Seasonic Focus SGX 500W

Serial Number R1901AA112430005

Lab ID SS19500001

Certification ID 25641

Test Result Report ID:

Certificate Issue Date: Feb 26, 2019

Scheme: ETA-EMI PSU

115V: CYBENETICS GOLD

230V: CYBENETICS SILVER 230v

Scheme: LAMBDA PSU

115V: CYBENETICS STANDARD++

230V: CYBENETICS A- 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	Seasonic
Model	Focus SGX 500W
OEM/ODM	Seasonic
Serial Number	R1901AA112430005
Product Specifications	
Manufacturer-Provided Information	
Rated Voltage (Vrms)	100-240
Rated Current (Arms)	6-3
Rated Frequency (Hz)	50-60

Rated Power (W)	500
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 (S1201512HB)
Semi-Passive Operation	✓
Cybenetics Testing Information	
Lab ID	SS19500001
Date of receipt	Feb 22, 2019
Testing Date	Feb 22, 2019
Report Issued Date	Feb 26, 2019
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 (360mm)	1	1	18AWG	No
4+4 pin EPS12V (400mm)	1	1	18AWG	No
6+2 pin PCIe (400mm+100mm)	1	2	18AWG	No
SATA (300mm+200mm+100mm)	1	3	18AWG	No
4 pin Molex (300mm+200mm+200mm)	1	3	18AWG	No
AC Power Cord (1370mm) - C13 coupler	1	1	18AWG	-

Power Specifications

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	20	20	41	3	0.3
	Watts	100		492	15	3.6
Total Max. Power (W)		500				

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)	88.907%
Average Noise Output (>1450 Load Combinations)	31.11dBA
Average PF (>1450 Load Combinations)	0.981
Efficiency With 10W (≤500W) or 2% (>500W) Load	60.452%
Standby Power Consumption	0.0444W
Non-Accredited	
12V Ripple (Full Load)	26.33mV
5V Ripple (Full Load)	23.73mV
3.3V Ripple (Full Load)	23.88mV
5VSB Ripple (Full Load)	14.62mV
12V Load Regulation	0.08%
5V Load Regulation	0.34%
3.3V Load Regulation	0.42%

5VSB Load Regulation	2.00%
Inrush Current	39.069A

230V

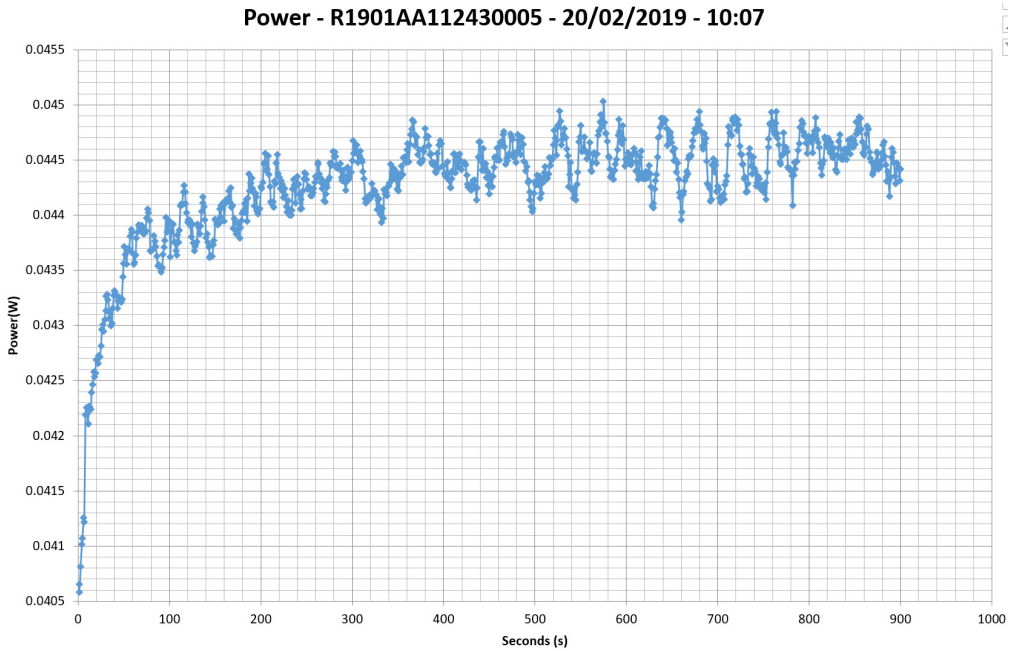
Accredited		
Average Efficiency (>1450 load combinations)	90.840%	
Average Noise Output (>1450 Load Combinations)	29.07dBA	
Average PF (>1450 Load Combinations)	0.927	
Efficiency With 10W (≤500W) or 2% (>500W) Load	-	
Standby Power Consumption	0.0678W	
Non-Accredited		
12V Ripple (Full Load)	26.79mV	
5V Ripple (Full Load)	24.23mV	
3.3V Ripple (Full Load)	22.88mV	
5VSB Ripple (Full Load)	12.98mV	
12V Load Regulation	0.07%	
5V Load Regulation	0.32%	
3.3V Load Regulation	0.42%	
5VSB Load Regulation	1.94%	
Inrush Current	56.094A	
Hold-Up Time & PWR_OK Signal	23.50ms	
AC Loss to PWR_OK Hold Up Time	21.10ms	
PWR_OK Inactive to DC Loss Delay	2.40ms	
OPP (0.00°C / 0.00°C)	-	-

