Bitfenix Whisper 450W

Serial Number 711Q00002

Lab ID 138

Certification ID 25138

Test Result Report ID:

Certificate Issue Date: Jun 7, 2018

Scheme: ETA-EMI PSU

115V



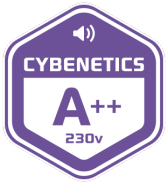
230V



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	Bitfenix
Model	Whisper 450W
OEM/ODM	Channel Well Technology
Serial Number	711Q00002
Product Specifications	
Manufacturer-Provided Information	
Rated Voltage (Vrms)	100-240
Rated Current (Arms)	7
Rated Frequency (Hz)	47-63

Rated Power (W)	450
Operating Temperature (Continuous Full Load) (°C)	
Type	ATX12V
Cable Design	Fully Modular
Warranty	-
Cybenetics Measurements	
Dimensions (W x H x D)	
Weight	
Cooling	135mm Hydro Dynamic Bearing Fan (DF1352512SEMN)
Semi-Passive Operation	✗
Cybenetics Testing Information	
Lab ID	138
Date of receipt	May 27, 2018
Testing Date	Jun 5, 2018
Report Issued Date	Jun 7, 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
ATX connector 20+4 pin (610mm)	1	1	18AWG
4+4 pin EPS12V (650mm)	1	1	18AWG
6+2 pin PCIe (650mm)	2	2	18AWG
SATA (500mm+150mm+150mm+150mm)	2	8	18AWG
4 pin Molex (500mm+150mm+150mm+150mm)	1	4	18AWG

Power Specifications

Rail		3.3V	5V	12V	12V	12V	5VSB	-12V
Max. Power	Amps	20	20	25	25	25	2.5	0.3
	Watts	100		450			12.5	3.6
Total Max. Power (W)		450						

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)	88.669%
Average Noise Output (>1450 Load Combinations)	11.63dBA
Average PF (>1450 Load Combinations)	0.979
Efficiency With 10W (≤500W) or 2% (>500W) Load	-
Standby Power Consumption	0.0464W
Non-Accredited	
12V Ripple (Full Load)	26.32mV
5V Ripple (Full Load)	12.17mV
3.3V Ripple (Full Load)	21.16mV
5VSB Ripple (Full Load)	18.65mV
12V Load Regulation	0.65%
5V Load Regulation	1.35%
3.3V Load Regulation	1.22%

5VSB Load Regulation	1.54%
Inrush Current	40.727A

230V

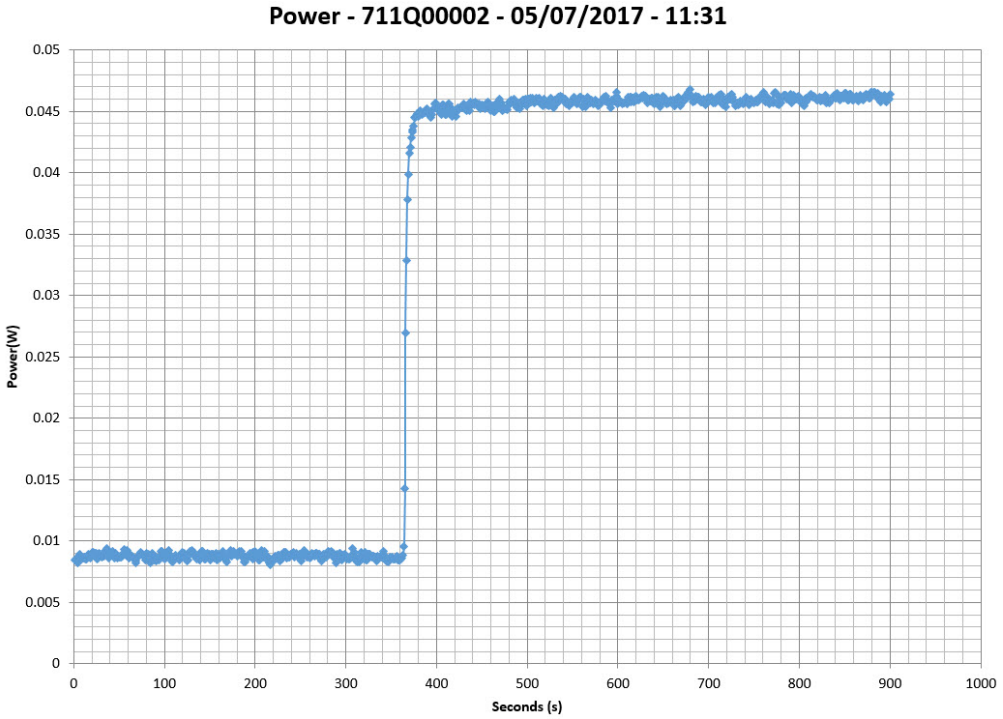
Accredited		
Average Efficiency (>1450 load combinations)	90.944%	
Average Noise Output (>1450 Load Combinations)	11.33dBA	
Average PF (>1450 Load Combinations)	0.912	
Efficiency With 10W (≤500W) or 2% (>500W) Load	-	
Standby Power Consumption	0.0713W	
Non-Accredited		
12V Ripple (Full Load)	24.57mV	
5V Ripple (Full Load)	7.40mV	
3.3V Ripple (Full Load)	11.92mV	
5VSB Ripple (Full Load)	20.96mV	
12V Load Regulation	0.39%	
5V Load Regulation	0.26%	
3.3V Load Regulation	0.42%	
5VSB Load Regulation	1.30%	
Inrush Current	51.043A	
Hold-Up Time & PWR_OK Signal	14.00ms	
AC Loss to PWR_OK Hold Up Time	13.70ms	
PWR_OK Inactive to DC Loss Delay	0.30ms	
OPP (0.00°C / 0.00°C)	-	-

