Anex

be quiet! SFX-L-500

Lab ID#: 152
Receipt Date: -
Test Date: -

Report: 20PS152A
Report Date: Jan 8, 2000

DUT INFORMATION

Brand	be quiet!
Manufacturer (OEM)	High Power
Series	SFX L Power
Model Number	SFX-L-500
Serial Number	214P7230000009
DUT Notes	

DUT SPECIFICATIONS

Rated Voltage (Vrms)	100-240
Rated Current (Arms)	10
Rated Frequency (Hz)	50-60
Rated Power (W)	500
Type	SFX-L
Cooling	120mm Fluid Dynamic Bearing Fan (S1201512MB)
Semi-Passive Operation	✗
Cable Design	Fully Modular

POWER SPECIFICATIONS

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	20	20	41.7	3	0.3
	Watts	105		500	15	3.6
Total Max. Power (W)		500				

CABLES AND CONNECTORS

Modular Cables

Description	Cable Count	Connector Count (Total)	Gauge
ATX connector 20+4 pin (300)	1	1	18AWG
4+4 pin EPS12V (405mm)	1	1	18AWG
6+2 pin PCIe (500mm+150mm)	1	2	18AWG
6+2 pin PCIe (405mm+150mm)	1	2	18AWG
SATA (500mm+150mm+150mm)	1	3	18AWG
SATA (300mm+150mm+150mm)	1	3	18AWG
4 pin Molex (300mm+200mm+200mm)	1	3	18AWG

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General Data	
Manufacturer (OEM)	CWT
Platform Model	-
Primary Side	
Transient Filter	4x Y caps, 2x X caps, 2x CM chokes, 1x MOV
Inrush Protection	NTC Thermistor & Diode
Bridge Rectifier(s)	2x GBU1006 (600V, 10A @ 100°C)
APFC MOSFETS	2x Infineon IPW50R280CE (550V, 11.4A @ 100°C, 0.28Ohm)
APFC Boost Diode	1x Power Integrations QH08TZ600 (600V, 8A @ 150°C)
Hold-up Cap(s)	1x Nichicon (400V, 390uF, 2000h @ 105 °C, GG)
Main Switchers	2x Vishay SiHG20N50C (560V, 11A @ 100°C, 0.27Ohm)
Combo APFC/PWM Controller	Champion CM6800TX & CM03X Green PFC controller
Topology	Primary side: Half-Bridge & LLC Resonant Controller Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	
+12V MOSFETS	4x APEC AP9990GH-HF (60V, 100A @ 25°C, 6mOhm)
5V & 3.3V	DC-DC Converters: 6x APEC AP72T03GP (30V, 47A @ 100°C, 9.5mOhm) PWM Controller: APW7159C
Filtering Capacitors	Electrolytics: Nippon Chemi-Con (1-5,000 @ 105°C, KZE), Su' scon (2-5,000h @ 105°C, MF), TAICON (105°C) Polymers: APAQ, EneSol
Supervisor IC	Weltrend WT7502 (OVP, UVP, SCP, PG)
Fan Model	Power Logic PLA13525S12M (12V, 0.40A, 111.1CFM, 41.6 dBA, Hydro Dynamic Bearing)
5VSB Circuit	
Rectifier	1x MBR2045CT SBR (45V, 20A) & CEF04N7G (700V, 4A, 3.3Ohm)
Standby PWM Controller	On-Bright OB5269CP
-12V Circuit	
Rectifier	UTC 2SB834L

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RESULTS	
Temperature Range (°C /°F)	30-32 / 86-89.6
Average Efficiency	88.280
Efficiency With 10W (≤500W) or 2% (>500W) Load -115V	0.000
Average Efficiency 5VSB	78.982
Standby Power Consumption (W) -115V	0.0763809
Standby Power Consumption (W) -230V	0.1171990
Average PF	0.994
ErP Lot 3/6 Ready	✓
(EU) No 617/2013 Compliance	✓
Avg Noise Output	23.91
Efficiency Rating (ETA)	PLATINUM
Noise Rating (LAMBDA)	A

