000
Type	ATX12V
Cooling	135mm Fluid Dynamic Bearing Fan (SIW3-13525-HF-26)
Semi-Passive Operation	✗
Cable Design	Fully Modular

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							

CABLES AND CONNECTORS

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	-

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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 @ 105Â°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-26Â (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

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RESULTS	
Temperature Range (°C /°F)	30-32 / 86-89.6
Average Efficiency	88.470
Efficiency With 10W (≤500W) or 2% (>500W) Load -115V	0.000
Average Efficiency 5VSB	81.373
Standby Power Consumption (W) -115V	0.0444480
Standby Power Consumption (W) -230V	0.1054500
Average PF	0.995
ErP Lot 3/6 Ready	✓
(EU) No 617/2013 Compliance	✓
Avg Noise Output	34.02
Efficiency Rating (ETA)	PLATINUM
Noise Rating (LAMBDA)	Standard++

TEST EQUIPMENT		
Electronic Loads	Chroma 6314A x2 63123A x6 63102A 63101A	Chroma 63601-5 x2 Chroma 63600-2 63640-80-80 x10 63610-80-20
AC Sources	Chroma 6530, Chroma 61604	
Power Analyzers	N4L PPA1530, 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	

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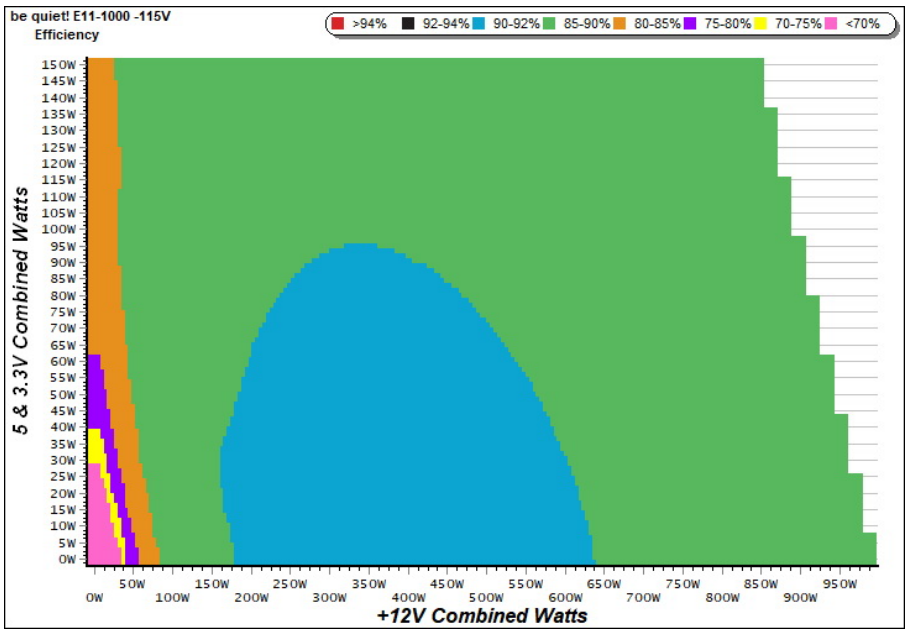
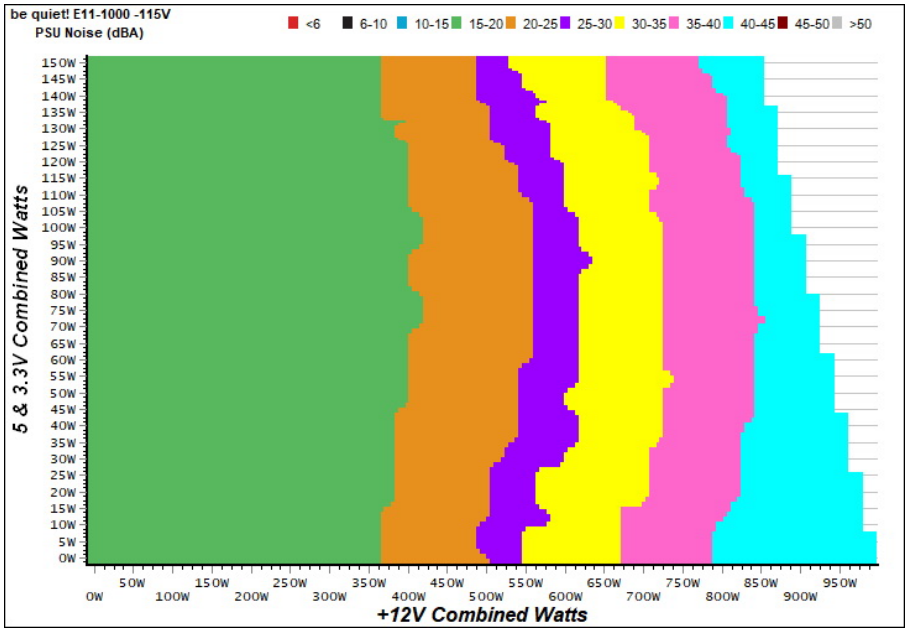
EFFICIENCY GRAPH