Hold-Up Time & PWR_OK Signal

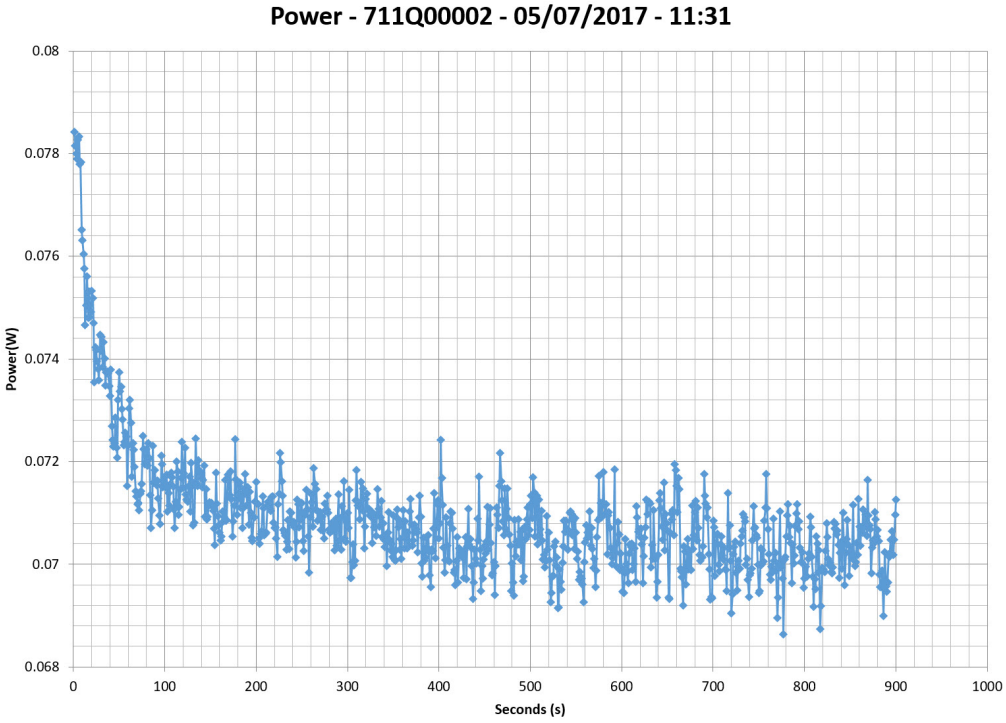
Hold-Up Time (ms)	14
AC Loss to PWR_OK Hold Up Time (ms)	13.7
PWR_OK Inactive to DC Loss Delay (ms)	0.3