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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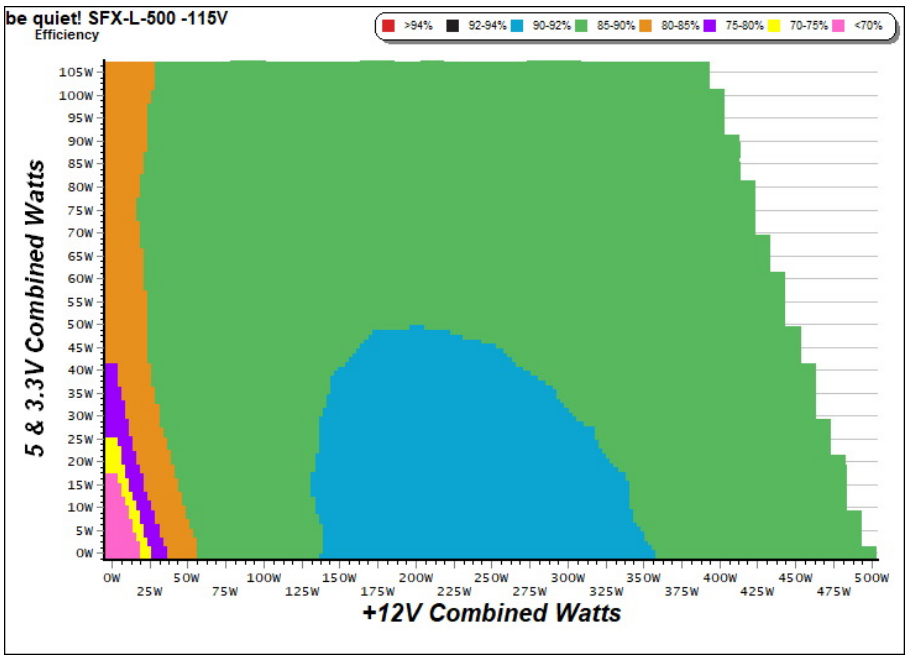
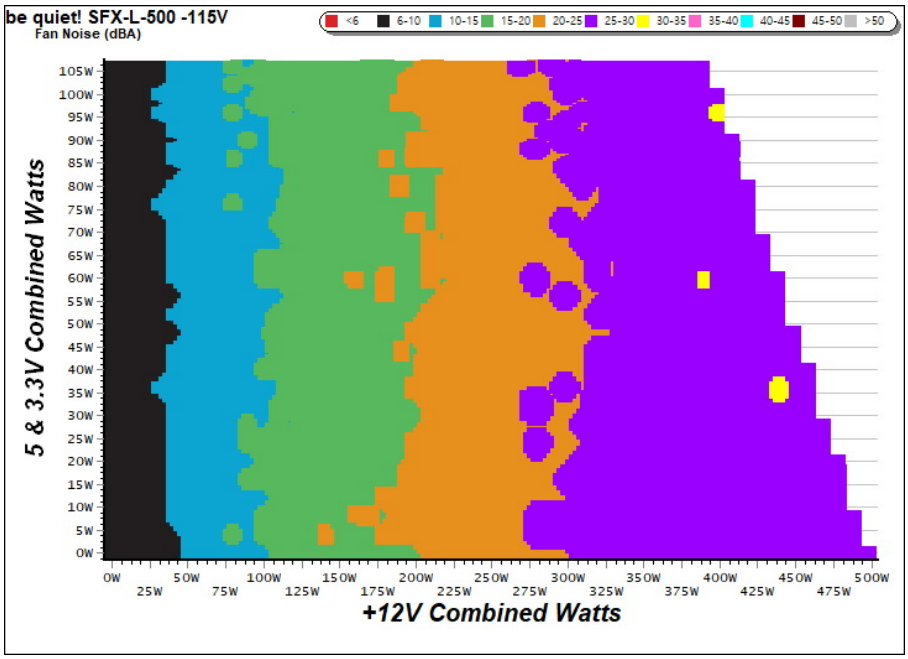
EFFICIENCY GRAPH



