be quiet!

be quiet! SFX L Power 600W

Serial Number 215P77230000018

Lab ID 144

Certification ID 25144

Test Result Report ID: 20PS144A

Certificate Issue Date: Jul 24, 2018

Scheme: ETA-EMI PSU

115V

230V

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	SFX L Power 600W
OEM/ODM	High Power
Serial Number	215P77230000018
Product Specifications	
Manufacturer-Provided Information	
Rated Voltage (Vrms)	100-240
Rated Current (Arms)	10
Rated Frequency (Hz)	50-60

Rated Power (W)	600
Operating Temperature (Continuous Full Load) (°C)	
Type	SFX-L
Cable Design	Fully Modular
Warranty	-
Cybenetics Measurements	
Dimensions (W x H x D)	
Weight	
Cooling	120mm Fluid Dynamic Bearing Fan (S1201512MB)
Semi-Passive Operation	✗
Cybenetics Testing Information	
Lab ID	144
Date of receipt	Jul 17, 2018
Testing Date	Jul 21, 2018
Report Issued Date	Jul 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 (300)	1	1	18AWG	No
4+4 pin EPS12V (405mm)	2	2	18AWG	No
6+2 pin PCIe (500mm+150mm)	1	2	18AWG	No
6+2 pin PCIe (405mm+150mm)	1	2	18AWG	No
SATA (500mm+150mm+150mm)	1	3	18AWG	No
SATA (300mm+150mm+150mm)	1	3	18AWG	No
4 pin Molex (300mm+200mm+200mm)	1	3	18AWG	No
AC Power Cord (1400mm) - C13 coupler	1	1	18AWG	-

Power Specifications

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	22	22	50	3	0.3
	Watts	105		600	15	3.6
Total Max. Power (W)		600				

Parts Description

General Data	
Manufacturer (OEM)	High Power
Platform Model	-
Primary Side	
Transient Filter	4x Y caps, 2x X caps, 2x CM chokes, 1x MOV, 1x CMD02X
Inrush Protection	-
Bridge Rectifier(s)	1x
APFC MOSFETS	2x Toshiba TK16A60W (600V, 15.8A @ 150°C, 0.19Ohm)
APFC Boost Diode	1x Infineon IDH06G65C5 (650V, 6A @ 145°C)
Hold-up Cap(s)	1x Rubycon (420V, 470uF, 3000h @ 85 °C, USH)
Main Switchers	2x Toshiba TK16A60W (600V, 15.8A @ 150°C, 0.19Ohm) Driver IC: ST8233BD
APFC Controller	Infineon ICE3PCS01G
LLC Resonant Controller	Infineon ICE2HS01G
Topology	Primary side: Half-Bridge & LLC Resonant Controller Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	
+12V MOSFETS	6x Infineon BSC027N04LSG (40V, 88A @ 100°C, 2.7mOhm)
5V & 3.3V	DC-DC Converters: 4x Infineon BSC0902NS (30V, 67A @ 100°C, 2.6mOhm) PWM Controller: APW7159C
Filtering Capacitors	Electrolytics: Nippon Chemi-Con (1-5,000 @ 105°C, KZE), Nippon Chemi-Con (4-10,000 @ 105°C, KY) Polymers: Nippon Chemi-Con
Supervisor IC	SITI PS223 (OVP, UVP, SCP, PG ,OTP)
Fan Model	Globe Fan S1201512MB (12V, 0.25A, 120mm, Fluid Dynamic Bearing)
5VSB Circuit	

Rectifiers	2x Infineon 060N03L 1x P10V45SP SBR (45V, 10A)
Standby PWM Controller	SANKEN STR-A6069H
-12V Circuit	
Rectifier	KEC KIA7912PI (-12V, 1A)

Test Results

Temperature & Compliance Info

Temperature Range (°C /°F)	28-32 / 82.4-89.6
ErP Lot 3/6 Ready	ErP Lot 3/6 2010: ✓ ErP Lot 3/6 2013: ✓ ErP Lot 3/6 2014, CEC: Partially
(EU) No 617/2013 Compliance	✓

Performance Summary

115V

Accredited	
Average Efficiency (>1450 load combinations)	88.839%
Average Noise Output (>1450 Load Combinations)	25.49dBA
Average PF (>1450 Load Combinations)	0.996
Efficiency With 10W (≤500W) or 2% (>500W) Load	-
Standby Power Consumption	0.0744W
Non-Accredited	
12V Ripple (Full Load)	45.87mV
5V Ripple (Full Load)	23.57mV
3.3V Ripple (Full Load)	31.86mV
5VSB Ripple (Full Load)	21.32mV
12V Load Regulation	0.72%
5V Load Regulation	1.78%
3.3V Load Regulation	2.25%

5VSB Load Regulation	3.88%
Inrush Current	88.035A

230V

Accredited		
Average Efficiency (>1450 load combinations)	90.635%	
Average Noise Output (>1450 Load Combinations)	25.66dBA	
Average PF (>1450 Load Combinations)	0.971	
Efficiency With 10W (≤500W) or 2% (>500W) Load	-	
Standby Power Consumption	0.1140W	
Non-Accredited		
12V Ripple (Full Load)	48.92mV	
5V Ripple (Full Load)	22.47mV	
3.3V Ripple (Full Load)	29.87mV	
5VSB Ripple (Full Load)	21.38mV	
12V Load Regulation	0.75%	
5V Load Regulation	1.74%	
3.3V Load Regulation	2.19%	
5VSB Load Regulation	3.80%	
Inrush Current	69.895A	
Hold-Up Time & PWR_OK Signal	16.90ms	
AC Loss to PWR_OK Hold Up Time	15.70ms	
PWR_OK Inactive to DC Loss Delay	1.20ms	
OPP (0.00°C / 0.00°C)	-	-

