



Seasonic Focus GX-1000 (ATX v3.1)



Lab ID SS10002568

Certification ID 252568

Test Result Report ID: 24PS2568A

Certificate Issue Date: Sep 18, 2024

115V

230V

Scheme: ETA-EMI PSU

115V

230V

Scheme: LAMBDA PSU

Outside Validation Scope

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 GX-1000 (ATX v3.1)
OEM/ODM	Seasonic
Serial Number	
Product Specifications	
Manufacturer-Provided Information	
V_{in} (Vrms)	100-240
I_{in} (Arms)	13-6.5

□□□□ (Hz)	50-60
□□□□ (W)	1000
Operating Temperature (Continuous Full Load) (°C)	
□□	ATX12V
□□□□	Fully Modular
Warranty	-
Cybenetics Measurements	
Dimensions (W x H x D)	
Weight	
□□	135mm Fluid Dynamic Bearing Fan (HA13525H12F-Z)
□□□□	✓ (selectable)
Cybenetics Testing Information	
Lab ID	SS10002568
Date of receipt	Sep 4, 2024
Testing Date	Sep 12, 2024
Report Issued Date	Sep 18, 2024
Engineer Name	-
Authorized By the Laboratory Technical Manager	Aristeidis Bitziopoulos
Signature	

□□□□ (Non-accredited measurements)

□□□□				
□□	□□□□	□□□□□	Gauge	In Cable Capacitors
ATX □□ 20+4 pin (610mm)	1	1	16-18AWG	□
4+4 pin EPS 12V □□ (750mm)	2	2	16AWG	□
6+2pin PCIe□□ (750mm)	3	3	16-18AWG	□
12+4 pin PCIe (700mm) (600W)	1	1	16-24AWG	□
SATA□□ (500mm+150mm+150mm+150mm)	2	8	18AWG	□
4-pin Molex (450mm+120mm+120mm)	1	3	18AWG	□

Protection Features(Manufacturer)

Over Power Protection	✓
Over Current (+12V) Protection	✓
Over Temperature Protection	✓
Short Circuit Protection	✓
Surge Protection	✓
Inrush Current Protection	✓
Fan Failure Protection	✗

□□□□

□		3.3V	5V	12V	5VSB	-12V
□□□	□□	25	25	83	3	0.3
	□	125		996	15	3.6
□□□□ (W)		1000				

Parts Description

General Data	
Manufacturer (OEM)	Seasonic
PCB Type	Double-Sided
Primary Side	
Transient Filter	4x Y caps, 2x X caps, 2x CM chokes, 1x MOV
Inrush Protection	1x NTC Thermistor MF72 5D-20L (5 ohm) & Relay
Bridge Rectifier(s)	2x GBU1508 (800V, 15A @ 40°C)
APFC MOSFETs	2x Alpha & Omega AOB125A60L (600V, 18A @ 100°C, Rds(on): 0.125Ohm)
APFC Boost Diode	1x Infineon IDK08G65C5 (650V, 8A @ 145°C)
Bulk Cap(s)	1x Nippon Chemi-con (400V, 820uF, 2,000h @ 105°C)

Main Switchers	4x Alpha & Omega AOB190A60C (600V, 12A @ 100°C, Rds(on): 0.19 Ohm)
Resonant Controller	Champion CU6901VPA
APFC Controller	Champion CM6500UNX
Topology	Primary side: APFC, Full-Bridge & LLC converter Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	
+12V MOSFETs	6x Nexperia PSMN1R4-40YLD (40V, 214A @ 100°C, Rds(on): 1.4mOhm)
5V & 3.3V	DC-DC Converters: 6x Nexperia PSMN4R0_30YLD (30V, 95A @ 100°C, Rds(on): 4mOhm) PWM Controller(s): AnpecAPW7159C
Filtering Capacitors	Electrolytic: 3x Nichicon (2-5,000h @ 105°C, HD), 1x Nippon Chemi-Con (1-5,000h @ 105°C, KZE), 5x Rubycon (3-6,000h @ 105°C, YXG) 2x Rubycon (6-10,000h @ 105°C, ZLH) Polymer: 20x Nippon Chemi-Con, 7x FPCAP
Supervisor IC	Weltrend WT7527RA (OVP, UVP, OCP, SCP, PG)
Fan Controller	Nuvoton M031FB0AE
Fan Model	Hong Hua HA13525H12F-Z (135mm, 12V, 0.50A, Fluid Dynamic Bearing Fan)
5VSB	
Rectifier	DK DK5V45R10S (45v, Rds(on): 10mOhm)
Standby PWM Controller	Excelliance MOS EM8569C