Graphs

115V

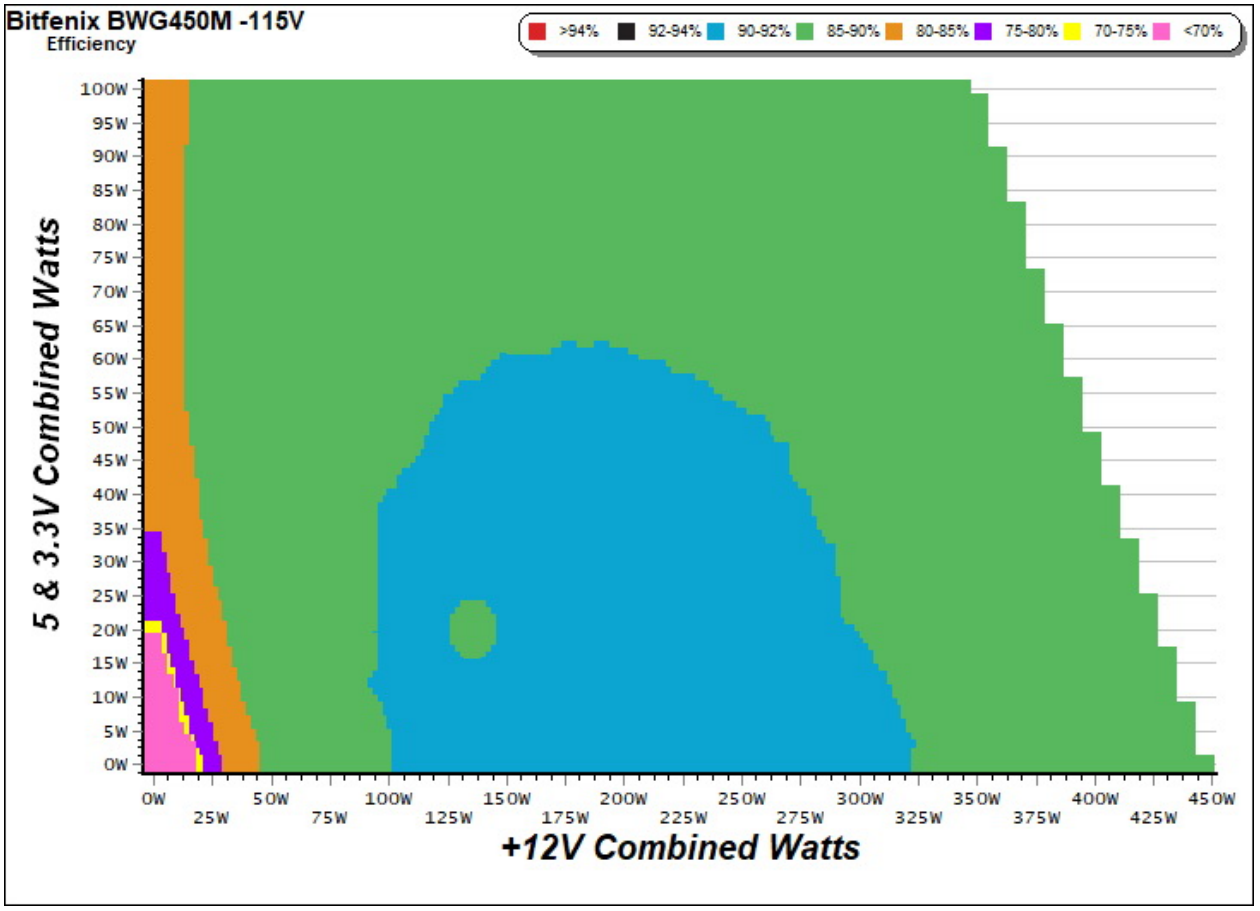


230V



Efficiency Graph

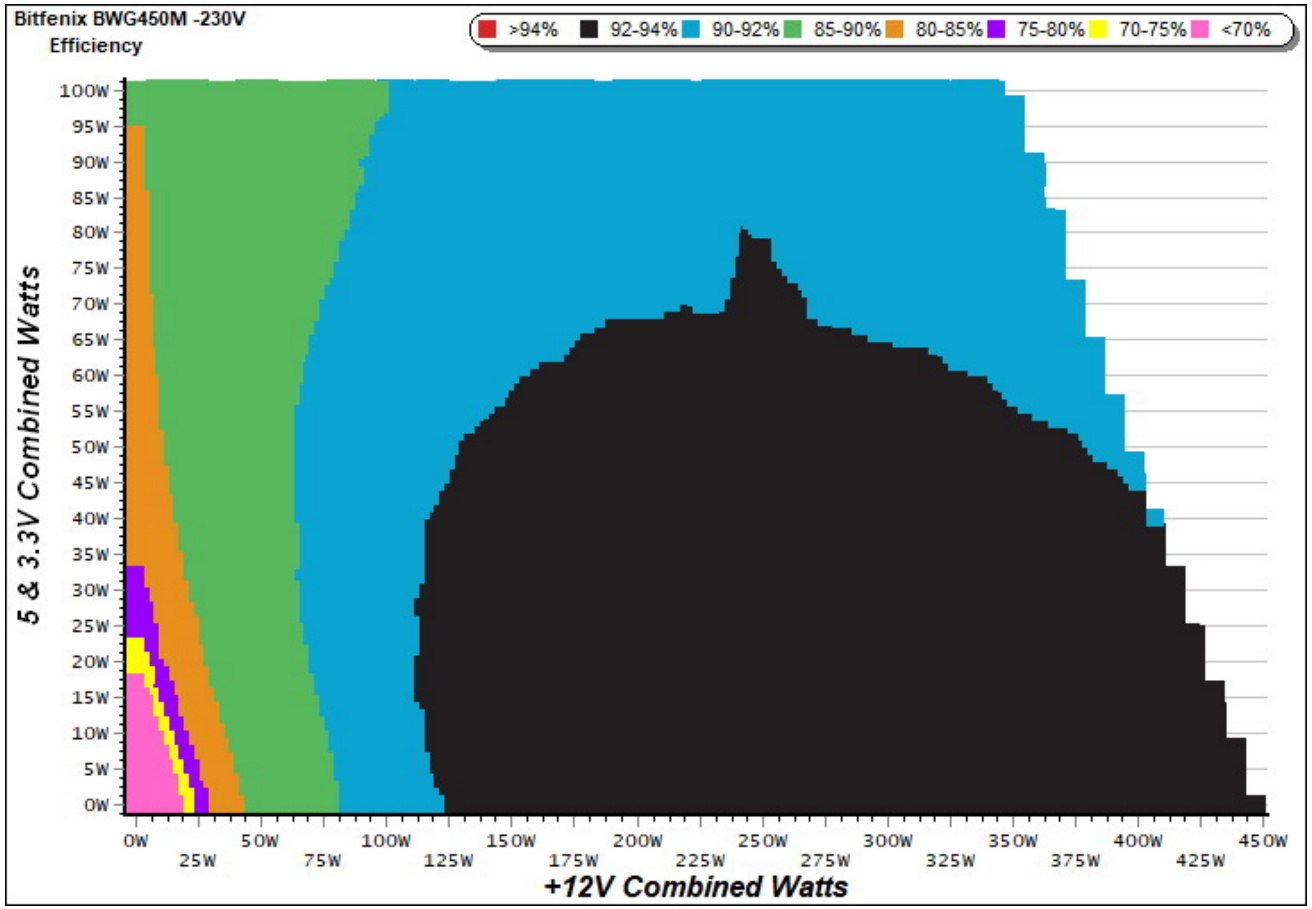
115V



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

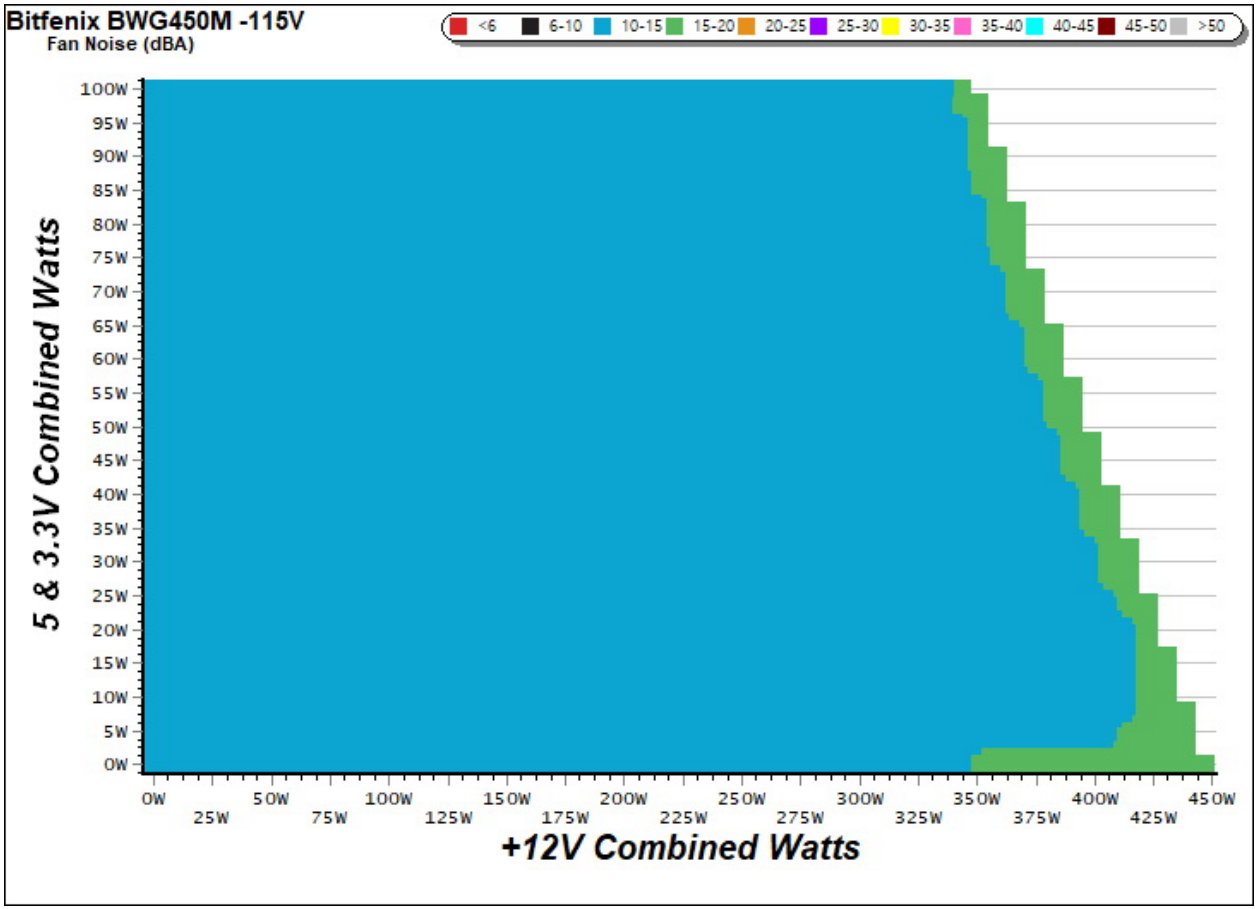


INFO