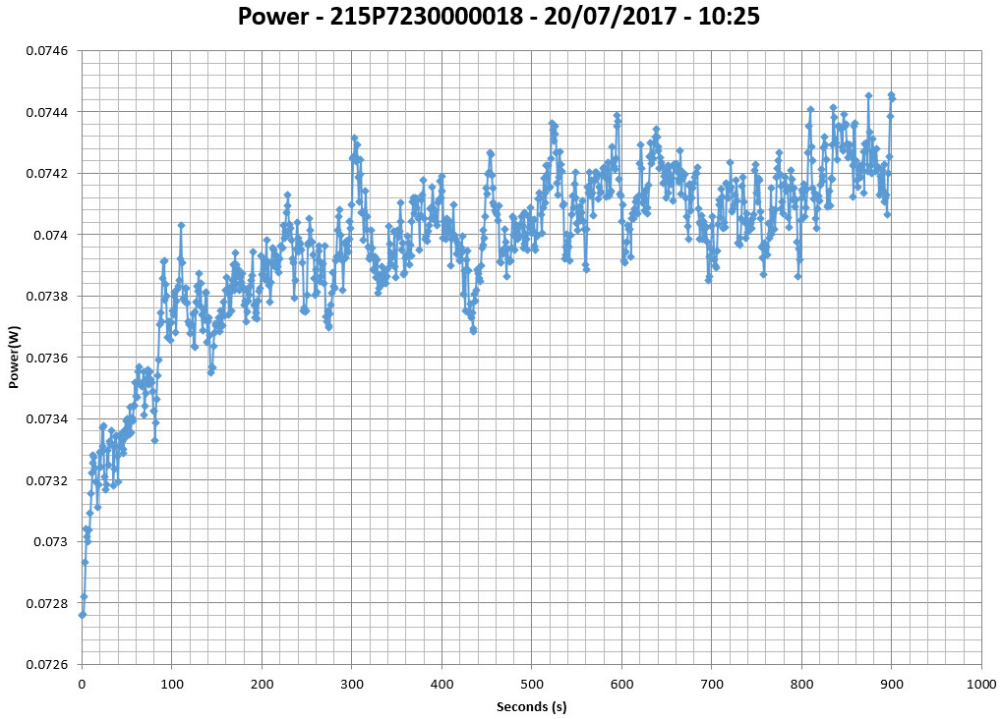
Hold-Up Time & PWR_OK Signal

Hold-Up Time (ms)	16.9
AC Loss to PWR_OK Hold Up Time (ms)	15.7
PWR_OK Inactive to DC Loss Delay (ms)	1.2