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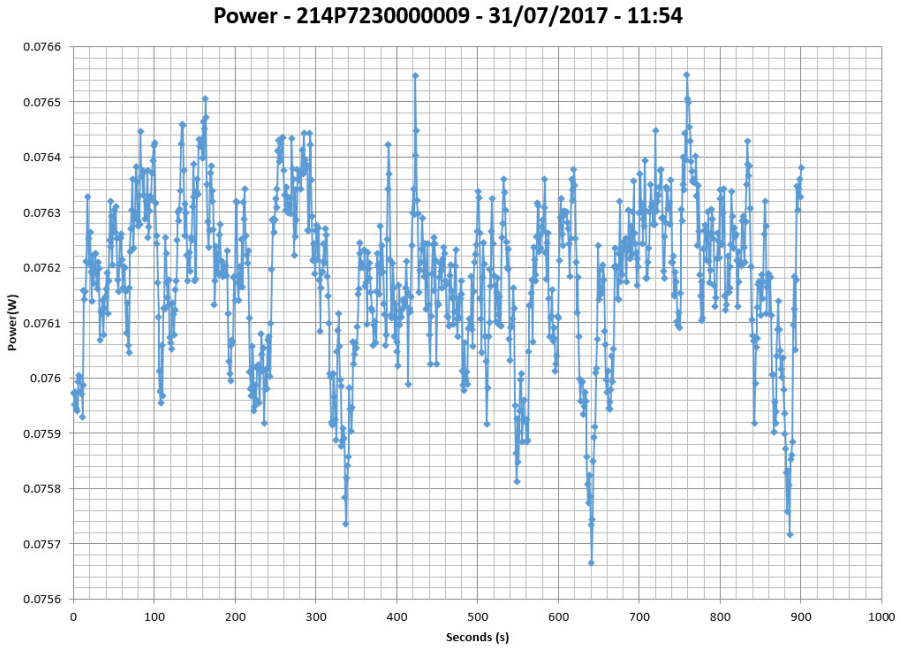
5VSB EFFICIENCY -115V (ERP LOT 3/6 & CEC)

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.041A	0.210	62.500%	0.048
	5.111V	0.336		115.20V
2	0.087A	0.442	71.061%	0.085
	5.109V	0.622		115.20V
3	0.541A	2.755	80.157%	0.268
	5.088V	3.437		115.18V
4	1.001A	5.074	80.706%	0.318
	5.067V	6.287		115.18V
5	1.501A	7.571	80.585%	0.343
	5.044V	9.395		115.18V
6	3.001A	14.914	78.268%	0.382
	4.970V	19.055		115.18V

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.041A	0.210	54.974%	0.017
	5.111V	0.382		230.47V
2	0.087A	0.442	64.431%	0.029
	5.109V	0.686		230.46V
3	0.541A	2.754	75.639%	0.137
	5.087V	3.641		230.46V
4	1.001A	5.073	78.602%	0.204
	5.066V	6.454		230.46V
5	1.501A	7.570	79.626%	0.250
	5.043V	9.507		230.47V
6	3.001A	14.918	78.524%	0.317
	4.971V	18.998		230.47V