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Noise Graph

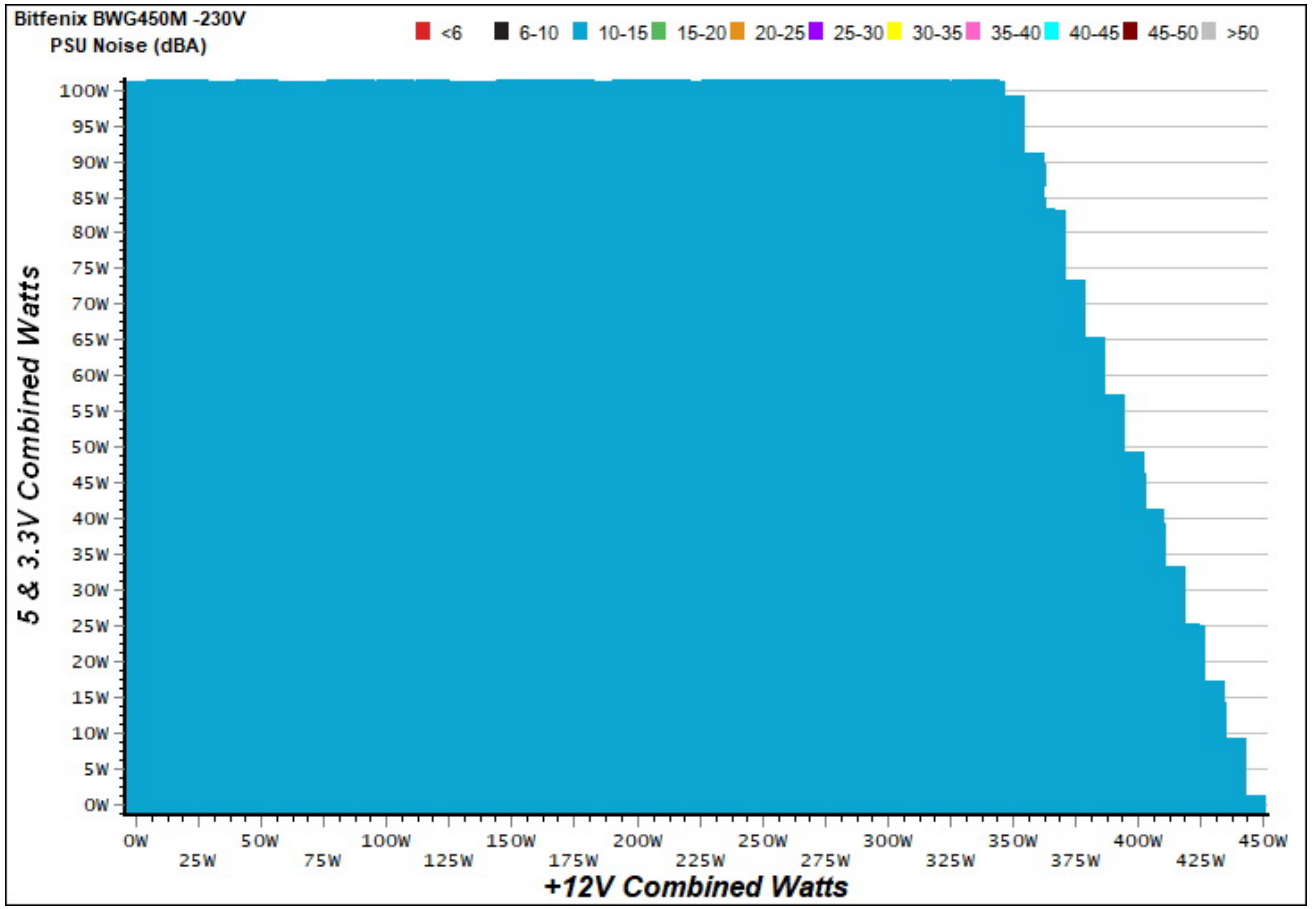
115V



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

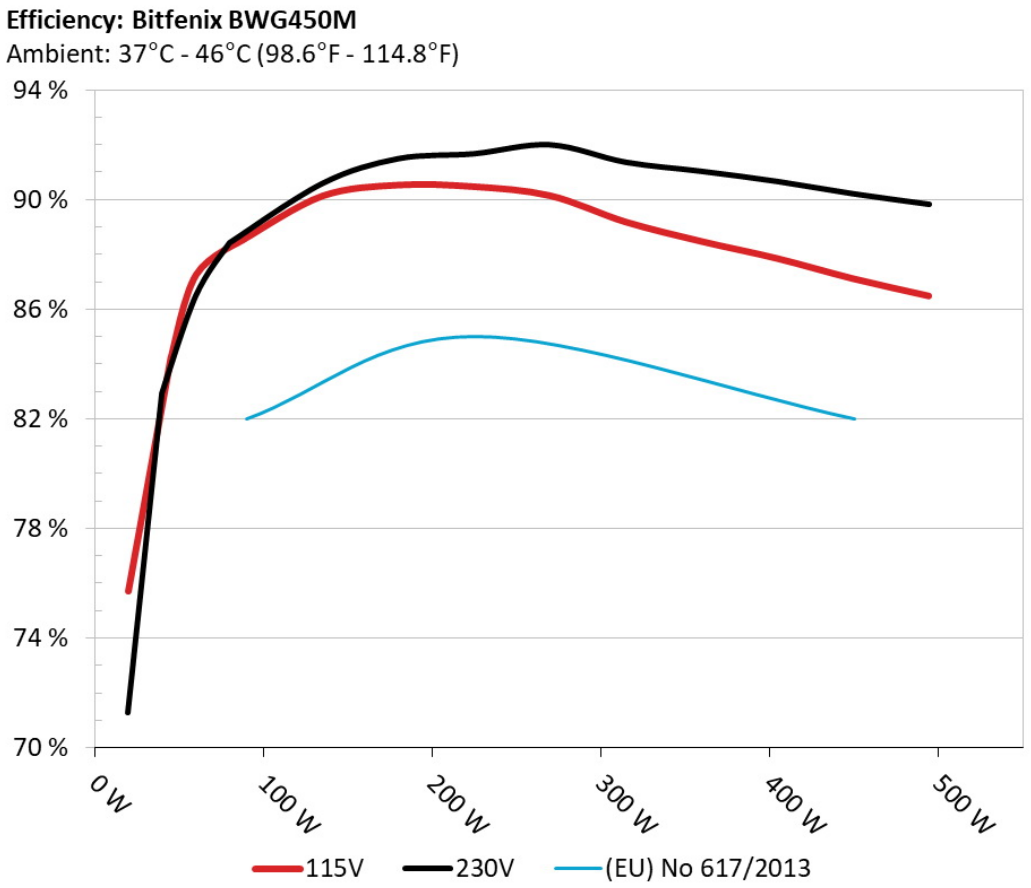


INFO