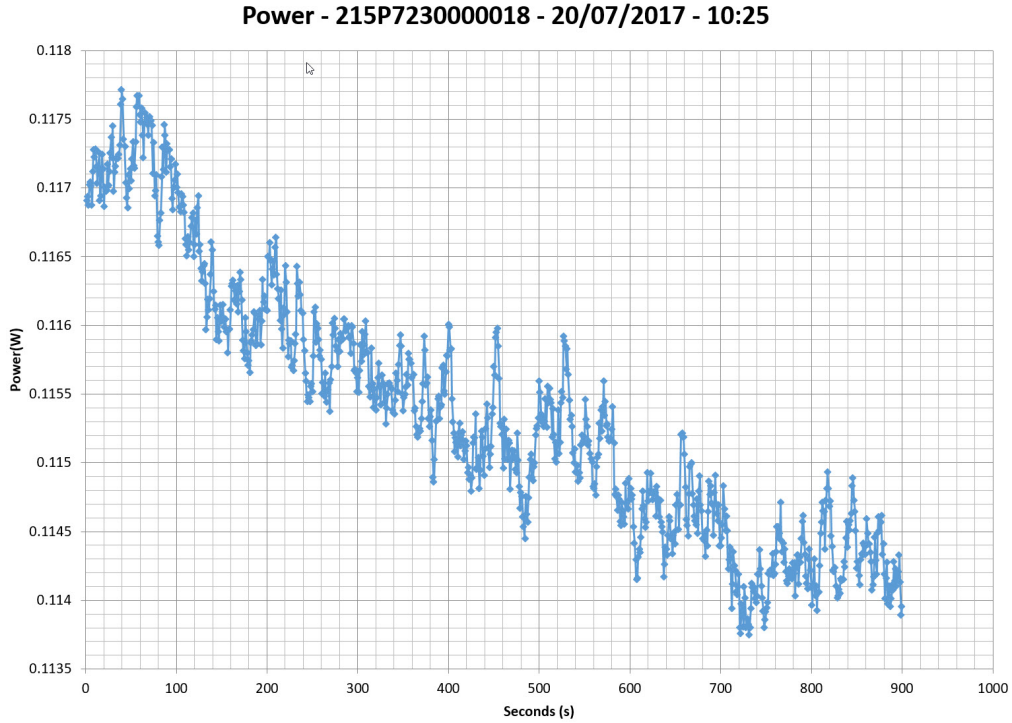
Vampire Power

Graphs

115V

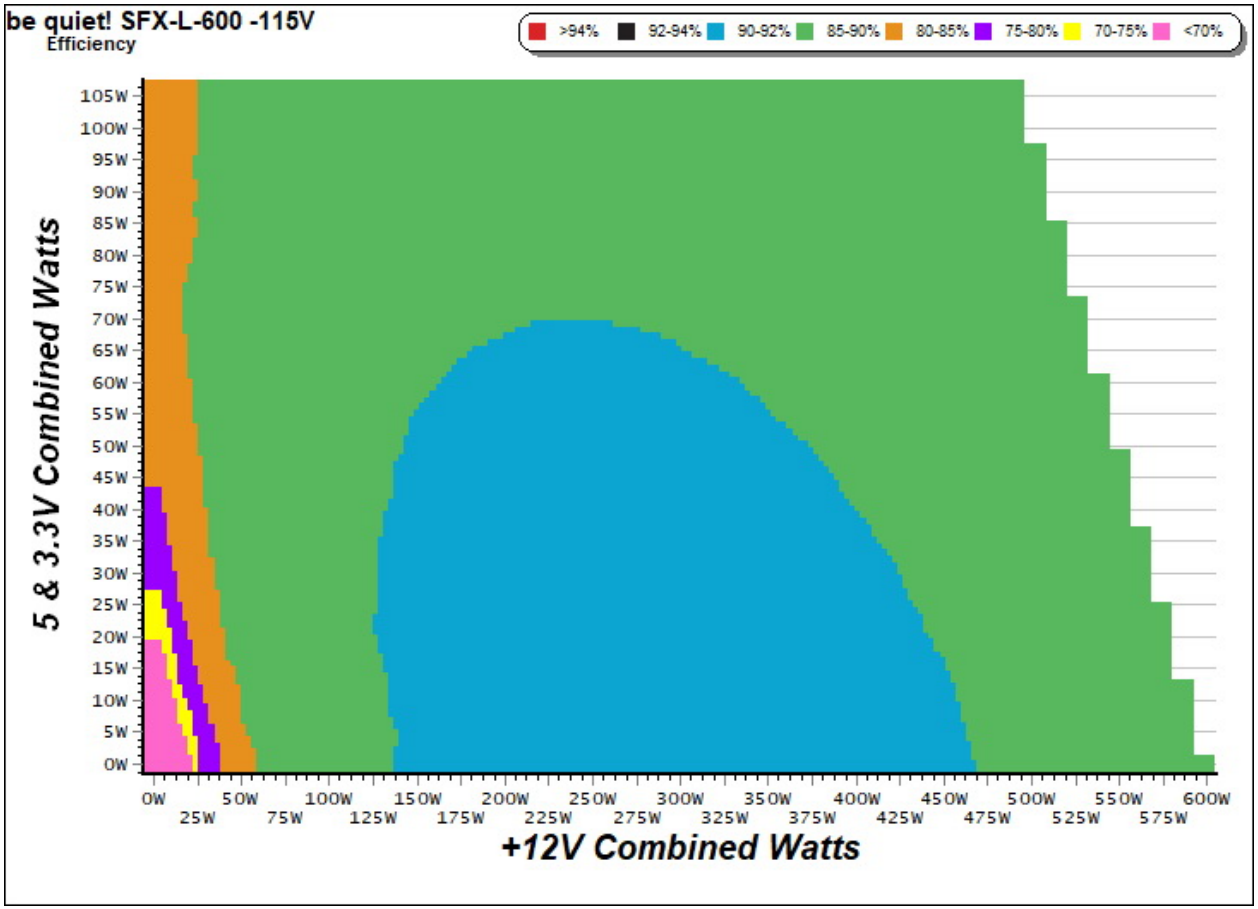


230V



Efficiency Graph

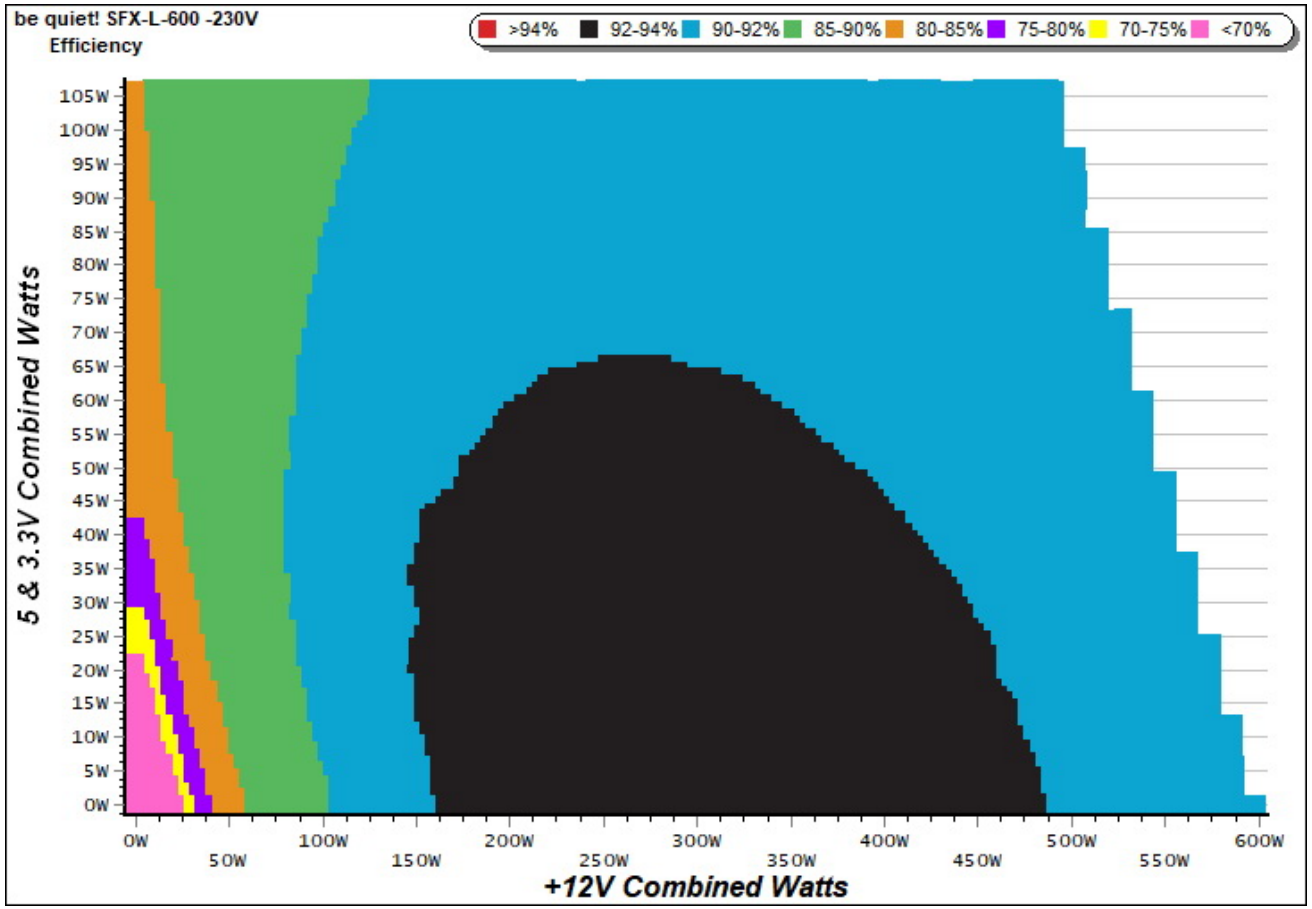
115V



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

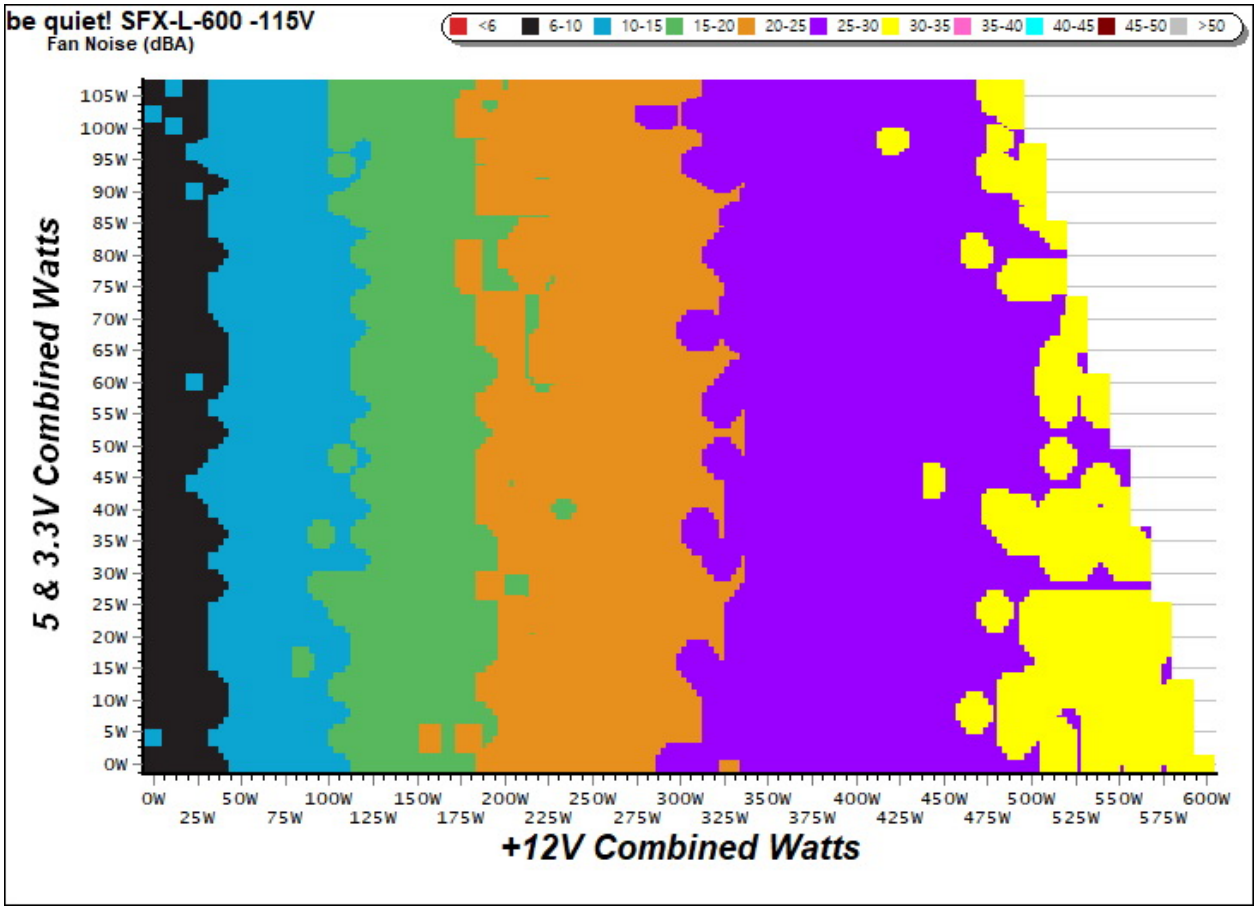


INFO

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