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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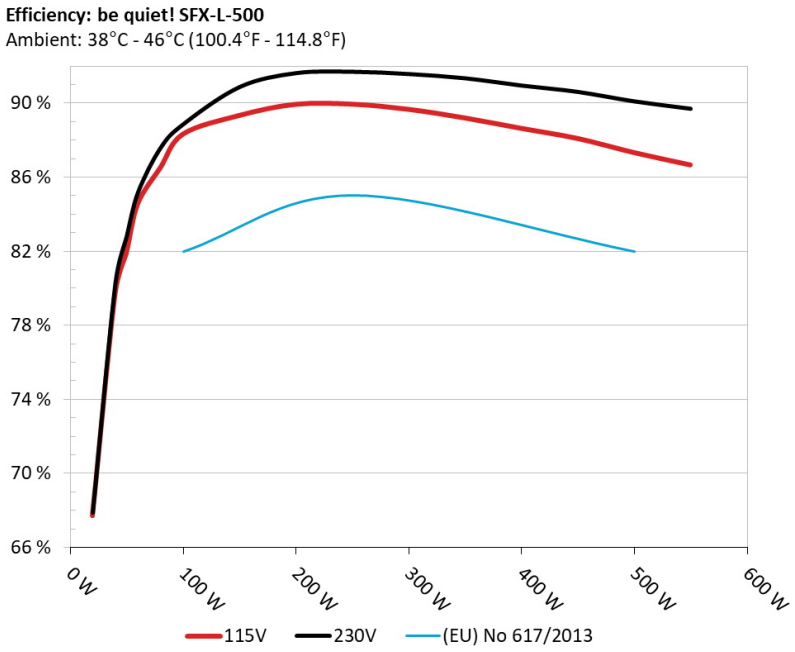
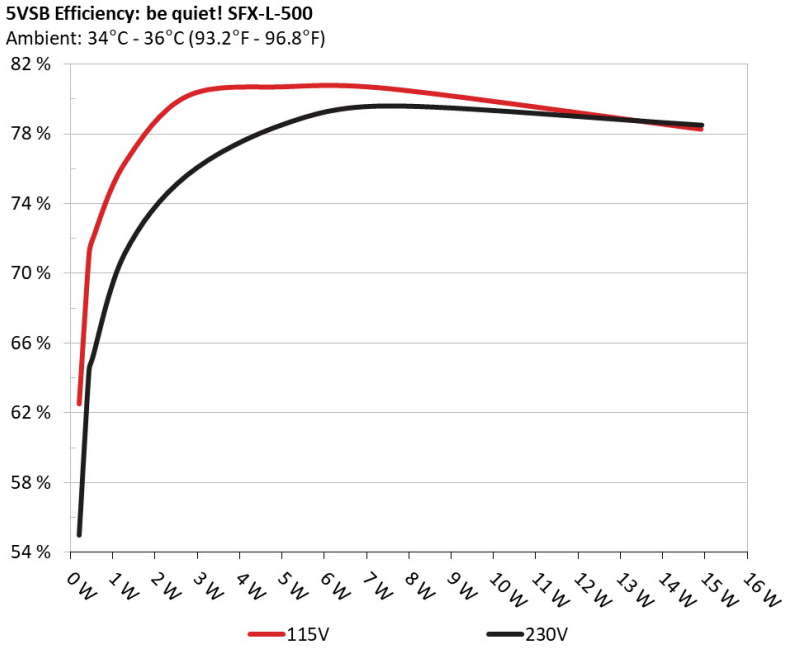
EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE



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)	Fan Noise (dB[A])	Temps (In/Out)	PF/AC Volts
1	2.306A	1.976A	1.958A	0.990A	49.753	81.915%	1320	25.8	38.70°C	0.968
	12.211V	5.073V	3.361V	5.039V	60.737				40.92°C	115.22V
2	5.650A	2.961A	2.948A	1.190A	99.752	88.305%	1320	25.8	38.86°C	0.992
	12.193V	5.063V	3.354V	5.026V	112.963				41.34°C	115.22V
3	9.335A	3.468A	3.465A	1.395A	149.861	89.320%	1393	27.2	39.10°C	0.992
	12.186V	5.054V	3.345V	5.009V	167.779				41.70°C	115.21V
4	13.031A	3.965A	3.950A	1.600A	199.750	89.920%	1455	29.5	39.56°C	0.995
	12.168V	5.047V	3.338V	4.995V	222.143				42.26°C	115.21V
5	16.556A	4.972A	4.956A	1.805A	249.753	89.927%	1544	29.6	39.94°C	0.996
	12.034V	5.034V	3.329V	4.981V	277.730				42.88°C	115.21V
6	19.801A	5.977A	5.965A	2.010A	299.735	89.649%	1530	29.5	40.69°C	0.997
	12.117V	5.024V	3.318V	4.968V	334.341				43.77°C	115.21V
7	23.184A	6.988A	6.978A	2.219A	349.731	89.183%	1613	30.9	41.56°C	0.998
	12.104V	5.013V	3.309V	4.953V	392.149				44.84°C	115.21V
8	26.571A	7.999A	7.998A	2.426A	399.684	88.623%	1706	32.6	42.26°C	0.998
	12.092V	5.003V	3.299V	4.939V	450.995				45.69°C	115.21V
9	30.391A	8.513A	8.534A	2.430A	449.704	88.077%	1738	32.9	43.40°C	0.998
	12.080V	4.993V	3.291V	4.934V	510.579				46.93°C	115.21V
10	33.962A	9.040A	9.047A	3.062A	499.615	87.314%	1776	33.5	44.79°C	0.999
	12.069V	4.983V	3.282V	4.895V	572.208				48.44°C	115.21V
11	38.138A	9.057A	9.066A	3.065A	549.596	86.648%	1865	35.0	46.09°C	0.999
	12.058V	4.975V	3.275V	4.887V	634.283				50.16°C	115.21V
CL1	0.096A	13.020A	13.004A	0.004A	109.880	82.171%	1650	31.4	43.27°C	0.992
	12.179V	5.023V	3.329V	5.107V	133.721				45.87°C	115.22V
CL2	41.619A	1.004A	1.001A	1.001A	516.001	88.246%	1755	33.4	45.03°C	0.999
	12.078V	5.016V	3.306V	4.977V	584.732				47.92°C	115.21V