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

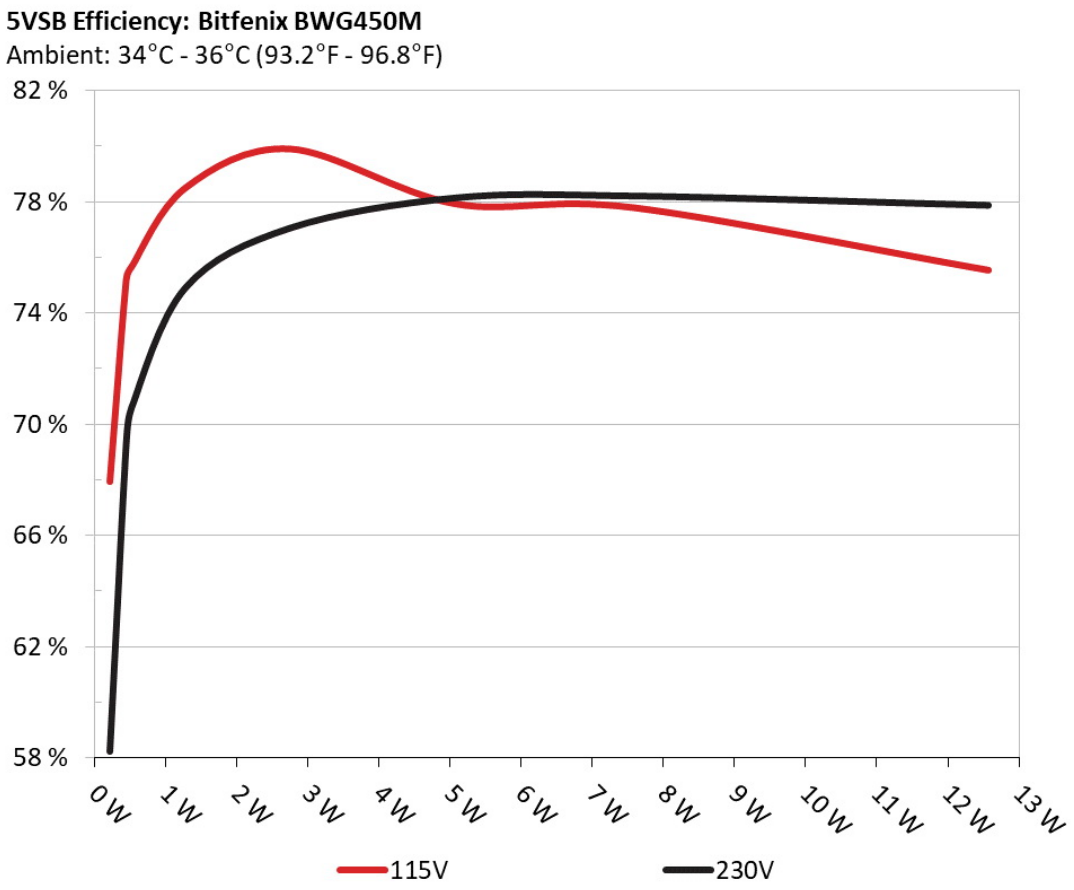
Efficiency under high ambient temperature



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	0.212	67.949%	0.031
	5.085V	0.312		115.16V
2	0.087A	0.443	75.212%	0.058
	5.084V	0.589		115.16V
3	0.542A	2.750	79.895%	0.260
	5.073V	3.442		115.14V
4	1.002A	5.073	77.926%	0.360
	5.063V	6.510		115.14V
5	1.502A	7.585	77.787%	0.412
	5.051V	9.751		115.14V
6	2.501A	12.576	75.541%	0.462
	5.028V	16.648		115.14V