Hold-Up Time & PWR_OK Signal

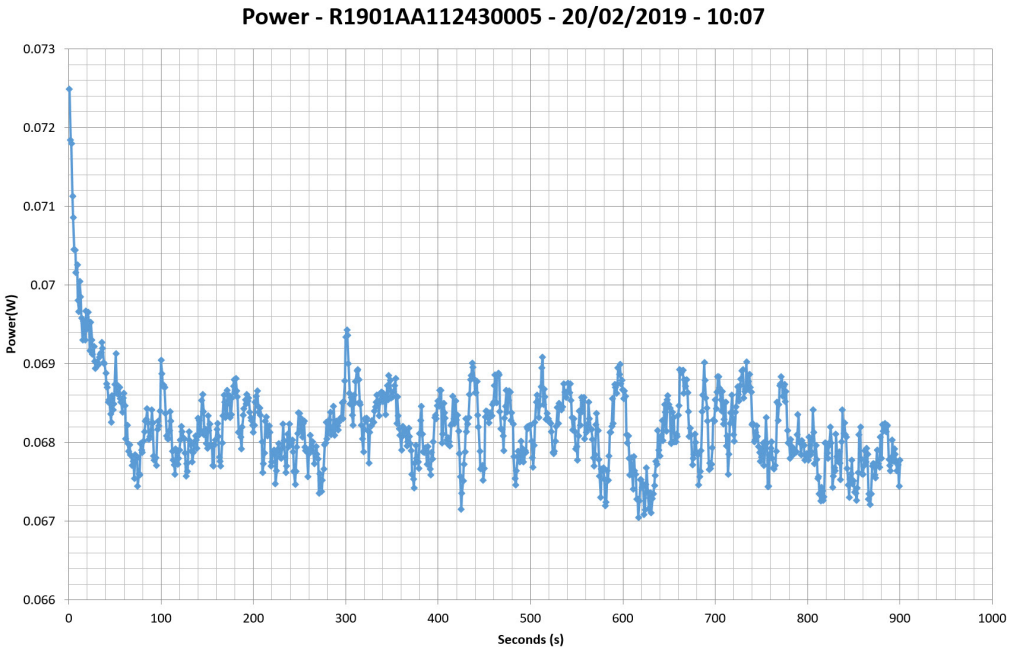
Hold-Up Time (ms)	23.5
AC Loss to PWR_OK Hold Up Time (ms)	21.1
PWR_OK Inactive to DC Loss Delay (ms)	2.4