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20-80W LOAD TESTS

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	Fan Noise (dB[A])	PF/AC Volts
1	1.196A	0.493A	0.470A	0.195A	19.655	67.717%	1227	24.2	0.914
	12.187V	5.083V	3.371V	5.075V	29.025				115.22V
2	2.413A	0.981A	0.976A	0.390A	39.723	79.703%	1260	24.4	0.959
	12.217V	5.079V	3.367V	5.065V	49.839				115.22V
3	3.638A	1.468A	1.483A	0.590A	59.826	84.563%	1245	24.3	0.979
	12.207V	5.073V	3.363V	5.055V	70.747				115.22V
4	4.850A	1.976A	1.963A	0.790A	79.761	86.487%	1260	24.4	0.981
	12.199V	5.069V	3.359V	5.044V	92.223				115.22V

RIPPLE MEASUREMENTS

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	7.1 mV	8.6 mV	5.6 mV	6.5 mV	Pass
20% Load	9.2 mV	10.7 mV	7.0 mV	7.9 mV	Pass
30% Load	11.7 mV	10.8 mV	7.9 mV	8.7 mV	Pass
40% Load	14.0 mV	11.3 mV	9.2 mV	10.4 mV	Pass
50% Load	18.9 mV	14.9 mV	11.4 mV	11.9 mV	Pass
60% Load	23.2 mV	16.9 mV	13.6 mV	13.8 mV	Pass
70% Load	26.1 mV	18.7 mV	15.1 mV	15.5 mV	Pass
80% Load	28.6 mV	19.8 mV	16.8 mV	17.0 mV	Pass
90% Load	32.0 mV	21.7 mV	18.6 mV	18.7 mV	Pass
100% Load	37.3 mV	23.4 mV	21.2 mV	21.8 mV	Pass
110% Load	42.0 mV	23.8 mV	22.8 mV	23.5 mV	Pass
Crossload 1	13.0 mV	15.8 mV	12.8 mV	12.3 mV	Pass
Crossload 2	37.1 mV	20.8 mV	17.0 mV	19.4 mV	Pass

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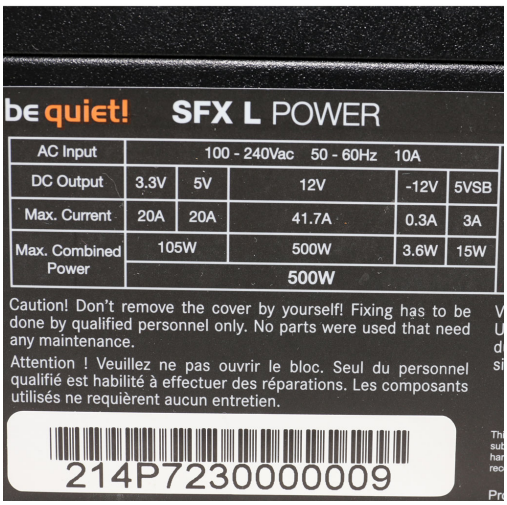
HOLD-UP TIME & POWER OK SIGNAL (230V)	
Hold-Up Time (ms)	18.5
AC Loss to PWR_OK Hold Up Time (ms)	16.2
PWR_OK Inactive to DC Loss Delay (ms)	2.3

Top side



Power specifications label

CERTIFICATIONS

CYBENETICS PLATINUM

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