230V

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.042A	0.212	58.242%	0.011
	5.086V	0.364		230.39V
2	0.087A	0.443	69.327%	0.019
	5.085V	0.639		230.39V
3	0.542A	2.750	77.052%	0.101
	5.074V	3.569		230.38V
4	1.002A	5.074	78.134%	0.169
	5.063V	6.494		230.38V
5	1.502A	7.585	78.204%	0.227
	5.051V	9.699		230.39V
6	2.501A	12.577	77.867%	0.304
	5.028V	16.152		230.39V

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	1.920A	1.994A	1.969A	0.986A	44.770	84.034%	470	11.6	38.39°C	0.932
	12.077V	5.019V	3.345V	5.059V	53.276				43.41°C	115.18V
2	4.880A	2.988A	2.961A	1.186A	89.755	88.589%	470	11.6	38.54°C	0.967
	12.069V	5.012V	3.340V	5.053V	101.316				43.97°C	115.17V
3	8.191A	3.499A	3.474A	1.385A	134.896	90.116%	470	11.6	38.83°C	0.976
	12.062V	5.006V	3.336V	5.047V	149.692				44.56°C	115.16V
4	11.496A	4.005A	3.958A	1.585A	179.786	90.512%	470	11.6	39.07°C	0.982
	12.055V	5.000V	3.332V	5.040V	198.632				45.39°C	115.16V
5	14.469A	5.000A	4.955A	1.786A	224.723	90.453%	470	11.6	39.64°C	0.984
	12.046V	4.990V	3.328V	5.033V	248.441				46.63°C	115.16V
6	17.440A	6.018A	5.955A	1.987A	269.711	90.127%	470	11.6	40.46°C	0.985
	12.038V	4.984V	3.323V	5.026V	299.255				47.93°C	115.16V
7	20.419A	7.031A	6.960A	2.190A	314.675	89.167%	470	11.6	41.30°C	0.984
	12.028V	4.977V	3.318V	5.018V	352.906				49.20°C	115.16V
8	23.403A	8.057A	7.964A	2.394A	359.704	88.456%	800	22.4	42.44°C	0.985
	12.019V	4.969V	3.314V	5.010V	406.646				50.79°C	115.16V
9	26.822A	8.566A	8.488A	2.394A	404.755	87.832%	1150	32.3	43.73°C	0.984
	12.011V	4.963V	3.310V	5.007V	460.829				52.53°C	115.16V
10	30.192A	9.078A	8.983A	2.495A	449.563	87.099%	1455	39.2	44.87°C	0.984
	12.003V	4.956V	3.306V	5.002V	516.150				53.87°C	115.16V
11	33.959A	9.082A	8.992A	2.497A	494.540	86.468%	1455	39.2	46.08°C	0.985
	11.996V	4.954V	3.302V	5.000V	571.932				55.13°C	115.16V
CL1	0.100A	12.012A	12.004A	0.004A	101.042	84.670%	470	11.6	44.18°C	0.972
	12.043V	4.978V	3.334V	5.075V	119.336				52.88°C	115.17V

CL2	37.476A	1.003A	1.003A	1.002A	463.923	87.994%	1460	39.3	44.44°C	0.984
	12.022V	4.991V	3.316V	5.045V	527.220				53.34°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	1.924A	1.986A	1.967A	0.986A	44.784	83.046%	470	11.6	40.10°C	0.686
	12.066V	5.030V	3.350V	5.061V	53.927				43.59°C	230.29V
2	4.881A	2.982A	2.953A	1.186A	89.736	88.680%	470	11.6	40.75°C	0.835
	12.059V	5.028V	3.348V	5.055V	101.191				44.76°C	230.30V
3	8.189A	3.489A	3.462A	1.386A	134.880	90.784%	470	11.6	41.08°C	0.891
	12.060V	5.026V	3.347V	5.049V	148.573				45.43°C	230.30V
4	11.491A	3.981A	3.942A	1.585A	179.741	91.714%	470	11.6	41.83°C	0.919
	12.058V	5.025V	3.345V	5.043V	195.980				46.72°C	230.31V
5	14.457A	4.975A	4.931A	1.786A	224.717	91.951%	470	11.6	42.22°C	0.934
	12.052V	5.024V	3.344V	5.037V	244.388				47.85°C	230.32V
6	17.430A	5.974A	5.917A	1.985A	269.725	92.330%	470	11.6	42.69°C	0.945
	12.045V	5.023V	3.344V	5.031V	292.133				48.71°C	230.32V
7	20.405A	6.977A	6.909A	2.185A	314.730	91.544%	780	22.0	43.18°C	0.951
	12.038V	5.021V	3.341V	5.025V	343.803				49.50°C	000.00V
8	23.375A	7.972A	7.903A	2.389A	359.667	91.180%	970	27.3	43.79°C	0.955
	12.033V	5.020V	3.339V	5.018V	394.457				50.53°C	230.34V
9	26.784A	8.475A	8.416A	2.390A	404.771	90.935%	1215	33.9	44.16°C	0.959
	12.028V	5.018V	3.338V	5.018V	445.120				51.69°C	230.34V
10	30.141A	8.978A	8.899A	2.490A	449.628	90.571%	1455	39.2	45.13°C	0.961
	12.024V	5.017V	3.336V	5.013V	496.438				52.89°C	230.33V
11	33.896A	8.979A	8.901A	2.492A	494.610	90.327%	1455	39.2	46.00°C	0.964
	12.019V	5.016V	3.335V	5.012V	547.578				54.87°C	230.31V
CL1	0.101A	12.013A	12.005A	0.005A	101.813	85.103%	470	11.6	42.79°C	0.864
	12.044V	5.027V	3.347V	5.082V	119.635				49.10°C	230.29V