Graphs

115V

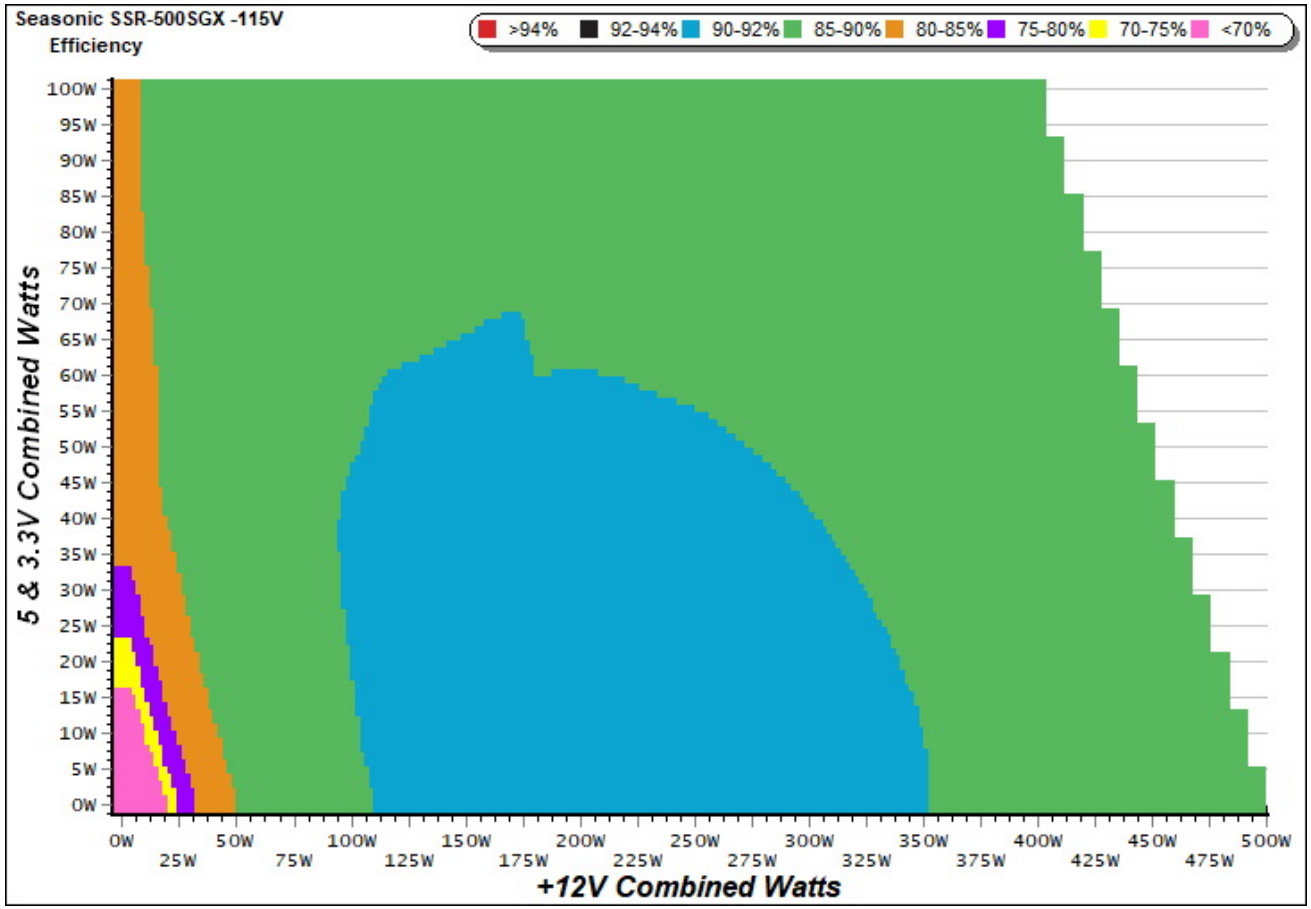


230V



Efficiency Graph

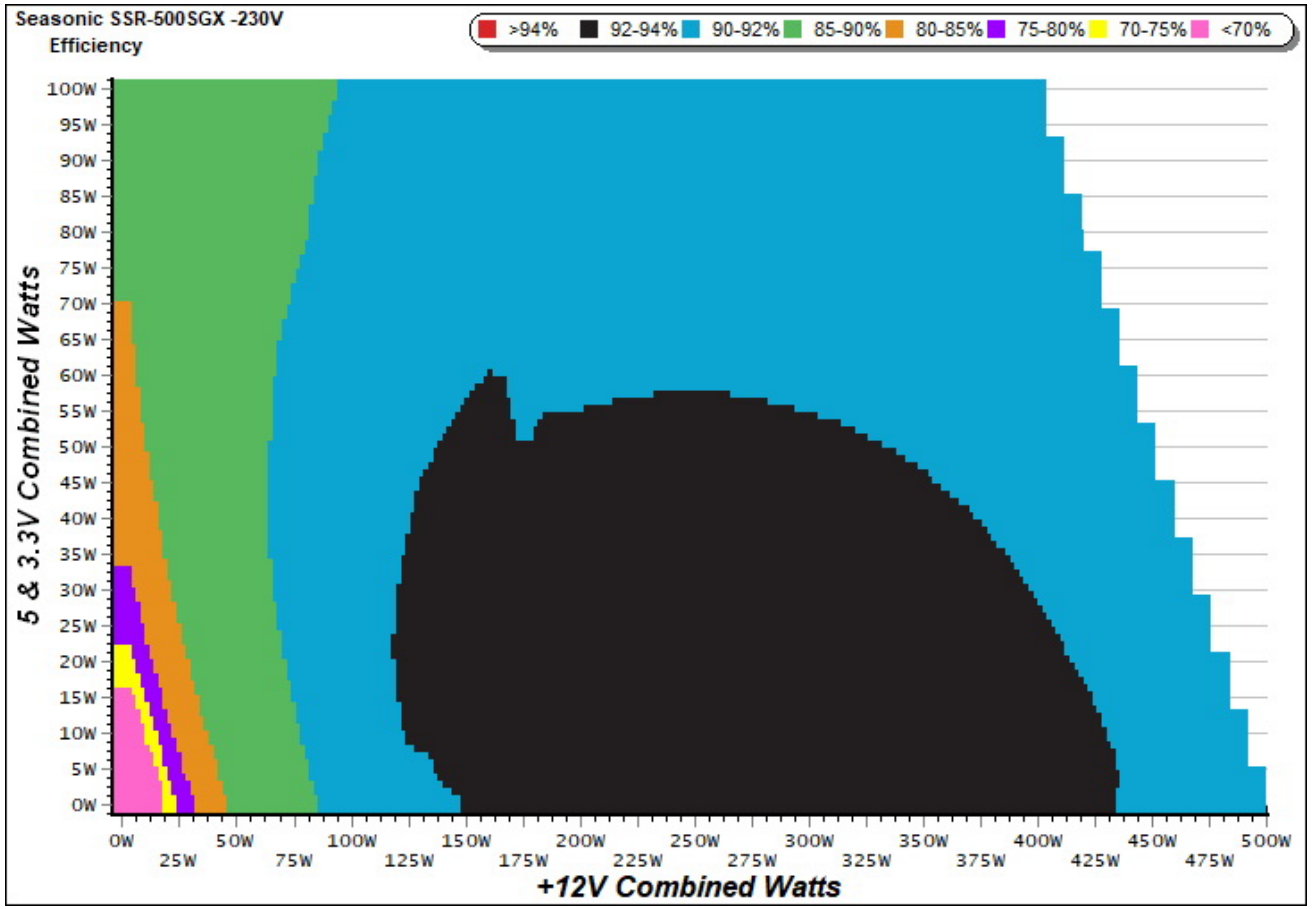
115V



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

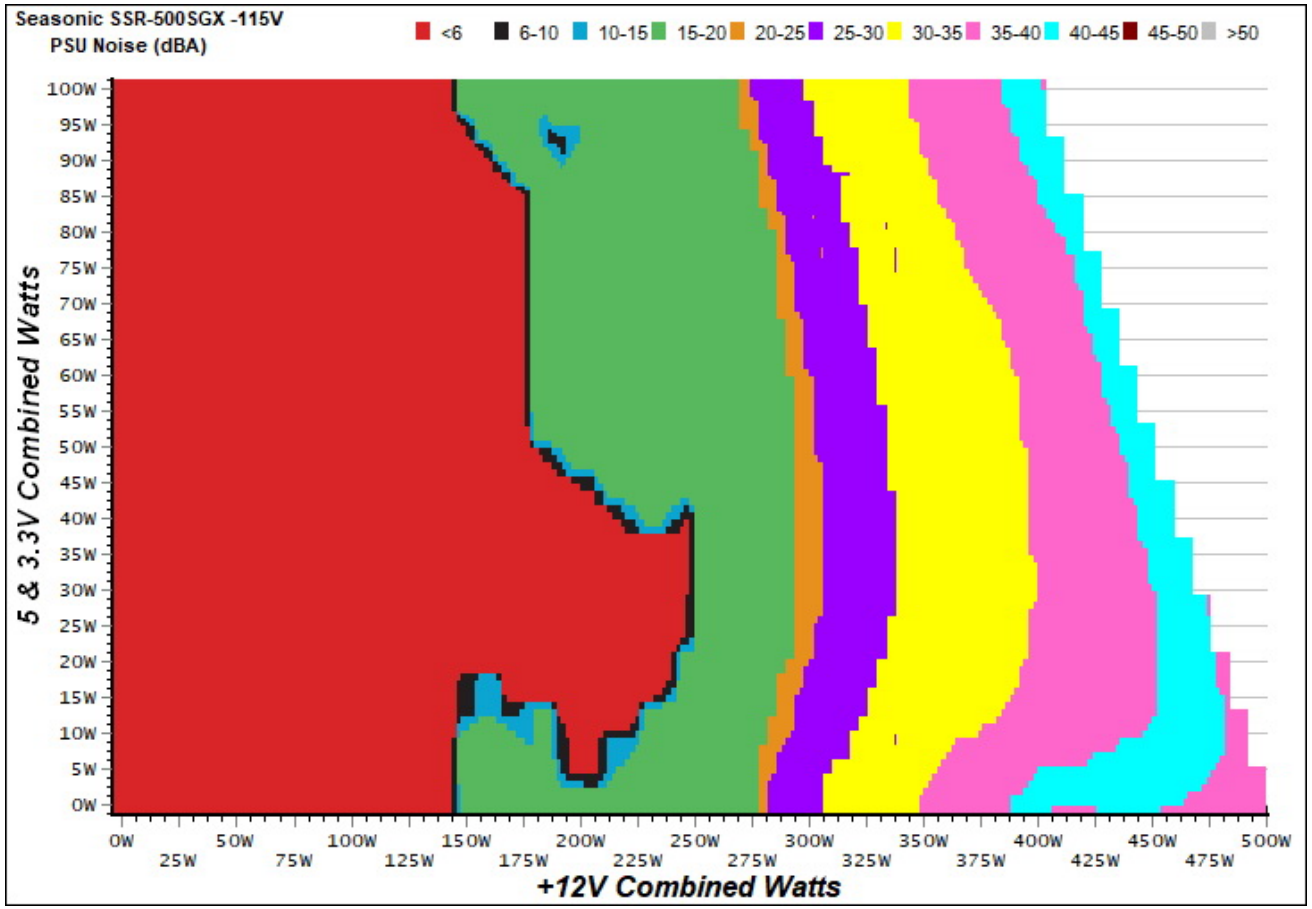


INFO

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

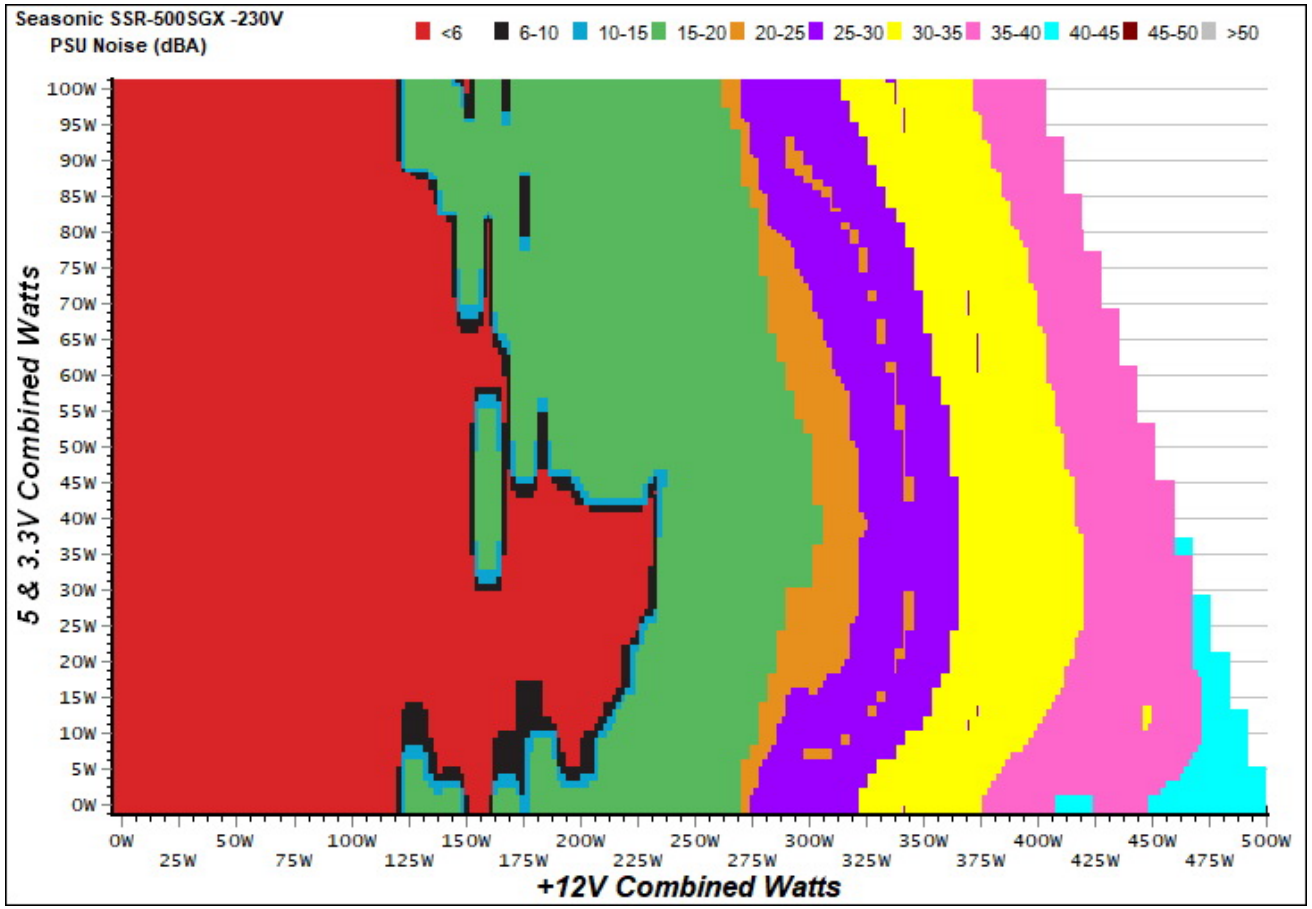