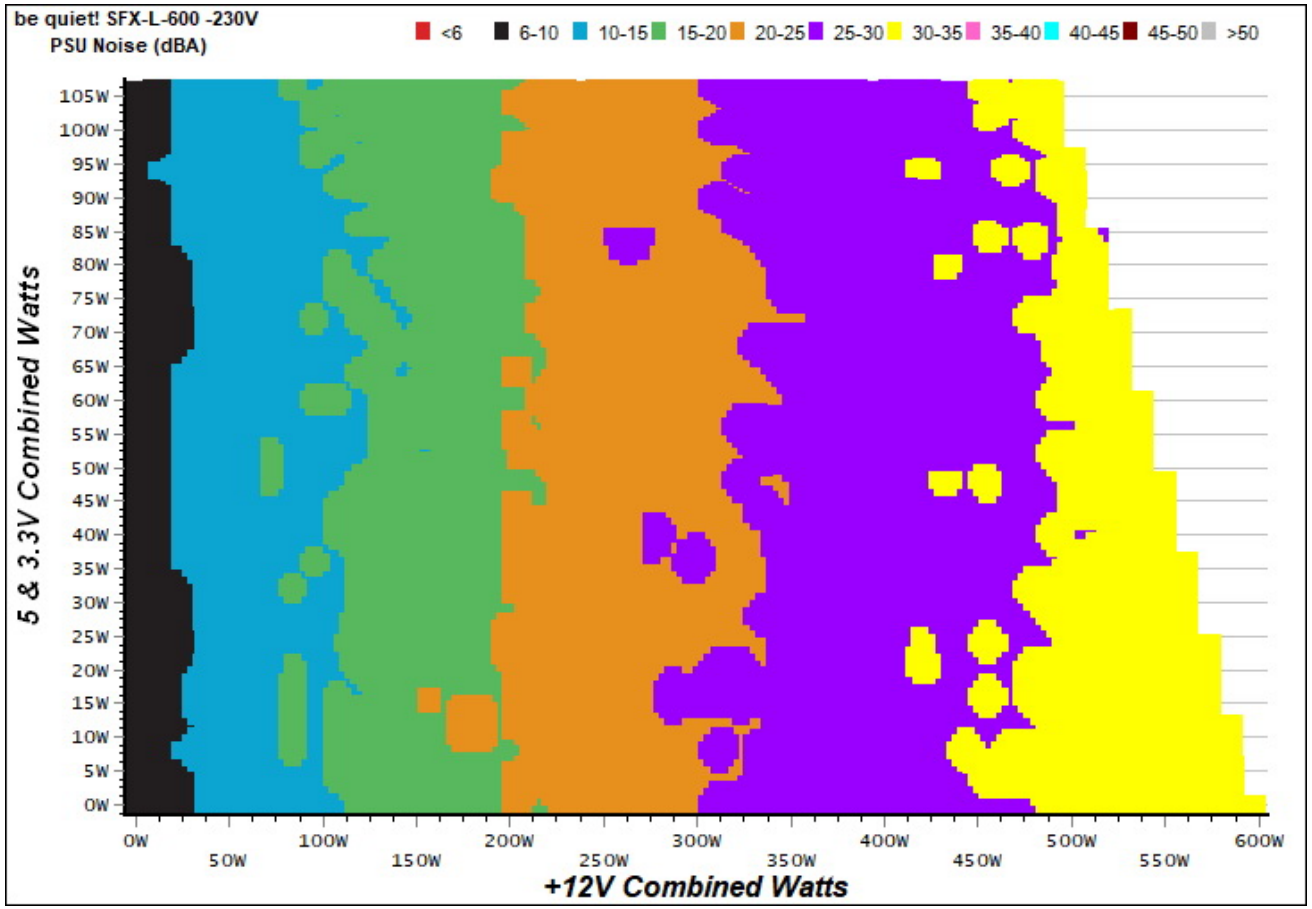
115V



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

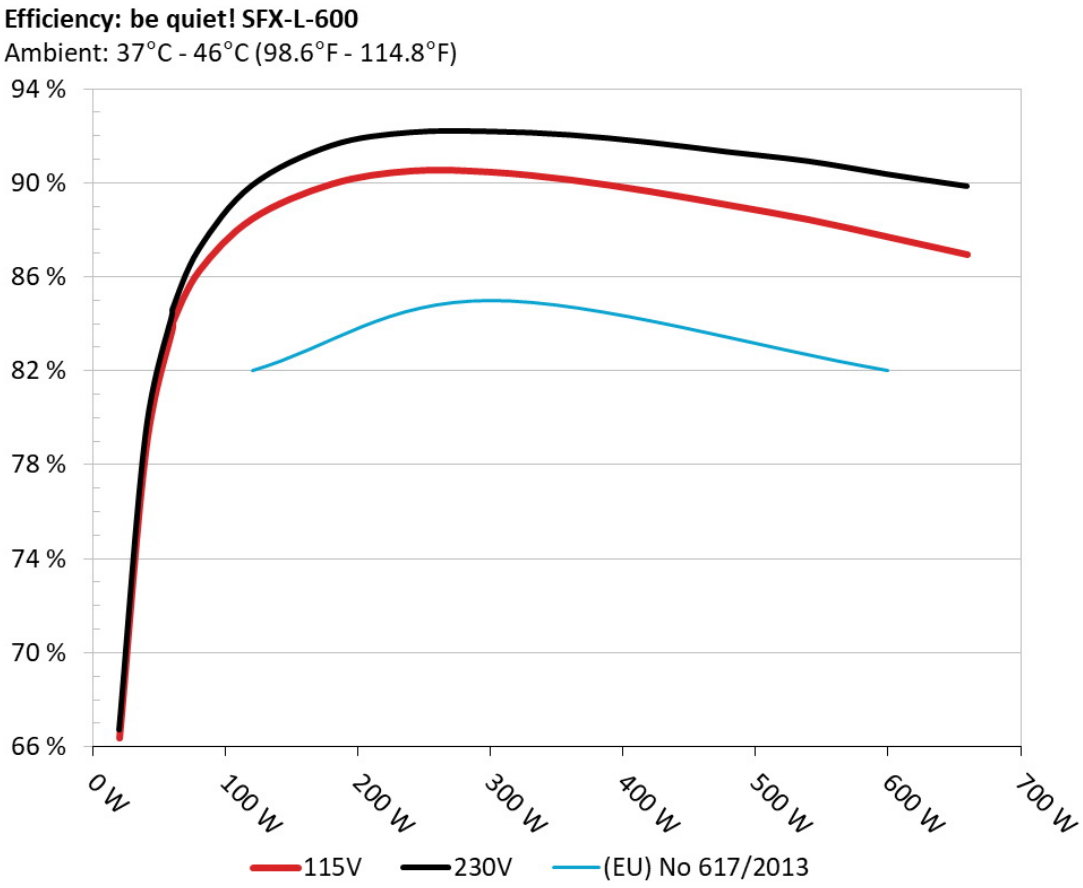


INFO

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

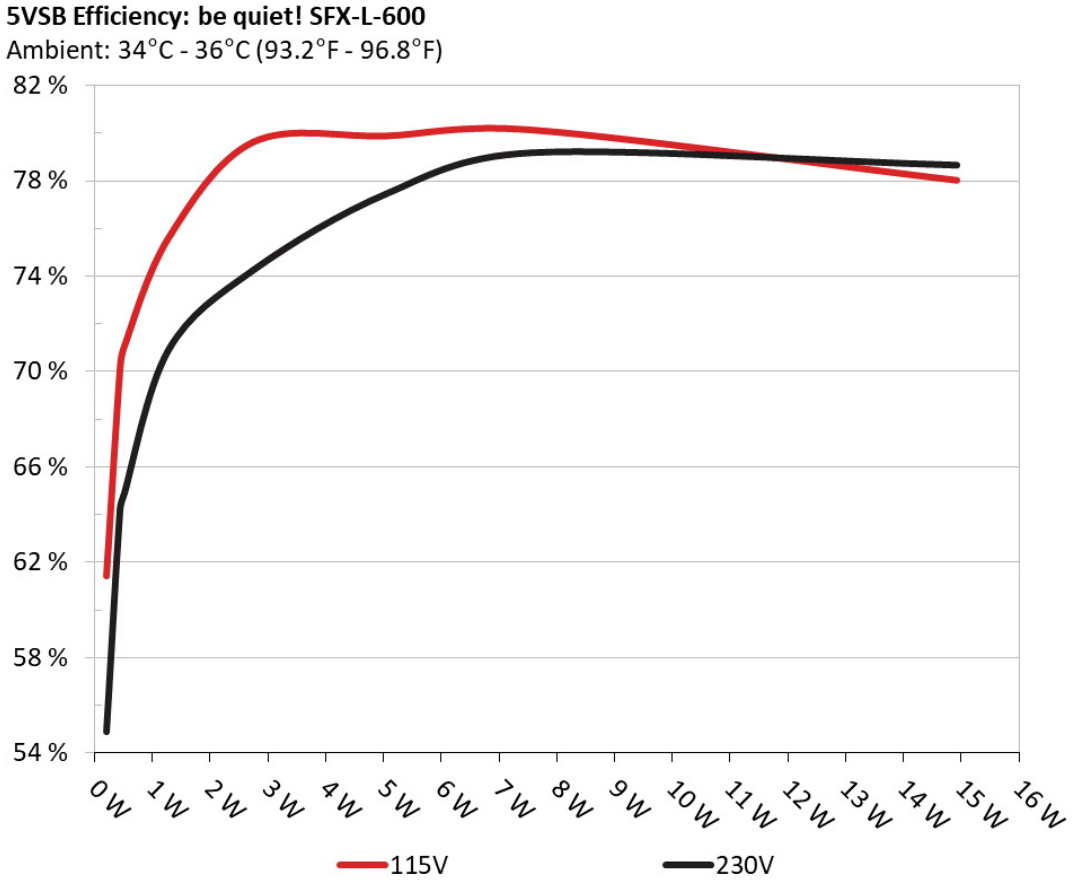
Efficiency under high ambient temperature



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	0.041A	0.212	61.449%	0.049
	5.118V	0.345		115.17V
2	0.087A	0.446	70.126%	0.087
	5.116V	0.636		115.17V
3	0.542A	2.760	79.654%	0.271
	5.094V	3.465		115.17V
4	1.002A	5.081	79.903%	0.322
	5.072V	6.359		115.17V
5	1.501A	7.580	80.152%	0.347
	5.049V	9.457		115.17V
6	3.002A	14.927	78.042%	0.387
	4.973V	19.127		115.16V

230V

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.042A	0.213	54.897%	0.017
	5.118V	0.388		230.38V
2	0.087A	0.446	64.173%	0.030
	5.116V	0.695		230.38V
3	0.542A	2.762	74.287%	0.140
	5.093V	3.718		230.39V
4	1.002A	5.082	77.505%	0.207
	5.072V	6.557		230.38V
5	1.502A	7.581	79.200%	0.252
	5.048V	9.572		230.38V
6	3.001A	14.928	78.676%	0.319
	4.974V	18.974		230.38V

Supplementary Tests (For Reference)

