Seasonic Focus Plus Gold 550W

Serial Number R1705AA135750743

Lab ID 133

Certification ID 25133

Test Result Report ID: 19PS133A

Certificate Issue Date: Jun 29, 2018

Scheme: ETA-EMI PSU

115V: CYBENETICS GOLD

230V: CYBENETICS SILVER 230v

Scheme: LAMBDA PSU

115V: CYBENETICS A

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 Plus Gold 550W
OEM/ODM	Seasonic
Serial Number	R1705AA135750743
Product Specifications	
Manufacturer-Provided Information	
Rated Voltage (Vrms)	100-240
Rated Current (Arms)	8-4
Rated Frequency (Hz)	50-60

Rated Power (W)	550
Operating Temperature (Continuous Full Load) (°C)	
Type	ATX12V
Cable Design	Fully Modular
Warranty	-
Cybenetics Measurements	
Dimensions (W x H x D)	
Weight	
Cooling	120mm Fluid Dynamic Bearing Fan (HA1225H12F-Z)
Semi-Passive Operation	✓ (selectable)
Cybenetics Testing Information	
Lab ID	133
Date of receipt	Jun 21, 2018
Testing Date	Jun 25, 2018
Report Issued Date	Jun 29, 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	18-22AWG
4+4 pin EPS12V (655mm)	1	1	18AWG
6+2 pin PCIe (680mm+80mm)	1	2	18AWG
SATA (460mm+115mm+115mm+115mm)	1	4	18AWG
SATA (460mm+120mm)	1	2	18AWG
4 pin Molex (460mm+120mm+120mm)	1	3	18AWG
FDD Adapter (+110mm)	1	1	22AWG

Power Specifications

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	20	20	45	3	0.3
	Watts	100		540	15	3.6
Total Max. Power (W)		550				

Parts Description

General Data	
Manufacturer (OEM)	Seasonic
Platform Model	FX
Primary Side	
Transient Filter	4x Y caps, 2x X caps, 2x CM chokes, 1x MOV
Inrush Protection	NTC Thermistor & Diode
Bridge Rectifier(s)	2x GBU1506 (600V, 15A @ 100°C)
APFC MOSFETS	2x UTC GPT18N50DG (500V, 18A @ 100°C, 0.265Ohm)
APFC Boost Diode	1x STMicroelectronics STTH8S06D (600V, 8A @ 125°C)
Hold-up Cap(s)	1x Nippon Chemi-Con (400V, 560uF, 2000h @ 105°C, CE)
Main Switchers	4x UTC GBT10N50ADG (500V, 10A @ 25°C, 0.61Ohm)
APFC Controller	Champion CM6500UNX
Resonant Controller	Champion CM6901T6X
Topology	Primary side: Full-Bridge & LLC Resonant Controller Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	
+12V MOSFETS	4x Nexperia PSMN2R6-40YS (40V, 100A @ 25°C, 2.8mOhm)
5V & 3.3V	DC-DC Converters: 6x Infineon BSC0906NS (30V, 40A @ 100°C, 4.5mOhm) PWM Controller: APW7159
Filtering Capacitors	Electrolytics: Chemi-Con (1-5,000 @ 105°C, KZE), Chemi-Con (4-10,000 @ 105°C, KY), W Polymers: Chemi-Con
Supervisor IC	Weltrend WT7527V (OVP, UVP, OCP, SCP, PG)
Fan Model	Hong Hua HA1225H12F-Z (120mm, 12V, 0.58A, 2200 RPM, Fluid Dynamic Bearing)
5VSB Circuit	

Standby PWM Controller	Excelliance EM8569

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)	88.048%
Average Noise Output (>1450 Load Combinations)	23.19dBA
Average PF (>1450 Load Combinations)	0.984
Efficiency With 10W (≤500W) or 2% (>500W) Load	-
Standby Power Consumption	0.0456W
Non-Accredited	
12V Ripple (Full Load)	24.83mV
5V Ripple (Full Load)	12.48mV
3.3V Ripple (Full Load)	12.30mV
5VSB Ripple (Full Load)	9.31mV
12V Load Regulation	0.07%
5V Load Regulation	0.46%
3.3V Load Regulation	0.12%
5VSB Load Regulation	3.04%
Inrush Current	41.972A