Test Results

Temperature & Compliance Info

□□□□ (°C /°F)	28-32 / 82.4-89.6
□□ ErP Lot3/6□□	✓
□□ (EU) No 617/2013□□	✓
ALPM (Alternative Low Power Mode) compatible	✓
ATX v3.1 PSU Power Excursion	✓

Performance Summary

115V

Accredited	
□□□□ (>1450 load combinations)	88.288%
Average Noise Output (>1450 Load Combinations)	28.24dBA
PF□□□ (>1450 Load Combinations)	0.978
Efficiency With 10W ($\leq$ 500W) or 2% (>500W) Load	71.053%
□□□□□	0.0644W
Non-Accredited	
12V Ripple (Full Load)	27.85mV
5V Ripple (Full Load)	16.64mV
3.3V Ripple (Full Load)	16.86mV
5VSB Ripple (Full Load)	25.42mV
12V Load Regulation	1.52%
5V Load Regulation	0.48%
3.3V Load Regulation	1.06%
5VSB Load Regulation	4.46%
Inrush Current	32.330A

230V

Accredited	
□□□□ (>1450 load combinations)	90.932%
Average Noise Output (>1450 Load Combinations)	28.22dBA
PF□□□ (>1450 Load Combinations)	0.947
Efficiency With 10W ($\leq$ 500W) or 2% (>500W) Load	67.976%
□□□□□	0.1677W
Non-Accredited	
12V Ripple (Full Load)	27.77mV
5V Ripple (Full Load)	19.14mV
3.3V Ripple (Full Load)	16.52mV

5VSB Ripple (Full Load)	26.62mV	
12V Load Regulation	1.50%	
5V Load Regulation	0.46%	
3.3V Load Regulation	1.06%	
5VSB Load Regulation	4.44%	
Inrush Current	68.550A	
12V Transient Response (200%)	11.26V	
5V Transient Response (200%)	4.911V	
3.3V Transient Response (200%)	3.188V	
5VSB Transient Response (200%)	4.811V	
□□□□ & PG□□	19.30ms	
AC Loss to PWR_OK Hold Up Time	14.40ms	
PWR_OK Inactive to DC Loss Delay	4.90ms	
PSU Timings: T1 (20% / 100%)	73.0ms	73.0ms
PSU Timings: T3 (20% / 100%)	130.0ms	128.0ms
12V OCP (25.3°C / 44.2°C)	112.00A (134.94%), 12.033V	106.20A (127.95%), 12.046V
5V OCP (25.3°C / 44.2°C)	33.2A (132.80%), 5.02V	31.7A (126.80%), 5.022V
3.3V OCP (25.3°C / 44.2°C)	35.4A (141.60%), 3.315V	34.2A (136.80%), 3.316V
5VSB OCP (25.3°C / 44.2°C)	6.2A (206.67%), 4.79V	6.3A (210.00%), 4.768V
OPP (26.28°C / 41.66°C)	134.71%	119.70%

□□□□ & PG□□

Hold-Up Time (ms)	19.3
AC Loss to PWR_OK Hold Up Time (ms)	14.4
PWR_OK Inactive to DC Loss Delay (ms)	4.9