Typical Load Tests

115V

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	Fan Noise (dB[A])	Temps (In/Out)	PF/AC Volts
1	3.117A	1.974A	1.954A	0.996A	59.787	83.863%	1400	27.3	38.14°C	0.972
	12.261V	5.056V	3.374V	5.016V	71.291				40.25°C	115.17V
2	7.260A	2.968A	2.938A	1.199A	119.813	88.488%	1435	28.6	38.70°C	0.992
	12.252V	5.047V	3.366V	5.000V	135.401				40.95°C	115.16V
3	11.752A	3.478A	3.446A	1.400A	179.885	89.971%	1455	29.5	38.95°C	0.995
	12.237V	5.038V	3.359V	4.985V	199.937				41.57°C	115.16V
4	16.250A	3.975A	3.935A	1.607A	239.761	90.528%	1550	30.2	39.17°C	0.997
	12.221V	5.030V	3.352V	4.970V	264.847				42.18°C	115.16V
5	20.419A	4.980A	4.932A	1.816A	299.775	90.480%	1560	30.4	39.79°C	0.998
	12.209V	5.019V	3.343V	4.955V	331.318				43.12°C	115.16V
6	24.585A	5.987A	5.931A	2.020A	359.735	90.148%	1610	31.3	40.24°C	0.998
	12.202V	5.009V	3.335V	4.940V	399.048				44.15°C	115.16V
7	28.755A	7.009A	6.939A	2.231A	419.741	89.657%	1655	32.2	41.27°C	0.999
	12.194V	4.999V	3.326V	4.924V	468.164				45.71°C	115.16V
8	32.928A	8.023A	7.956A	2.445A	479.674	89.069%	1765	34.2	42.46°C	0.999
	12.186V	4.988V	3.318V	4.906V	538.541				47.53°C	115.16V
9	37.532A	8.534A	8.484A	2.445A	539.710	88.458%	1830	34.9	43.70°C	0.999
	12.180V	4.980V	3.311V	4.900V	610.130				49.77°C	115.16V
10	41.890A	9.063A	8.995A	3.084A	599.662	87.718%	1860	35.4	44.83°C	0.999
	12.173V	4.970V	3.302V	4.861V	683.621				51.84°C	115.17V
11	46.829A	9.071A	9.014A	3.090A	659.593	86.965%	1870	35.6	46.07°C	0.999
	12.169V	4.964V	3.296V	4.852V	758.455				53.81°C	115.16V
CL1	0.098A	13.019A	13.003A	0.004A	110.018	81.865%	1790	34.5	44.20°C	0.993
	12.239V	5.011V	3.350V	5.072V	134.390				50.75°C	115.17V

CL2	49.948A	1.005A	1.002A	1.002A	622.143	88.269%	1850	35.2	44.58°C	0.999
	12.189V	5.002V	3.323V	4.960V	704.829				51.54°C	115.17V

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	3.121A	1.974A	1.955A	0.996A	59.825	84.521%	1435	28.6	38.07°C	0.851
	12.259V	5.055V	3.373V	5.012V	70.781				42.86°C	230.17V
2	7.262A	2.970A	2.939A	1.201A	119.846	89.970%	1423	28.2	38.17°C	0.945
	12.251V	5.047V	3.365V	4.996V	133.207				43.26°C	230.18V
3	11.755A	3.476A	3.454A	1.405A	179.938	91.666%	1455	29.5	38.52°C	0.969
	12.236V	5.038V	3.357V	4.980V	196.297				44.47°C	230.19V
4	16.255A	3.972A	3.940A	1.611A	239.810	92.199%	1560	30.4	38.86°C	0.981
	12.220V	5.030V	3.349V	4.966V	260.100				45.79°C	230.19V
5	20.423A	4.976A	4.938A	1.815A	299.804	92.289%	1613	30.9	39.61°C	0.987
	12.209V	5.020V	3.341V	4.949V	324.855				47.48°C	230.20V
6	24.592A	5.984A	5.938A	2.025A	359.790	92.091%	1650	31.4	40.50°C	0.992
	12.200V	5.011V	3.333V	4.934V	390.691				49.28°C	230.21V
7	28.759A	7.002A	6.945A	2.236A	419.791	91.739%	1755	33.4	41.10°C	0.992
	12.194V	5.002V	3.324V	4.917V	457.593				51.24°C	230.20V
8	32.936A	8.014A	7.960A	2.446A	479.687	91.295%	1765	34.2	42.78°C	0.995
	12.185V	4.990V	3.315V	4.900V	525.426				53.80°C	230.23V
9	37.542A	8.528A	8.493A	2.451A	539.770	90.887%	1810	35.3	43.70°C	0.995
	12.178V	4.983V	3.308V	4.893V	593.889				56.04°C	230.22V
10	41.895A	9.058A	9.004A	3.091A	599.685	90.318%	1860	35.4	45.04°C	0.996
	12.172V	4.973V	3.298V	4.852V	663.972				59.32°C	230.23V
11	46.838A	9.064A	9.020A	3.095A	659.617	89.800%	1870	35.6	46.29°C	0.997
	12.168V	4.965V	3.292V	4.845V	734.543				62.54°C	230.23V
CL1	0.101A	13.018A	13.003A	0.005A	110.263	83.271%	1830	34.9	44.87°C	0.939
	12.234V	5.021V	3.356V	5.084V	132.414				56.16°C	230.23V

CL2	49.955A	1.001A	1.004A	1.002A	622.243	90.928%	1870	35.6	44.47°C	0.996
	12.190V	4.998V	3.315V	4.951V	684.326				59.15°C	230.25V