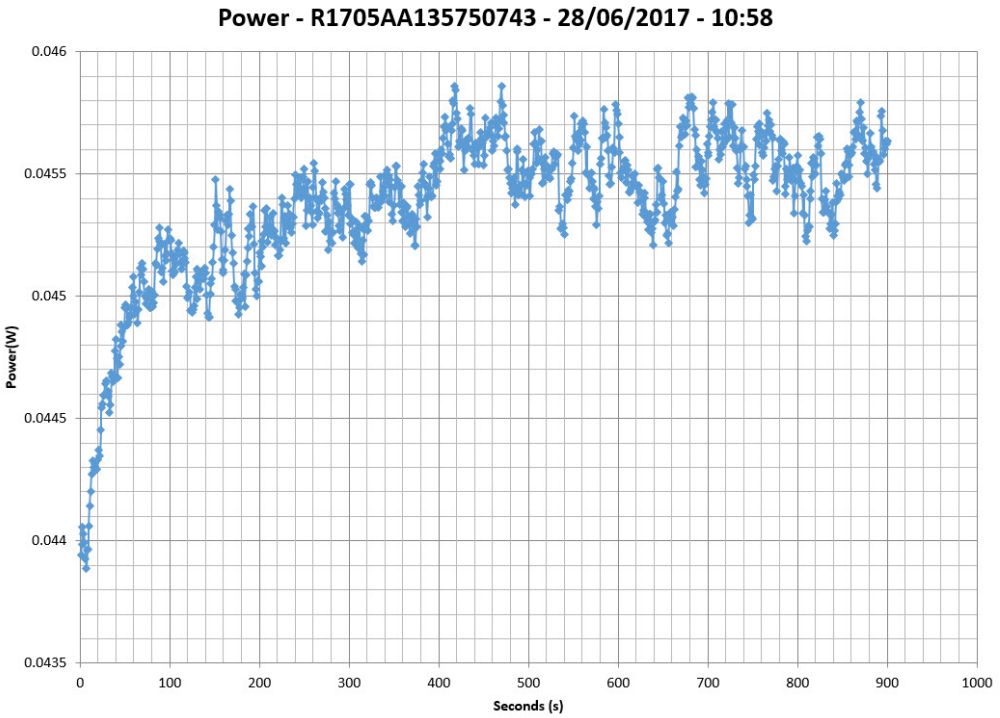
230V		
Accredited		
Average Efficiency (>1450 load combinations)	90.768%	
Average Noise Output (>1450 Load Combinations)	18.68dBA	
Average PF (>1450 Load Combinations)	0.926	
Efficiency With 10W (≤500W) or 2% (>500W) Load	-	
Standby Power Consumption	0.0756W	
Non-Accredited		
12V Ripple (Full Load)	22.87mV	
5V Ripple (Full Load)	13.50mV	
3.3V Ripple (Full Load)	13.51mV	
5VSB Ripple (Full Load)	7.95mV	
12V Load Regulation	0.11%	
5V Load Regulation	0.32%	
3.3V Load Regulation	0.54%	
5VSB Load Regulation	2.67%	
Inrush Current	54.244A	
Hold-Up Time & PWR_OK Signal	23.70ms	
AC Loss to PWR_OK Hold Up Time	19.50ms	
PWR_OK Inactive to DC Loss Delay	4.20ms	
OPP (0.00°C / 0.00°C)	-	-

Hold-Up Time & PWR_OK Signal

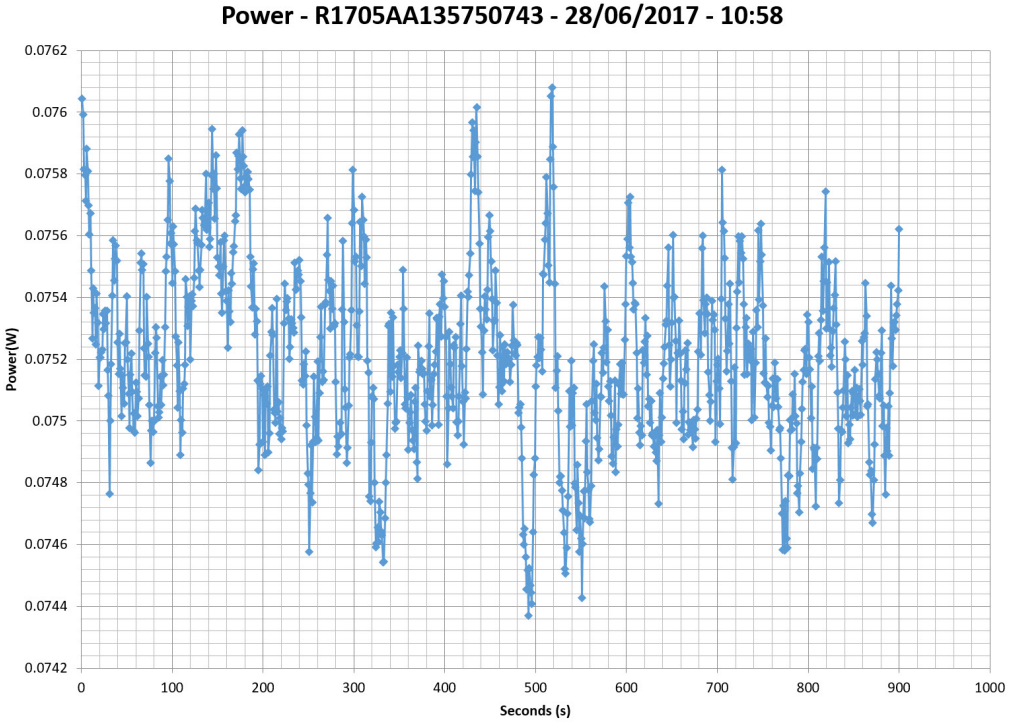
Hold-Up Time (ms)	23.7
AC Loss to PWR_OK Hold Up Time (ms)	19.5
PWR_OK Inactive to DC Loss Delay (ms)	4.2