115V



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

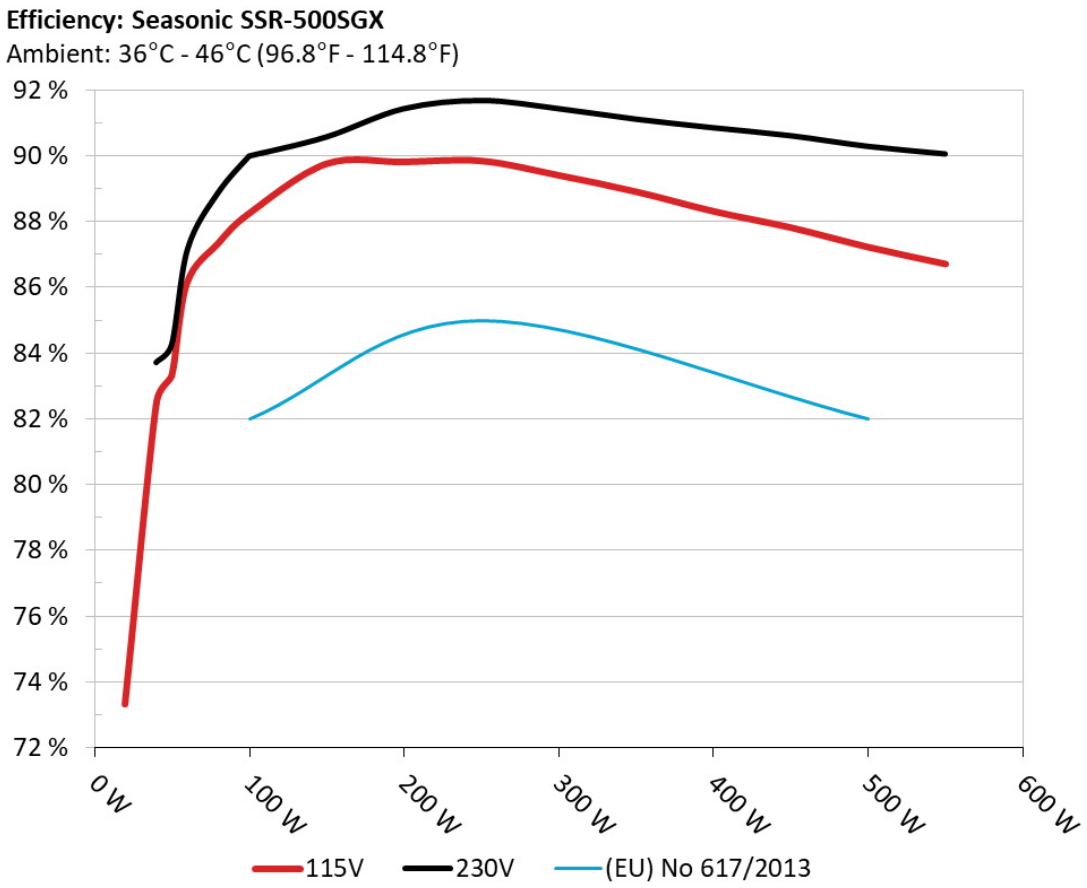


INFO

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

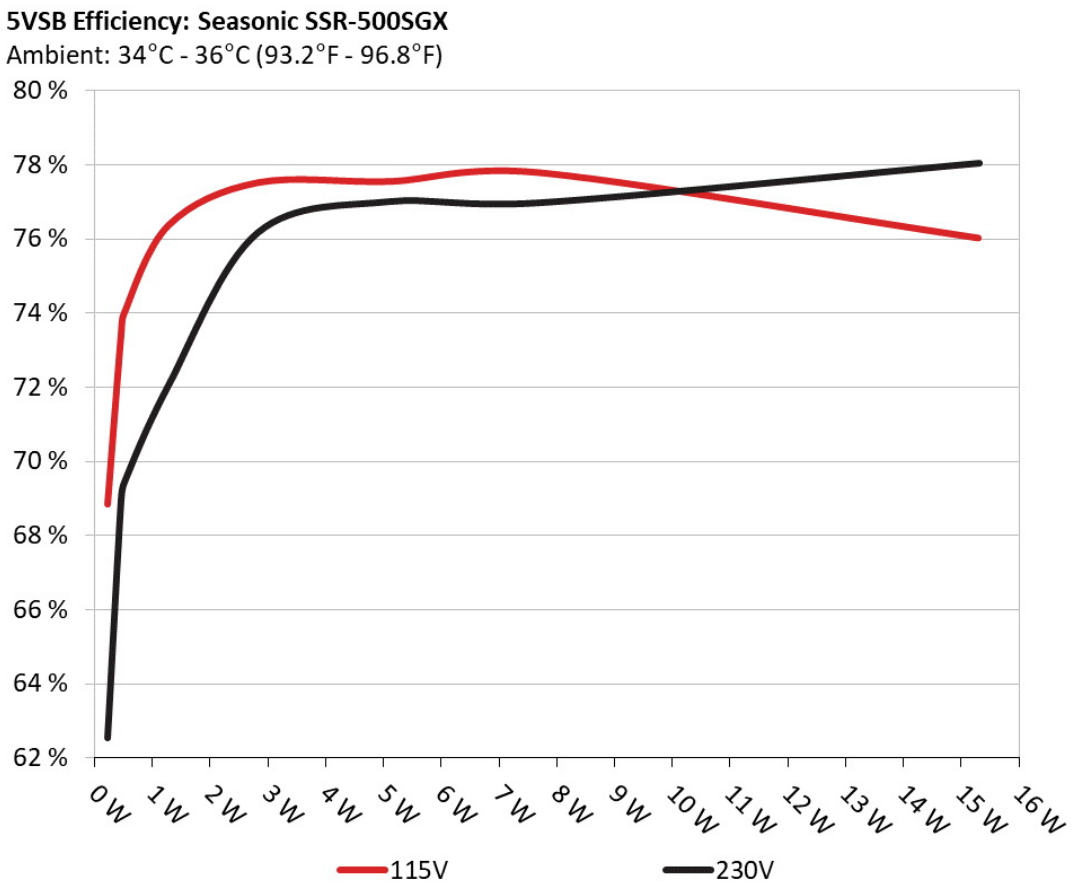
Efficiency under high ambient temperature



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	0.045A	0.232	68.843%	0.055
	5.152V	0.337		115.09V
2	0.090A	0.464	73.418%	0.100
	5.151V	0.632		115.09V
3	0.550A	2.829	77.528%	0.335
	5.143V	3.649		115.09V
4	1.000A	5.136	77.560%	0.403
	5.136V	6.622		115.09V
5	1.500A	7.692	77.799%	0.437
	5.127V	9.887		115.09V
6	3.000A	15.290	76.032%	0.481
	5.096V	20.110		115.08V

230V

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.232	62.534%	0.018
	5.152V	0.371		230.26V
2	0.090A	0.464	68.945%	0.033
	5.151V	0.673		230.26V
3	0.550A	2.829	76.171%	0.161
	5.142V	3.714		230.24V
4	1.000A	5.136	77.013%	0.242
	5.135V	6.669		230.24V
5	1.500A	7.690	76.977%	0.297
	5.126V	9.990		230.25V
6	3.001A	15.306	78.044%	0.371
	5.101V	19.612		230.25V