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)	Fan Noise (dB[A])	PF/AC Volts
1	1.195A	0.492A	0.471A	0.196A	19.704	66.381%	1270	24.8	0.914
	12.242V	5.065V	3.381V	5.057V	29.683				115.16V
2	2.411A	0.980A	0.973A	0.396A	39.750	78.721%	1270	24.8	0.956
	12.238V	5.060V	3.378V	5.045V	50.495				115.16V
3	3.621A	1.477A	1.481A	0.596A	59.867	84.091%	1365	26.5	0.972
	12.261V	5.058V	3.375V	5.035V	71.193				115.16V
4	4.829A	1.975A	1.955A	0.796A	79.754	86.268%	1365	26.5	0.983
	12.255V	5.054V	3.373V	5.025V	92.449				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	1.196A	0.491A	0.472A	0.196A	19.716	67.164%	1365	26.5	0.608
	12.244V	5.063V	3.380V	5.054V	29.355				230.14V
2	2.414A	0.978A	0.976A	0.396A	39.784	79.751%	1400	27.3	0.760
	12.239V	5.059V	3.376V	5.042V	49.885				230.16V
3	3.625A	1.474A	1.481A	0.596A	59.892	84.772%	1343	26.2	0.850
	12.260V	5.057V	3.374V	5.031V	70.651				230.16V
4	4.835A	1.971A	1.954A	0.796A	79.791	87.308%	1393	27.2	0.892
	12.254V	5.053V	3.371V	5.020V	91.390				230.16V

The results above are not used in the certification process

Ripple Measurements

115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	8.1 mV	8.0 mV	11.9 mV	6.0 mV	Pass
20% Load	10.7 mV	9.2 mV	14.0 mV	7.8 mV	Pass
30% Load	13.7 mV	11.0 mV	17.7 mV	8.8 mV	Pass
40% Load	17.3 mV	12.1 mV	18.6 mV	10.1 mV	Pass
50% Load	22.0 mV	14.6 mV	19.6 mV	11.7 mV	Pass
60% Load	27.6 mV	16.1 mV	21.7 mV	13.5 mV	Pass
70% Load	30.3 mV	17.8 mV	25.5 mV	15.3 mV	Pass
80% Load	36.1 mV	20.2 mV	27.6 mV	16.8 mV	Pass
90% Load	40.0 mV	21.4 mV	30.1 mV	19.2 mV	Pass
100% Load	45.9 mV	23.6 mV	31.9 mV	21.3 mV	Pass
110% Load	57.4 mV	25.2 mV	35.8 mV	23.8 mV	Pass
Crossload 1	14.1 mV	13.7 mV	18.7 mV	11.1 mV	Pass
Crossload 2	52.8 mV	21.9 mV	30.2 mV	18.8 mV	Pass

The results above are not used in the certification process

230V

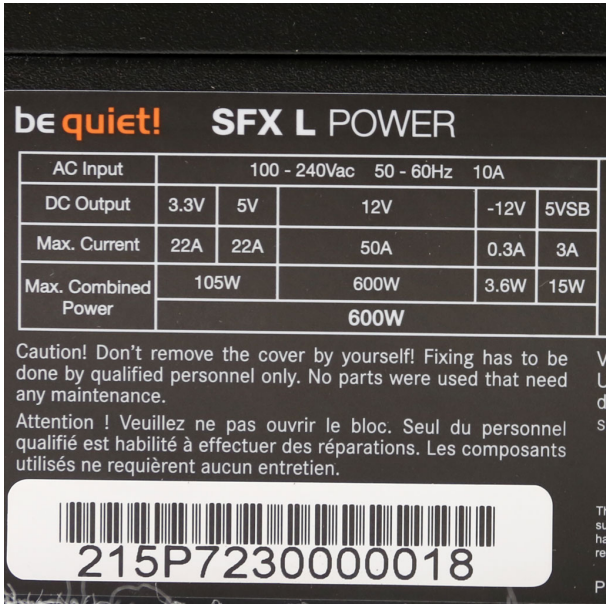
Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	7.1 mV	9.3 mV	7.7 mV	6.5 mV	Pass
20% Load	9.4 mV	9.6 mV	8.8 mV	8.2 mV	Pass
30% Load	12.5 mV	11.4 mV	9.4 mV	9.0 mV	Pass
40% Load	16.1 mV	11.5 mV	10.6 mV	10.3 mV	Pass
50% Load	21.6 mV	13.1 mV	12.5 mV	11.9 mV	Pass
60% Load	27.5 mV	15.2 mV	14.8 mV	13.6 mV	Pass
70% Load	41.0 mV	18.8 mV	45.6 mV	18.3 mV	Pass
80% Load	34.7 mV	18.8 mV	19.6 mV	17.6 mV	Pass

Test	12V	5V	3.3V	5VSB	Pass/Fail
90% Load	40.1 mV	20.0 mV	20.9 mV	19.6 mV	Pass
100% Load	46.4 mV	21.5 mV	22.9 mV	21.6 mV	Pass
110% Load	93.7 mV	24.1 mV	23.6 mV	29.6 mV	Pass
Crossload 1	11.9 mV	14.4 mV	16.0 mV	10.6 mV	Pass
Crossload 2	54.1 mV	19.5 mV	18.3 mV	19.2 mV	Pass

The results above are not used in the certification process

be quiet! SFX L Power 600W

Top side



Power specifications label

All data and graphs included in this test report can be used by any individual on the following conditions:
› It should be mentioned that the test results are provided by Cybenetics
› The link to the original test results document should be provided in any case

Cybenetics runs voluntary certification programs for power supplies - ETA for efficiency, LAMBDA for noise and SAFE for safety and correct operation - and for cooling products, with DELTA for chassis soundproofing and PHI for fan airflow and static pressure. THETA rates cooler performance on AMD AM5 and Intel LGA1851 outside ISO 17065 and accreditation scope

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