Tables

115V

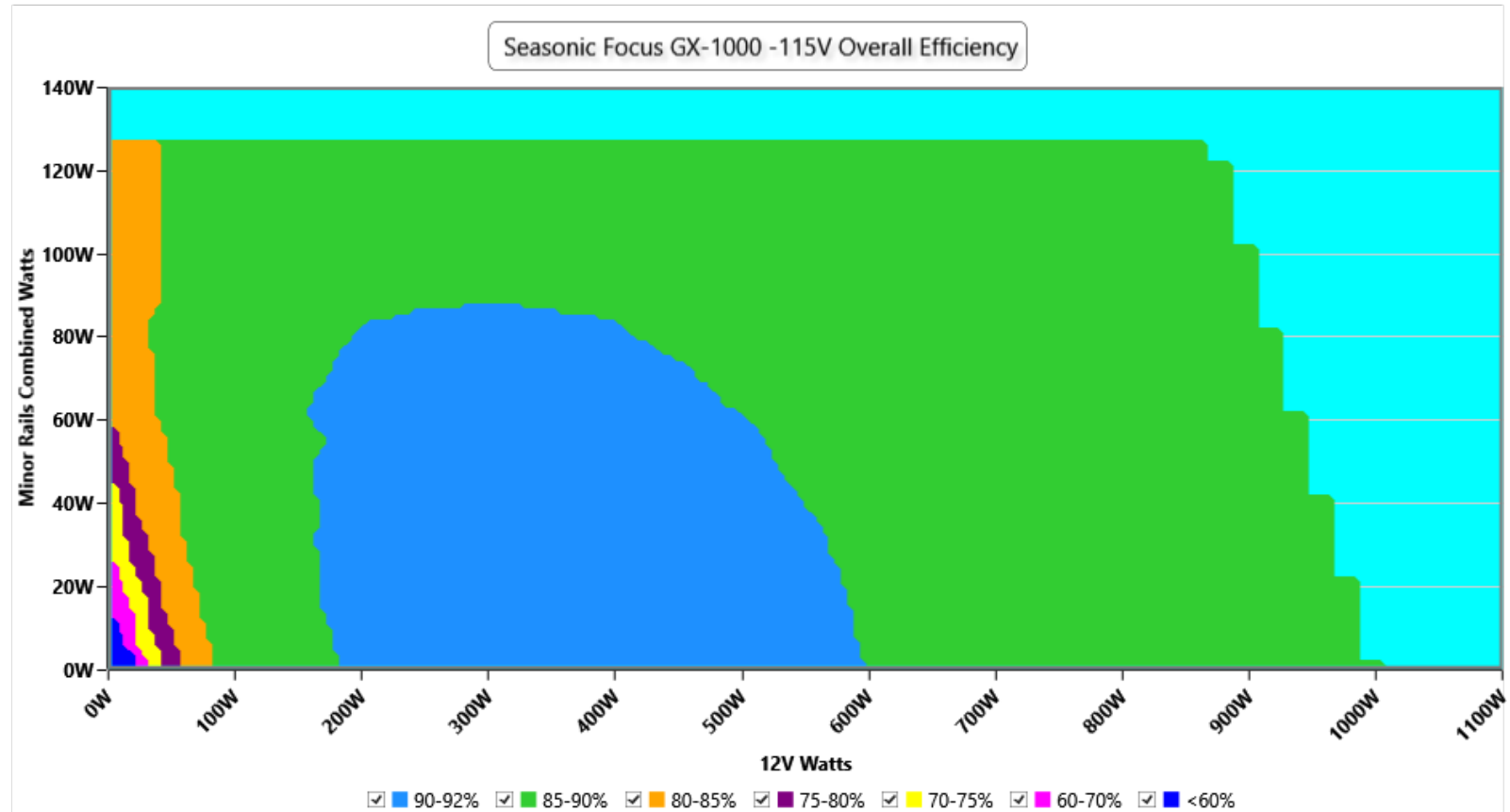
Detailed Results						
	Average	Min	Limit Min	Max	Limit Max	Result
Mains Voltage RMS:	115.08 V	115.04 V	113.85 V	115.12 V	116.15 V	PASS
Mains Frequency:	60.00 Hz	59.99 Hz	59.40 Hz	60.01 Hz	60.60 Hz	PASS
Mains Voltage CF:	1.416	1.415	1.340	1.418	1.490	PASS
Mains Voltage THD:	0.13 %	0.09 %	N/A	0.19 %	2.00 %	PASS
Real Power:	0.064 W	0.008 W	N/A	0.099 W	N/A	N/A
Apparent Power:	11.957 W	11.016 W	N/A	12.936 W	N/A	N/A
Power Factor:	0.006	N/A	N/A	N/A	N/A	N/A