Graphs

115V

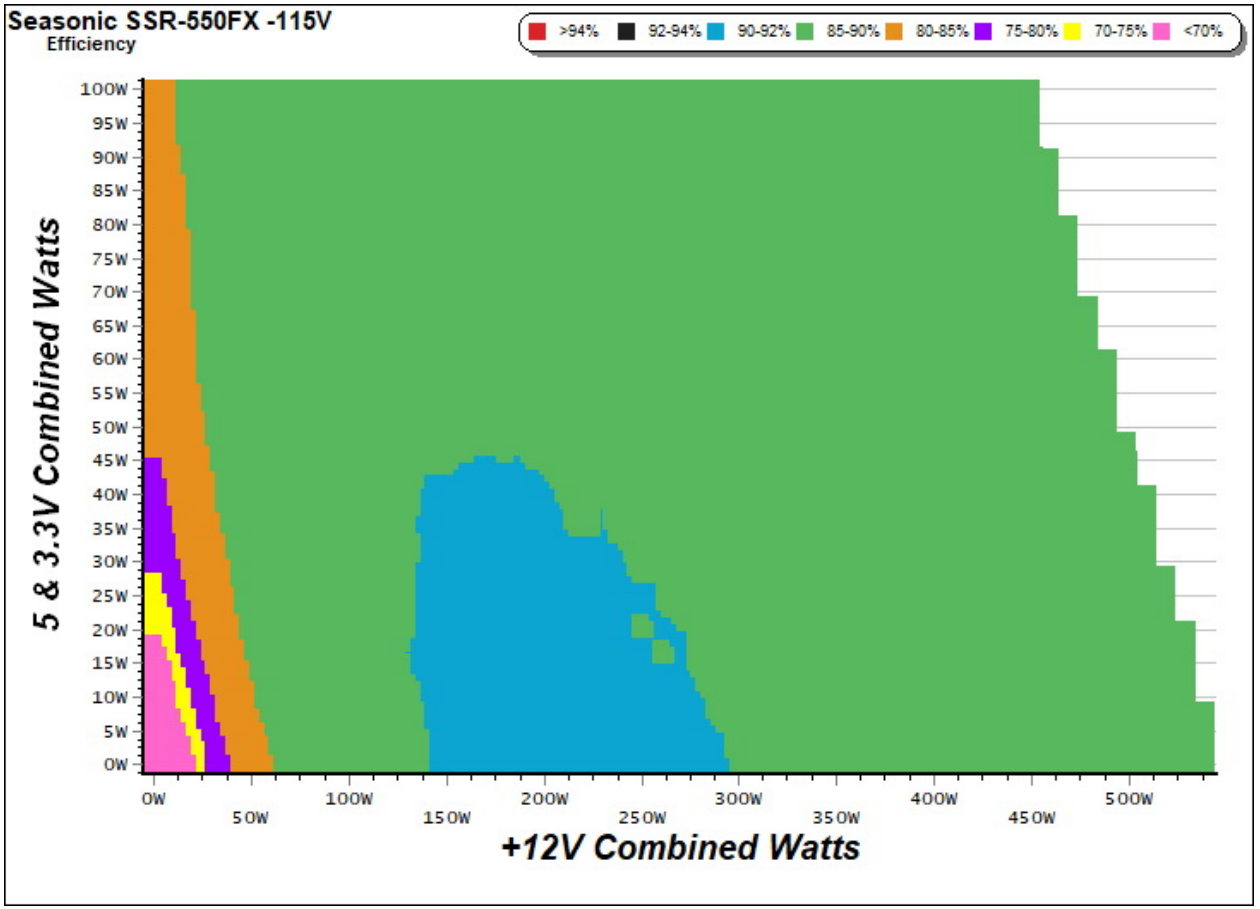


230V



Efficiency Graph

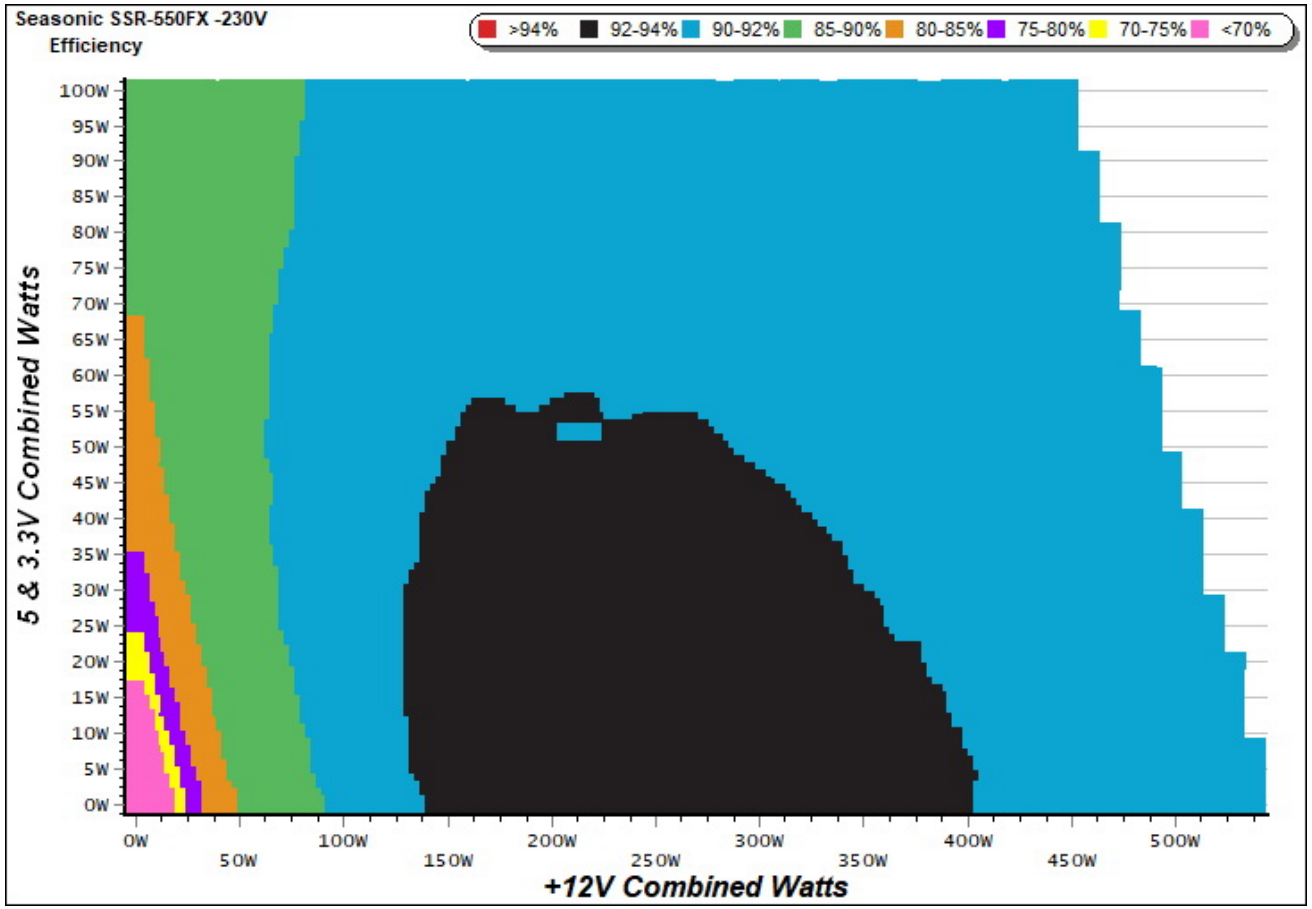
115V



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

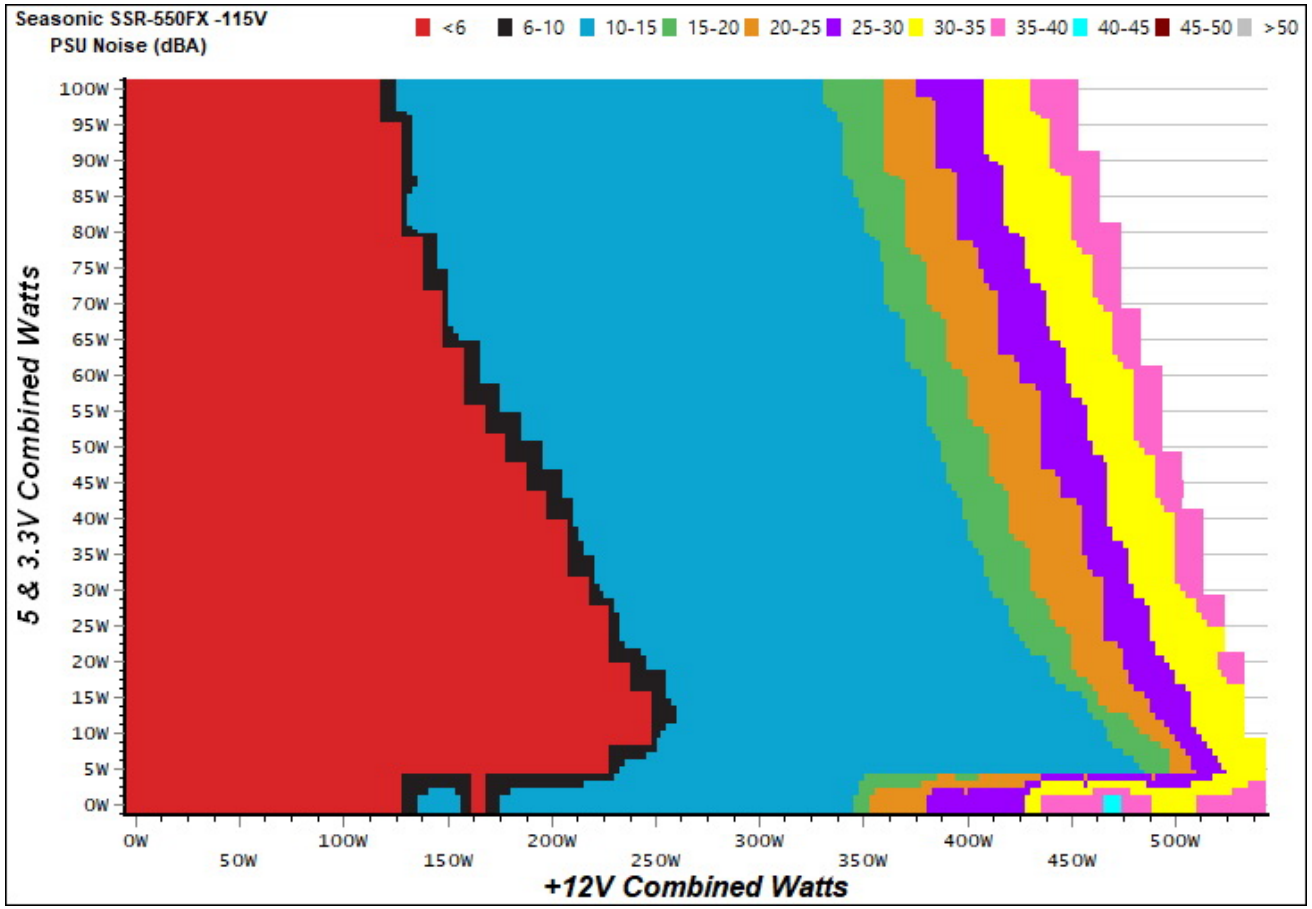


INFO

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

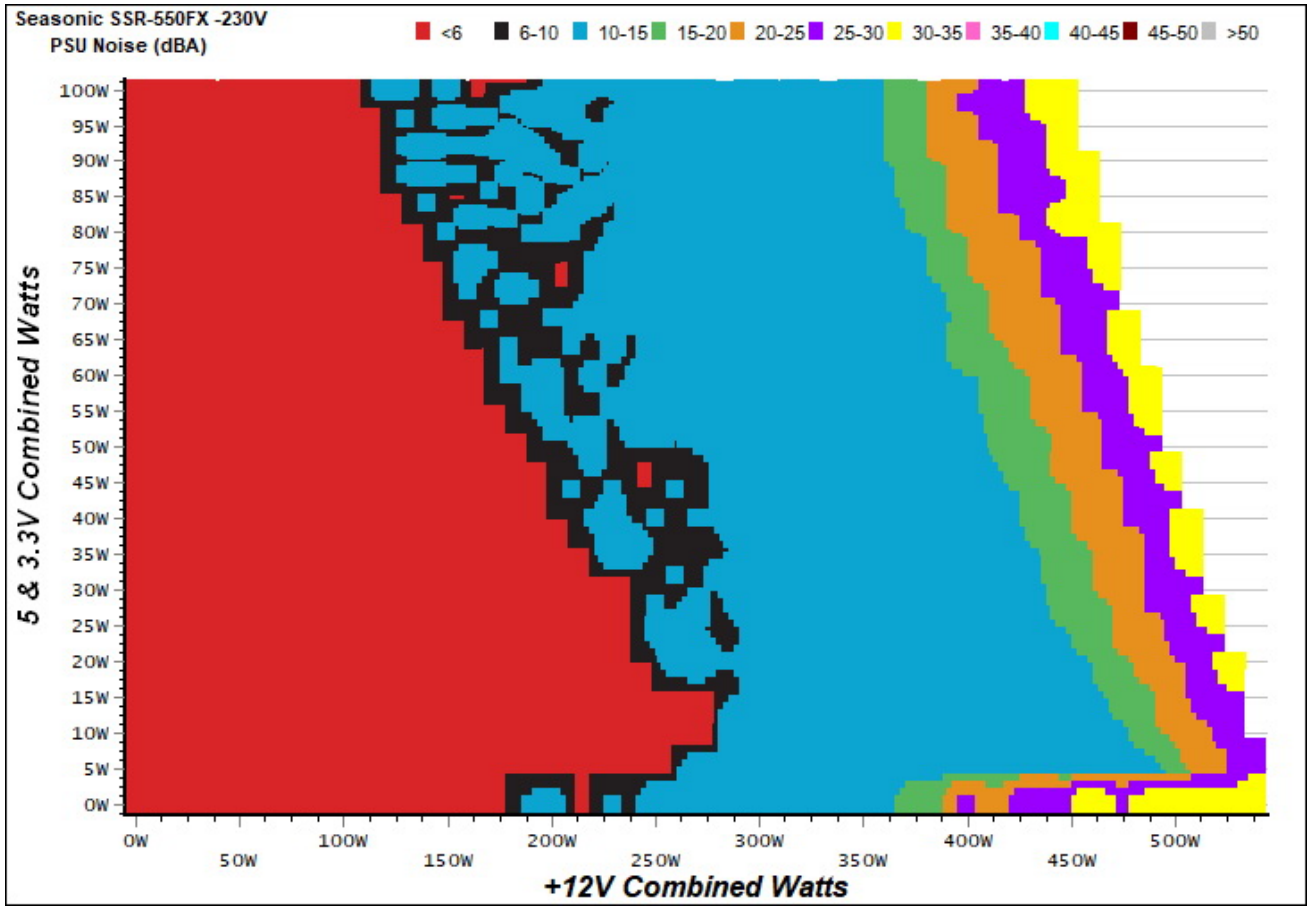