CL2	37.483A	1.003A	1.001A	1.002A	464.663	91.714%	1390	35.2	45.57°C	0.962
	12.038V	5.020V	3.342V	5.051V	506.645				52.63°C	230.29V

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	1.206A	0.492A	0.474A	0.196A	19.633	75.695%	470	11.6	0.821
	12.086V	5.029V	3.350V	5.080V	25.937				115.17V
2	2.441A	0.991A	0.984A	0.391A	39.749	84.193%	470	11.6	0.919
	12.082V	5.024V	3.347V	5.074V	47.212				115.17V
3	3.677A	1.487A	1.494A	0.591A	59.865	87.246%	470	11.6	0.949
	12.077V	5.020V	3.345V	5.069V	68.616				115.17V
4	4.903A	1.994A	1.972A	0.786A	79.771	88.595%	470	11.6	0.962
	12.073V	5.017V	3.343V	5.064V	90.030				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])	PF/AC Volts
1	1.210A	0.492A	0.472A	0.196A	19.663	71.214%	470	11.6	0.477
	12.074V	5.031V	3.353V	5.080V	27.611				230.27V
2	2.447A	0.988A	0.984A	0.391A	39.787	83.005%	470	11.6	0.650
	12.070V	5.030V	3.352V	5.075V	47.933				230.27V
3	3.684A	1.487A	1.489A	0.590A	59.913	86.630%	470	11.6	0.753
	12.067V	5.029V	3.350V	5.070V	69.160				230.27V
4	4.907A	1.985A	1.967A	0.786A	79.745	88.484%	470	11.6	0.813
	12.063V	5.029V	3.349V	5.065V	90.124				230.29V

The results above are not used in the certification process

Ripple Measurements

115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	13.7 mV	8.4 mV	8.1 mV	5.3 mV	Pass
20% Load	20.5 mV	8.1 mV	8.4 mV	5.9 mV	Pass
30% Load	21.3 mV	8.1 mV	9.0 mV	5.8 mV	Pass
40% Load	20.9 mV	8.6 mV	9.2 mV	7.1 mV	Pass
50% Load	20.7 mV	8.8 mV	9.3 mV	7.3 mV	Pass
60% Load	21.0 mV	8.9 mV	11.4 mV	10.4 mV	Pass
70% Load	22.0 mV	9.7 mV	14.8 mV	10.4 mV	Pass
80% Load	23.5 mV	16.0 mV	17.8 mV	19.8 mV	Pass
90% Load	24.6 mV	10.9 mV	19.0 mV	21.4 mV	Pass
100% Load	26.3 mV	12.2 mV	21.2 mV	18.7 mV	Pass
110% Load	26.2 mV	12.2 mV	20.8 mV	20.7 mV	Pass
Crossload 1	23.8 mV	12.4 mV	10.1 mV	5.6 mV	Pass
Crossload 2	25.0 mV	11.7 mV	18.7 mV	13.9 mV	Pass

The results above are not used in the certification process

230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	4.7 mV	5.6 mV	7.6 mV	6.7 mV	Pass
20% Load	4.6 mV	5.6 mV	7.9 mV	6.3 mV	Pass
30% Load	47.2 mV	6.4 mV	8.0 mV	7.8 mV	Pass
40% Load	28.8 mV	6.3 mV	8.5 mV	7.8 mV	Pass
50% Load	24.5 mV	6.0 mV	8.2 mV	8.7 mV	Pass
60% Load	19.7 mV	6.1 mV	8.5 mV	11.4 mV	Pass
70% Load	21.0 mV	6.0 mV	8.3 mV	11.2 mV	Pass
80% Load	22.4 mV	15.4 mV	12.8 mV	20.4 mV	Pass

Test	12V	5V	3.3V	5VSB	Pass/Fail
90% Load	22.7 mV	10.7 mV	9.9 mV	21.4 mV	Pass
100% Load	24.6 mV	7.4 mV	11.9 mV	21.0 mV	Pass
110% Load	24.5 mV	7.6 mV	12.6 mV	21.7 mV	Pass
Crossload 1	5.8 mV	6.4 mV	11.6 mV	5.5 mV	Pass
Crossload 2	23.8 mV	7.5 mV	10.3 mV	11.8 mV	Pass

The results above are not used in the certification process

Bitfenix Whisper 450W



Top side



Power specifications label

Cybenetics [illegible] ETA[illegible] LAMBDA[illegible] SAFE[illegible] DELTA[illegible] PHI[illegible]

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