230V

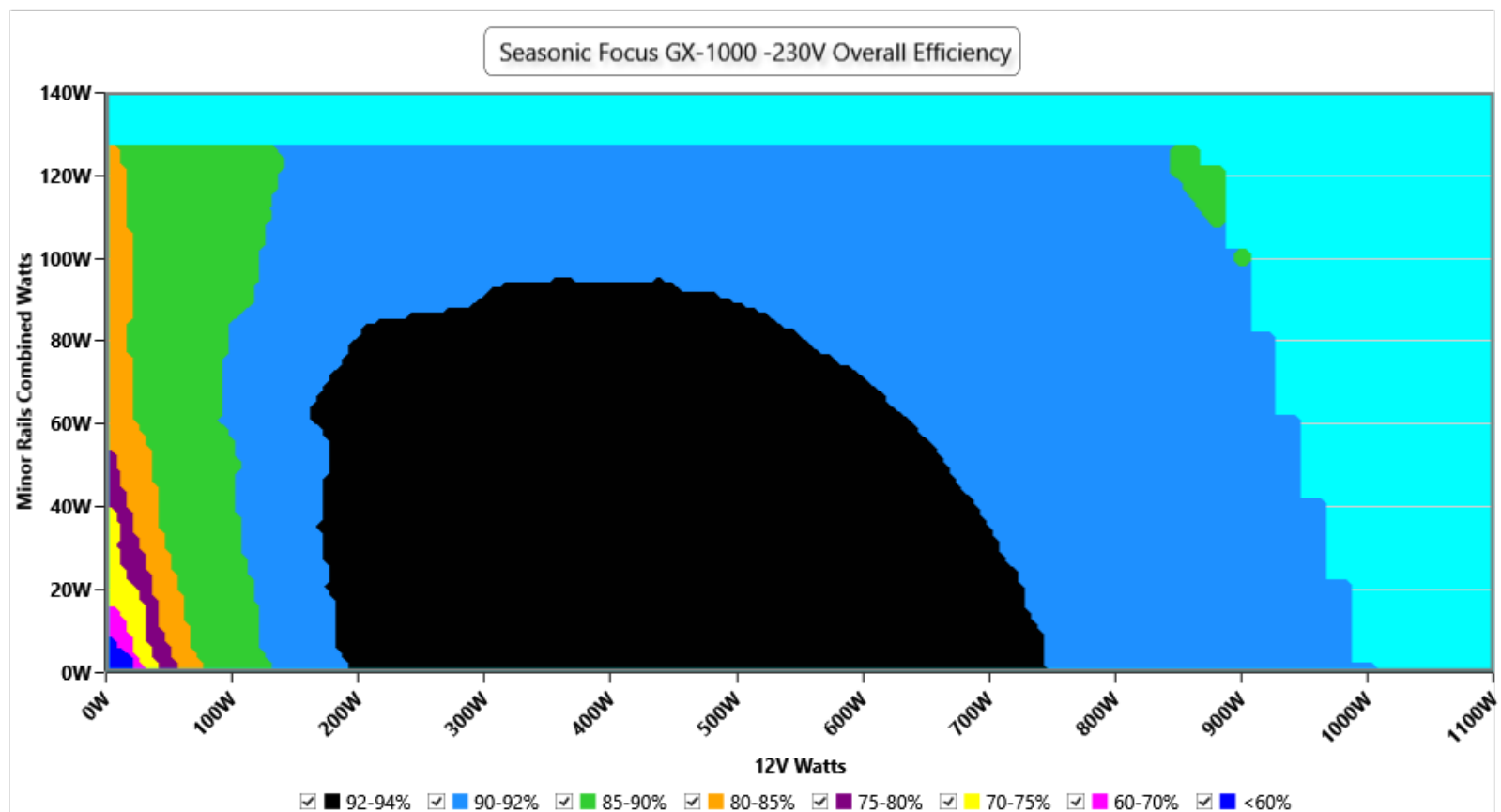
Detailed Results						
	Average	Min	Limit Min	Max	Limit Max	Result
Mains Voltage RMS:	231.03 V	230.92 V	227.70 V	231.09 V	232.30 V	PASS
Mains Frequency:	50.00 Hz	49.99 Hz	49.50 Hz	50.01 Hz	50.50 Hz	PASS
Mains Voltage CF:	1.417	1.416	1.340	1.419	1.490	PASS
Mains Voltage THD:	0.17 %	0.15 %	N/A	0.28 %	2.00 %	PASS
Real Power:	0.168 W	0.123 W	N/A	0.233 W	N/A	N/A
Apparent Power:	36.108 W	34.937 W	N/A	37.364 W	N/A	N/A
Power Factor:	0.005	N/A	N/A	N/A	N/A	N/A