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	2.333A	2.000A	1.984A	0.975A	49.518	83.324%	0	<6.0	43.89°C	0.934
	11.973V	4.999V	3.320V	5.128V	59.428				39.40°C	115.09V
2	5.739A	3.002A	2.980A	1.172A	99.611	88.256%	0	<6.0	44.38°C	0.972
	11.975V	4.996V	3.318V	5.119V	112.866				39.75°C	115.09V
3	9.480A	3.503A	3.465A	1.370A	149.523	89.764%	0	<6.0	45.16°C	0.981
	11.976V	4.995V	3.317V	5.110V	166.574				40.07°C	115.08V
4	13.223A	4.004A	3.980A	1.568A	199.550	89.821%	939	19.8	40.60°C	0.985
	11.976V	4.994V	3.316V	5.101V	222.163				45.94°C	115.09V
5	16.630A	5.007A	4.976A	1.768A	249.682	89.851%	1014	23.2	41.18°C	0.988
	11.977V	4.994V	3.315V	5.093V	277.886				46.78°C	115.09V
6	20.034A	6.007A	5.973A	1.967A	299.761	89.414%	1338	33.2	41.95°C	0.987
	11.978V	4.993V	3.315V	5.084V	335.249				47.87°C	115.09V
7	23.441A	7.010A	6.969A	2.168A	349.889	88.914%	1489	36.7	42.31°C	0.988
	11.979V	4.992V	3.314V	5.074V	393.514				48.36°C	115.09V
8	26.851A	8.016A	7.966A	2.370A	400.017	88.317%	1797	41.5	42.71°C	0.989
	11.978V	4.990V	3.313V	5.065V	452.931				48.86°C	115.09V
9	30.657A	8.523A	8.452A	2.373A	449.759	87.826%	2028	44.1	43.11°C	0.990
	11.979V	4.989V	3.312V	5.059V	512.105				49.77°C	115.12V
10	34.231A	9.024A	8.971A	2.975A	499.788	87.232%	2082	44.1	44.26°C	0.991
	11.980V	4.987V	3.310V	5.043V	572.942				51.03°C	115.13V
11	38.404A	9.027A	8.971A	2.978A	549.815	86.720%	2084	44.1	46.09°C	0.992
	11.981V	4.986V	3.309V	5.038V	634.013				53.27°C	115.12V
CL1	0.140A	12.000A	11.998A	0.000A	101.367	83.622%	1245	31.4	41.74°C	0.973
	11.977V	4.995V	3.313V	5.124V	121.220				46.13°C	115.18V

CL2	41.008A	1.004A	0.997A	1.000A	504.765	88.169%	2089	44.1	44.76°C	0.991
	11.982V	4.992V	3.317V	5.088V	572.496				51.15°C	115.10V

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	2.340A	2.000A	1.985A	0.975A	49.602	84.250%	0	<6.0	45.02°C	0.712
	11.972V	4.999V	3.320V	5.127V	58.875				39.46°C	230.26V
2	5.745A	3.002A	2.982A	1.173A	99.691	89.362%	0	<6.0	45.34°C	0.856
	11.975V	4.996V	3.318V	5.117V	111.559				39.59°C	230.27V
3	9.489A	3.503A	3.465A	1.370A	149.621	90.559%	935	19.7	40.45°C	0.907
	11.975V	4.995V	3.317V	5.109V	165.219				46.43°C	230.28V
4	13.231A	4.005A	3.981A	1.569A	199.644	91.417%	941	19.9	40.85°C	0.934
	11.975V	4.994V	3.316V	5.100V	218.388				46.93°C	230.28V
5	16.640A	5.007A	4.977A	1.768A	249.769	91.666%	1010	23.2	41.38°C	0.948
	11.975V	4.994V	3.315V	5.092V	272.476				47.77°C	230.29V
6	20.042A	6.010A	5.973A	1.968A	299.844	91.419%	1375	33.2	41.89°C	0.958
	11.977V	4.992V	3.314V	5.083V	327.988				48.39°C	230.29V
7	23.450A	7.013A	6.970A	2.169A	349.993	91.100%	1624	41.8	42.05°C	0.964
	11.978V	4.992V	3.314V	5.072V	384.184				49.17°C	230.30V
8	26.857A	8.015A	7.969A	2.370A	400.091	90.837%	1846	42.3	42.74°C	0.969
	11.978V	4.990V	3.313V	5.064V	440.449				49.90°C	230.30V
9	30.665A	8.520A	8.454A	2.373A	449.805	90.598%	2039	44.2	43.80°C	0.972
	11.978V	4.989V	3.311V	5.058V	496.483				51.26°C	230.31V
10	34.239A	9.023A	8.972A	2.975A	499.846	90.273%	2078	45.4	44.20°C	0.975
	11.979V	4.987V	3.310V	5.043V	553.705				52.40°C	230.31V
11	38.412A	9.027A	8.974A	2.978A	549.873	90.045%	2084	44.1	46.25°C	0.977
	11.980V	4.985V	3.309V	5.038V	610.667				54.73°C	230.32V
CL1	0.144A	11.999A	12.001A	0.000A	101.419	84.659%	1277	30.1	41.70°C	0.866
	11.976V	4.995V	3.313V	5.123V	119.797				47.97°C	230.32V

CL2	41.014A	1.003A	0.999A	1.000A	504.797	91.227%	2081	44.1	44.03°C	0.975
	11.981V	4.992V	3.317V	5.088V	553.344				52.42°C	230.32V