115V



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

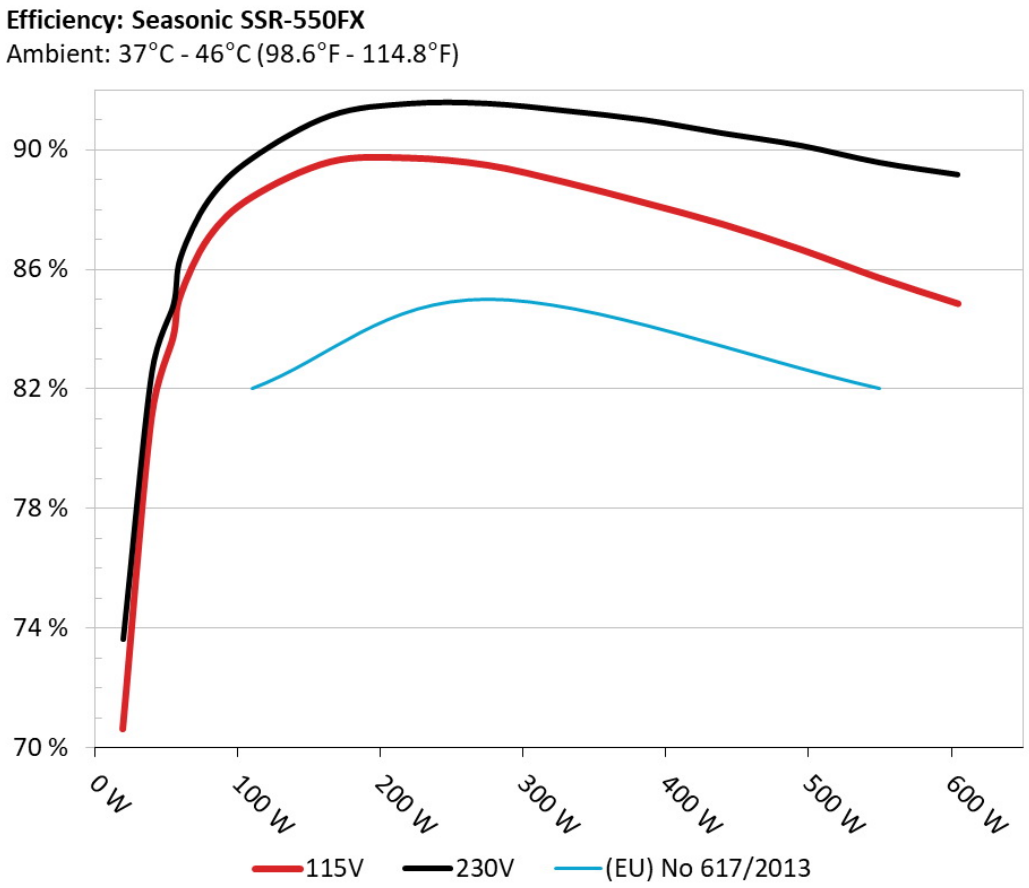


INFO

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

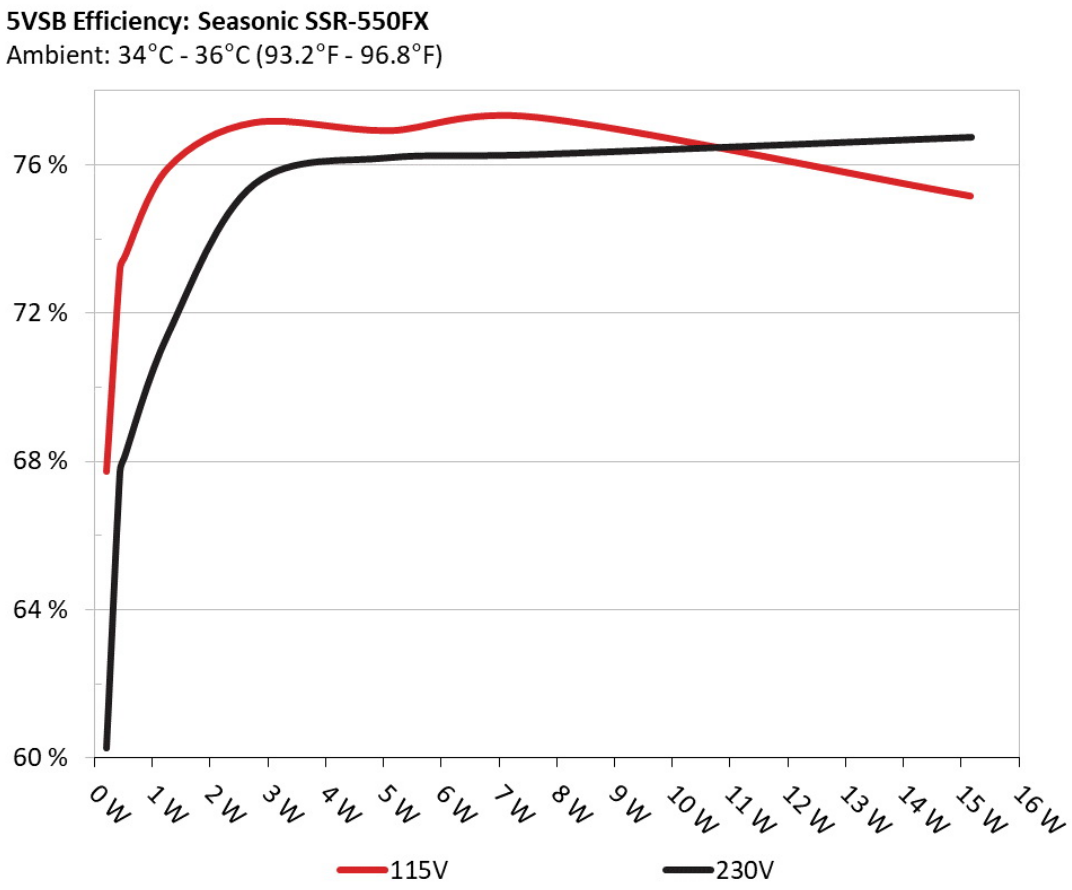
Efficiency under high ambient temperature



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	0.042A	0.214	67.722%	0.053
	5.133V	0.316		115.15V
2	0.087A	0.448	73.203%	0.099
	5.132V	0.612		115.16V
3	0.542A	2.776	77.133%	0.332
	5.120V	3.599		115.16V
4	1.002A	5.121	76.915%	0.401
	5.109V	6.658		115.16V
5	1.502A	7.655	77.276%	0.436
	5.098V	9.906		115.16V
6	3.002A	15.168	75.152%	0.483
	5.053V	20.183		115.16V

230V

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.042A	0.214	60.282%	0.018
	5.133V	0.355		230.40V
2	0.087A	0.447	67.727%	0.033
	5.131V	0.660		230.40V
3	0.542A	2.776	75.476%	0.162
	5.120V	3.678		230.39V
4	1.002A	5.119	76.187%	0.245
	5.109V	6.719		230.40V
5	1.502A	7.653	76.271%	0.299
	5.096V	10.034		230.40V
6	3.002A	15.186	76.736%	0.371
	5.059V	19.790		230.40V