115V



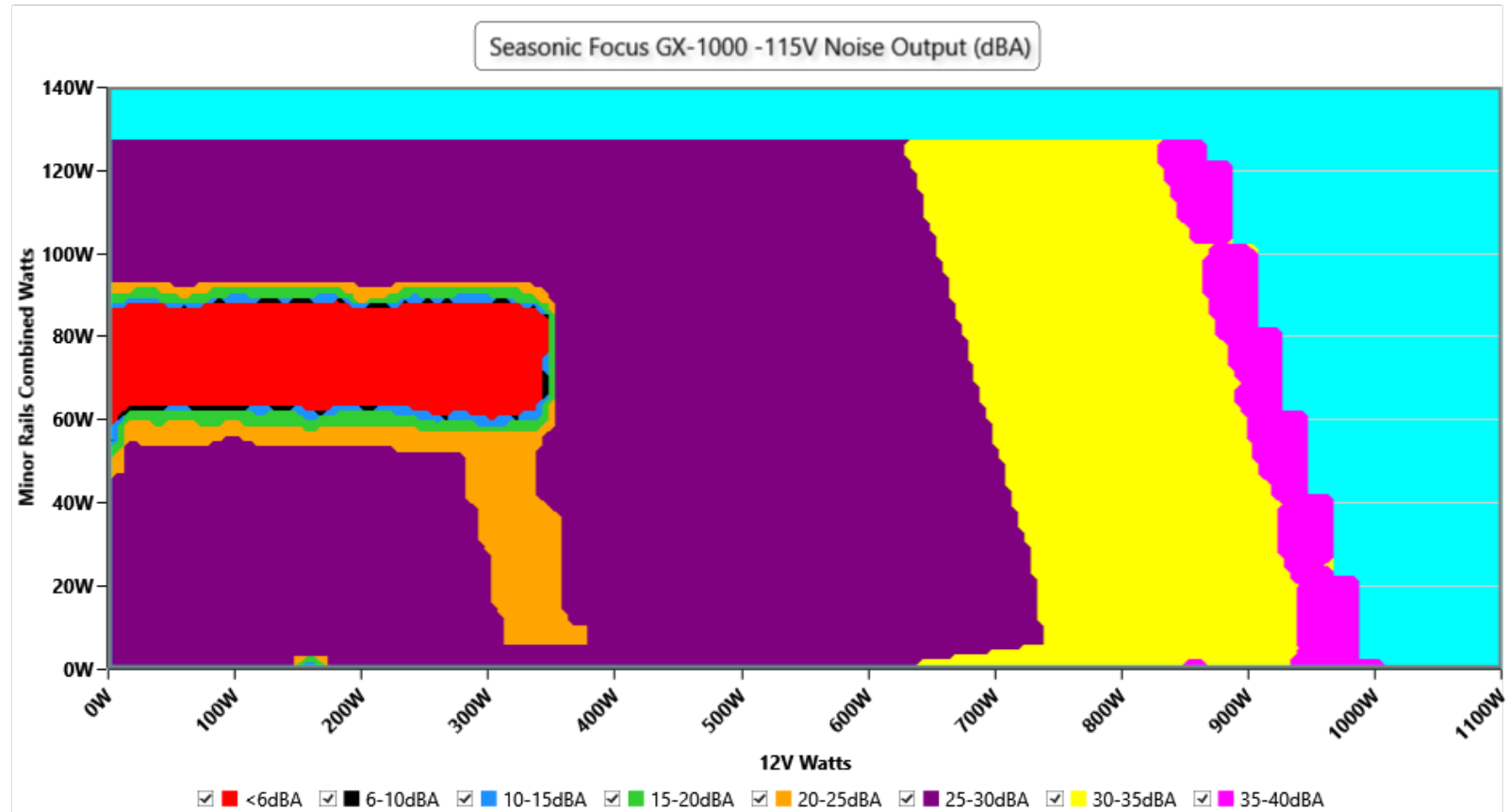
This graph depicts the PSU's efficiency throughout its entire operational range. For the generation of the efficiency and noise graphs we set our loaders to auto mode through our custom-made software before trying thousands of possible load combinations