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	1.194A	0.499A	0.477A	0.194A	19.373	73.341%	0	<6.0	0.816
	11.967V	5.008V	3.326V	5.146V	26.415				115.08V
2	2.466A	0.997A	0.989A	0.389A	39.796	82.532%	0	<6.0	0.919
	11.971V	5.004V	3.324V	5.140V	48.219				115.08V
3	3.668A	1.499A	1.471A	0.584A	59.298	86.131%	0	<6.0	0.949
	11.973V	5.001V	3.321V	5.135V	68.846				115.08V
4	4.936A	2.000A	1.987A	0.780A	79.698	87.354%	0	<6.0	0.962
	11.974V	4.999V	3.320V	5.129V	91.236				115.08V

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	2.882A	0.501A	0.477A	0.195A	39.578	83.708%	0	<6.0	0.654
	11.964V	5.007V	3.326V	5.143V	47.281				230.25V
2	4.149A	1.000A	0.990A	0.389A	59.961	87.164%	0	<6.0	0.749
	11.971V	5.003V	3.324V	5.137V	68.791				230.25V
3	5.348A	1.499A	1.474A	0.585A	79.419	88.852%	0	<6.0	0.813
	11.972V	5.000V	3.321V	5.132V	89.383				230.24V
4	6.615A	2.000A	1.986A	0.780A	99.793	89.979%	0	<6.0	0.855
	11.974V	4.998V	3.319V	5.126V	110.907				230.24V

The results above are not used in the certification process

Ripple Measurements

115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	11.8 mV	9.2 mV	14.2 mV	9.8 mV	Pass
20% Load	13.5 mV	10.8 mV	15.1 mV	10.1 mV	Pass
30% Load	12.5 mV	11.9 mV	15.7 mV	10.4 mV	Pass
40% Load	12.6 mV	12.8 mV	16.0 mV	10.4 mV	Pass
50% Load	13.4 mV	14.7 mV	16.8 mV	10.7 mV	Pass
60% Load	14.8 mV	16.5 mV	17.8 mV	11.2 mV	Pass
70% Load	15.7 mV	17.7 mV	19.1 mV	11.6 mV	Pass
80% Load	17.1 mV	20.8 mV	21.6 mV	12.6 mV	Pass
90% Load	17.8 mV	22.7 mV	23.4 mV	12.8 mV	Pass
100% Load	26.3 mV	23.7 mV	23.9 mV	14.6 mV	Pass
110% Load	27.4 mV	24.7 mV	24.8 mV	15.6 mV	Pass
Crossload 1	22.0 mV	21.9 mV	23.2 mV	10.2 mV	Pass
Crossload 2	24.8 mV	14.5 mV	17.7 mV	13.4 mV	Pass

The results above are not used in the certification process

230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	10.9 mV	9.0 mV	14.7 mV	9.2 mV	Pass
20% Load	12.7 mV	10.5 mV	16.3 mV	9.4 mV	Pass
30% Load	11.7 mV	11.3 mV	15.4 mV	10.1 mV	Pass
40% Load	12.3 mV	12.3 mV	17.1 mV	10.7 mV	Pass
50% Load	12.8 mV	14.4 mV	16.9 mV	10.6 mV	Pass
60% Load	13.4 mV	15.8 mV	18.6 mV	11.4 mV	Pass
70% Load	14.6 mV	18.0 mV	44.5 mV	28.1 mV	Pass
80% Load	16.1 mV	20.7 mV	22.0 mV	11.6 mV	Pass

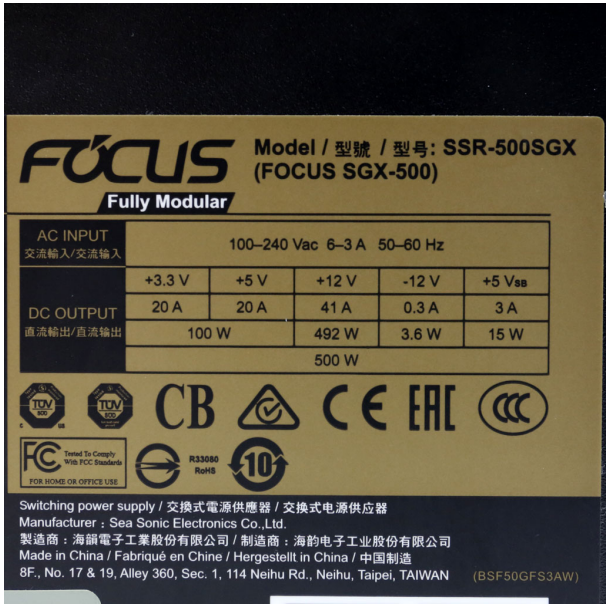
Test	12V	5V	3.3V	5VSB	Pass/Fail
90% Load	16.9 mV	21.4 mV	22.8 mV	11.9 mV	Pass
100% Load	26.8 mV	24.2 mV	22.9 mV	13.0 mV	Pass
110% Load	27.6 mV	24.7 mV	24.1 mV	13.6 mV	Pass
Crossload 1	20.9 mV	21.2 mV	22.7 mV	10.1 mV	Pass
Crossload 2	24.8 mV	14.3 mV	17.9 mV	12.5 mV	Pass

The results above are not used in the certification process

Seasonic Focus SGX 500W



Top side



Power specifications label