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



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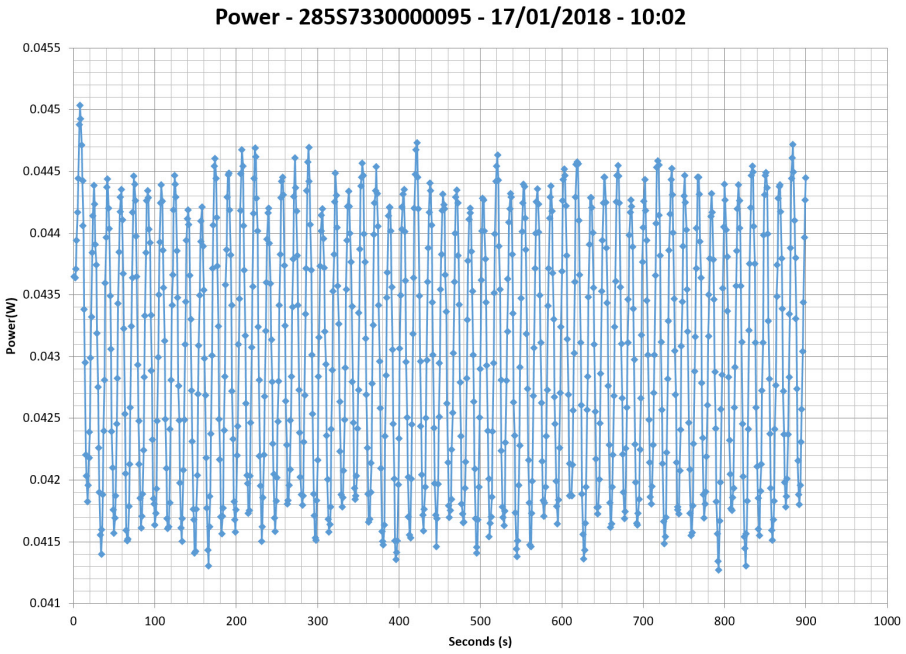
5VSB EFFICIENCY -115V (ERP LOT 3/6 & CEC)

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

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

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

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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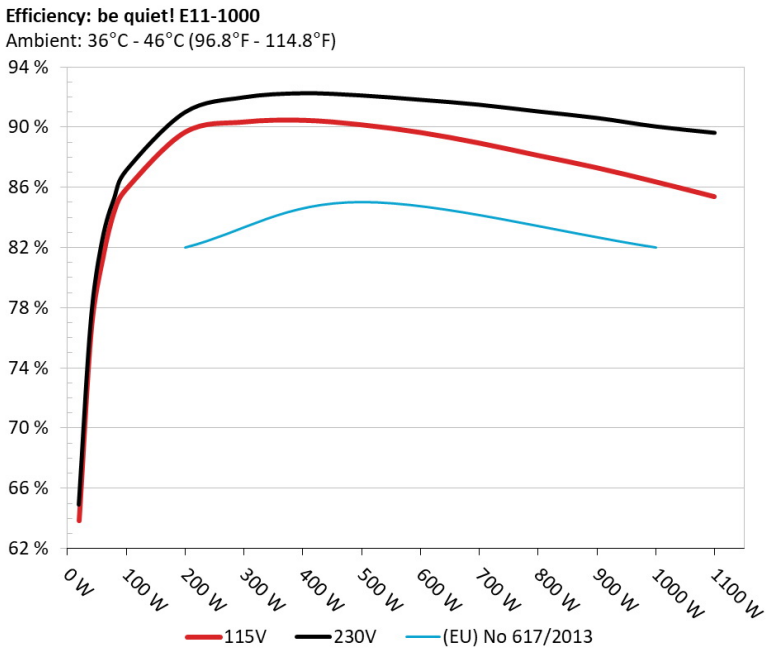
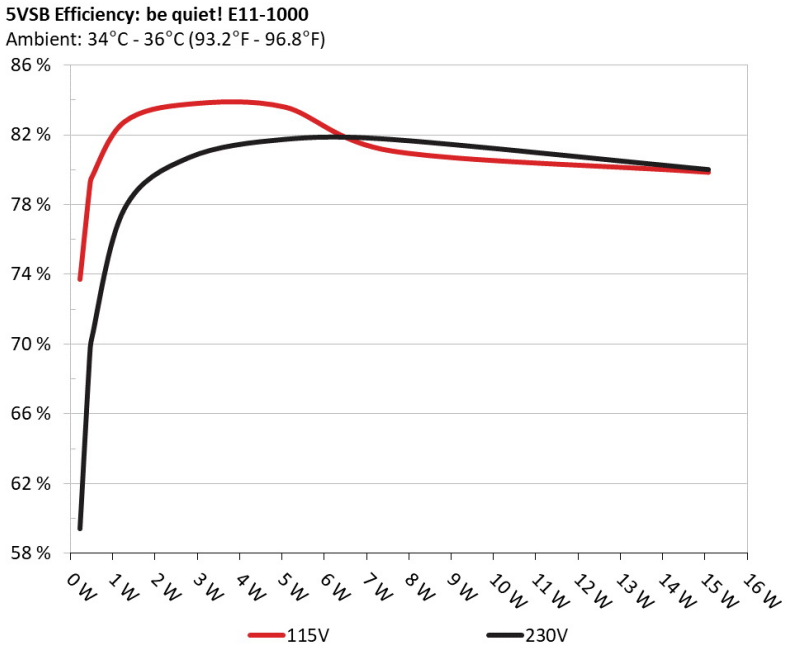
EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE



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

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10-110% LOAD TESTS

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

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20-80W LOAD TESTS

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

RIPPLE MEASUREMENTS

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

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HOLD-UP TIME & POWER OK SIGNAL (230V)	
Hold-Up Time (ms)	20.10
AC Loss to PWR_OK Hold Up Time (ms)	17.90
PWR_OK Inactive to DC Loss Delay (ms)	2.20

Top side

Power specifications label

CERTIFICATIONS