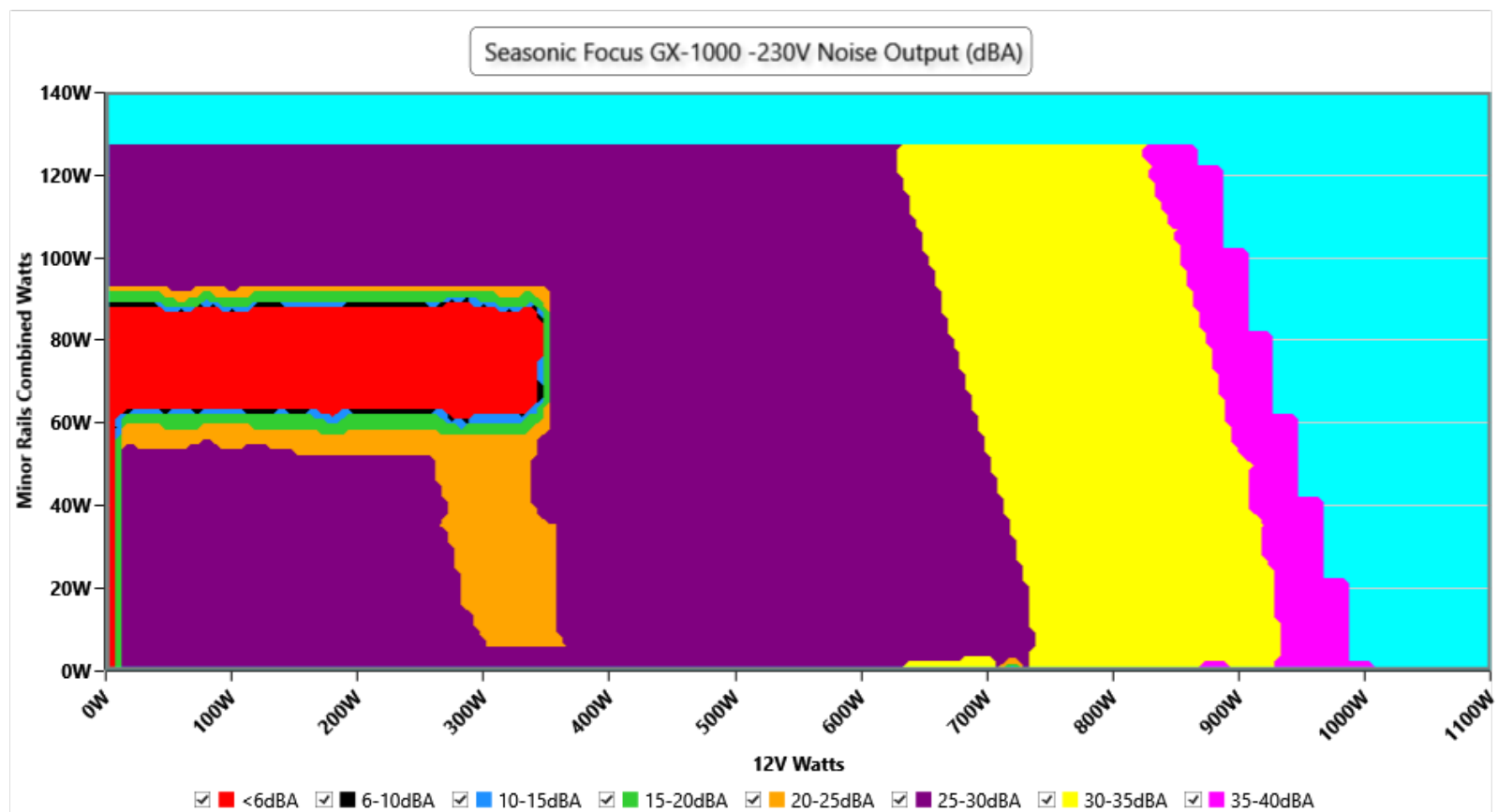
This graph depicts the PSU's efficiency throughout its entire operational range. For the generation of the efficiency and noise graphs we set our loaders to auto mode through our custom-made software before trying thousands of possible load combinations