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	2.730A	1.994A	1.984A	0.980A	54.808	83.708%	0	| 6.0	45.00°C	0.939
	12.165V	5.024V	3.318V	5.098V	65.475				38.78°C	115.19V
2	6.486A	2.982A	2.978A	1.178A	109.739	88.402%	0	| 6.0	46.60°C	0.975
	12.164V	5.021V	3.318V	5.085V	124.136				39.53°C	115.20V
3	10.588A	3.488A	3.492A	1.379A	164.875	89.589%	0	| 6.0	47.93°C	0.984
	12.164V	5.019V	3.317V	5.071V	184.034				40.10°C	115.18V
4	14.685A	3.986A	3.975A	1.580A	219.771	89.716%	700	14.6	41.30°C	0.988
	12.162V	5.017V	3.316V	5.059V	244.963				50.56°C	115.18V
5	18.438A	4.981A	4.973A	1.780A	274.687	89.479%	550	10.4	41.47°C	0.990
	12.162V	5.014V	3.316V	5.044V	306.985				50.75°C	115.18V
6	22.196A	5.987A	5.967A	1.986A	329.709	88.901%	560	10.5	41.98°C	0.990
	12.161V	5.012V	3.316V	5.030V	370.872				52.26°C	115.18V
7	25.952A	6.990A	6.964A	2.190A	384.664	88.226%	880	20.6	43.32°C	0.990
	12.160V	5.009V	3.316V	5.015V	435.998				53.00°C	115.17V
8	29.705A	7.991A	7.961A	2.399A	439.578	87.505%	1325	31.4	43.51°C	0.991
	12.159V	5.007V	3.315V	4.999V	502.349				52.32°C	115.17V
9	33.891A	8.489A	8.474A	2.400A	494.604	86.656%	1880	40.2	44.10°C	0.992
	12.158V	5.005V	3.315V	4.991V	570.765				51.76°C	115.17V
10	37.824A	9.004A	8.961A	3.015A	549.515	85.704%	2310	45.1	44.97°C	0.992
	12.156V	5.003V	3.314V	4.969V	641.178				52.00°C	115.16V
11	42.344A	9.006A	8.962A	3.020A	604.455	84.852%	2320	45.2	46.06°C	0.992
	12.156V	5.002V	3.313V	4.961V	712.362				53.42°C	115.16V
CL1	0.098A	12.012A	12.003A	0.004A	101.375	85.128%	720	14.9	45.85°C	0.973
	12.165V	5.011V	3.330V	5.096V	119.086				48.74°C	115.20V

CL2	44.966A	1.004A	1.003A	1.002A	559.997	86.334%	2320	45.2	45.17°C	0.992
	12.156V	5.009V	3.306V	5.036V	648.643				52.51°C	115.18V

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	2.730A	1.995A	1.989A	0.981A	54.838	84.975%	0	<6.0	53.92°C	0.702
	12.171V	5.022V	3.314V	5.099V	64.534				39.59°C	230.24V
2	6.486A	2.980A	2.986A	1.176A	109.762	89.871%	0	<6.0	54.56°C	0.854
	12.169V	5.020V	3.312V	5.089V	122.133				39.57°C	230.24V
3	10.586A	3.488A	3.502A	1.376A	164.894	91.180%	0	<6.0	41.34°C	0.912
	12.168V	5.019V	3.310V	5.076V	180.844				52.37°C	230.25V
4	14.681A	3.986A	3.988A	1.576A	219.800	91.689%	440	10.5	40.86°C	0.936
	12.167V	5.018V	3.308V	5.065V	239.723				56.92°C	230.25V
5	18.435A	4.979A	4.989A	1.781A	274.760	91.708%	560	10.5	40.88°C	0.952
	12.166V	5.017V	3.307V	5.054V	299.602				57.13°C	230.25V
6	22.196A	5.985A	5.989A	1.981A	329.777	91.487%	560	10.5	41.13°C	0.961
	12.164V	5.014V	3.304V	5.042V	360.464				57.83°C	230.25V
7	25.950A	6.991A	6.991A	2.186A	384.722	91.166%	755	16.1	41.15°C	0.967
	12.162V	5.012V	3.302V	5.030V	422.001				58.42°C	230.25V
8	29.705A	7.987A	8.000A	2.391A	439.623	90.763%	1120	27.7	41.81°C	0.972
	12.160V	5.010V	3.300V	5.017V	484.362				57.31°C	230.25V
9	33.892A	8.484A	8.516A	2.394A	494.677	90.421%	1695	37.7	41.31°C	0.975
	12.159V	5.009V	3.299V	5.010V	547.081				55.64°C	230.26V
10	37.834A	8.993A	9.009A	3.006A	549.701	89.924%	1935	42.1	42.16°C	0.978
	12.158V	5.007V	3.296V	4.988V	611.298				54.03°C	230.24V
11	42.349A	8.992A	9.010A	3.008A	604.519	89.461%	2320	45.2	42.54°C	0.980
	12.157V	5.005V	3.295V	4.983V	675.738				54.53°C	230.24V
CL1	0.101A	12.013A	12.004A	0.005A	101.222	86.540%	0	<6.0	46.19°C	0.846
	12.170V	5.015V	3.309V	5.109V	116.965				41.29°C	230.26V

CL2	44.982A	1.003A	1.001A	1.002A	560.286	90.576%	1990	42.8	39.66°C	0.978
	12.158V	5.011V	3.302V	5.053V	618.578				52.32°C	230.24V

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	1.199A	0.493A	0.480A	0.195A	19.663	70.646%	0	| 6.0	0.776
	12.166V	5.033V	3.321V	5.125V	27.833				115.19V
2	2.422A	0.992A	0.992A	0.391A	39.740	81.049%	0	| 6.0	0.907
	12.165V	5.026V	3.317V	5.117V	49.032				115.19V
3	3.652A	1.488A	1.504A	0.585A	59.883	85.108%	0	| 6.0	0.948
	12.165V	5.025V	3.318V	5.109V	70.361				115.19V
4	4.864A	1.994A	1.988A	0.781A	79.767	87.060%	0	| 6.0	0.963
	12.165V	5.024V	3.318V	5.099V	91.623				115.19V

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	1.203A	0.490A	0.480A	0.196A	19.705	73.799%	0	<6.0	0.486
	12.172V	5.030V	3.318V	5.126V	26.701				230.22V
2	2.424A	0.990A	0.994A	0.391A	39.773	82.721%	0	<6.0	0.607
	12.172V	5.023V	3.314V	5.118V	48.081				230.24V
3	3.652A	1.487A	1.506A	0.586A	59.904	86.535%	0	<6.0	0.721
	12.171V	5.023V	3.314V	5.111V	69.225				230.23V
4	4.866A	1.994A	1.989A	0.781A	79.812	88.480%	0	<6.0	0.789
	12.171V	5.022V	3.313V	5.102V	90.203				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	8.7 mV	5.5 mV	6.9 mV	5.8 mV	Pass
20% Load	11.9 mV	6.8 mV	9.3 mV	6.3 mV	Pass
30% Load	13.8 mV	7.4 mV	9.6 mV	5.9 mV	Pass
40% Load	15.8 mV	7.3 mV	11.3 mV	5.6 mV	Pass
50% Load	17.2 mV	8.0 mV	9.7 mV	7.0 mV	Pass
60% Load	19.1 mV	9.5 mV	8.2 mV	6.0 mV	Pass
70% Load	20.5 mV	9.5 mV	8.2 mV	6.6 mV	Pass
80% Load	21.8 mV	10.9 mV	9.2 mV	7.7 mV	Pass
90% Load	23.6 mV	11.9 mV	9.7 mV	8.3 mV	Pass
100% Load	24.8 mV	12.5 mV	12.3 mV	9.3 mV	Pass
110% Load	26.3 mV	14.6 mV	12.4 mV	9.3 mV	Pass
Crossload 1	13.2 mV	10.9 mV	9.8 mV	8.0 mV	Pass
Crossload 2	24.4 mV	10.4 mV	11.6 mV	8.6 mV	Pass

The results above are not used in the certification process

230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	7.4 mV	5.1 mV	7.4 mV	5.4 mV	Pass
20% Load	10.8 mV	5.7 mV	8.0 mV	5.3 mV	Pass
30% Load	13.4 mV	5.9 mV	7.8 mV	5.6 mV	Pass
40% Load	14.9 mV	6.5 mV	8.9 mV	5.7 mV	Pass
50% Load	16.0 mV	7.2 mV	8.8 mV	6.0 mV	Pass
60% Load	17.4 mV	8.1 mV	8.6 mV	6.0 mV	Pass
70% Load	18.8 mV	9.4 mV	8.6 mV	6.1 mV	Pass
80% Load	19.8 mV	9.3 mV	9.3 mV	6.3 mV	Pass

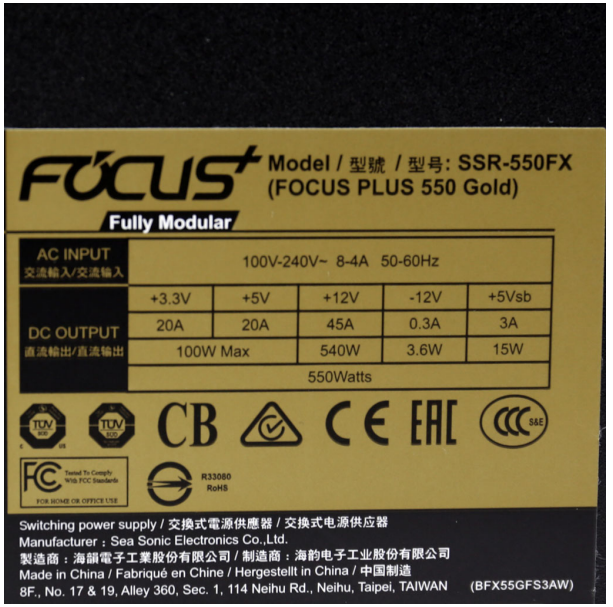
Test	12V	5V	3.3V	5VSB	Pass/Fail
90% Load	20.8 mV	10.6 mV	10.2 mV	6.8 mV	Pass
100% Load	22.9 mV	13.5 mV	13.5 mV	8.0 mV	Pass
110% Load	23.9 mV	14.6 mV	14.7 mV	7.9 mV	Pass
Crossload 1	11.1 mV	10.0 mV	9.9 mV	7.2 mV	Pass
Crossload 2	22.8 mV	9.3 mV	13.4 mV	7.2 mV	Pass

The results above are not used in the certification process

Seasonic Focus Plus Gold 550W



Top side



Power specifications label