115V

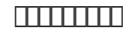


The PSU's noise in its entire operational range and under 30-32 °C ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails



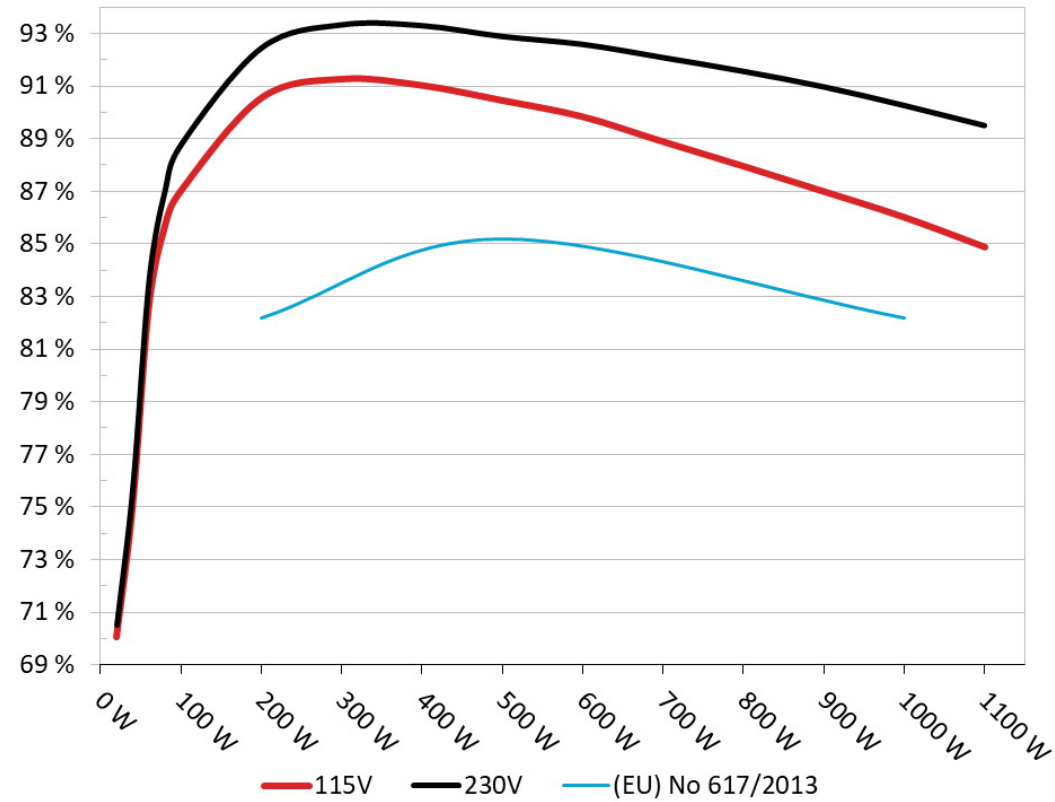
The PSU's noise in its entire operational range and under 30-32 °C ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails

Indicative Performance



Efficiency: Seasonic Focus GX-1000

Ambient: 36°C - 47°C (96.8°F - 116.6°F)

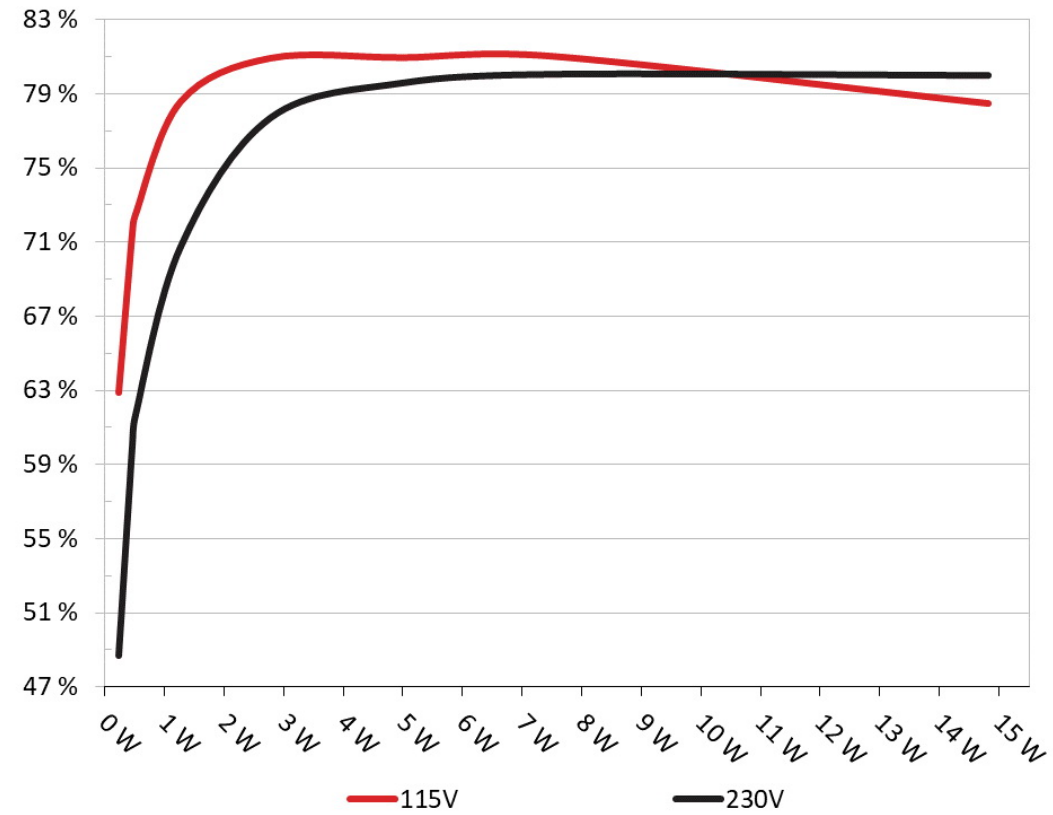


The PSU's efficiency under high ambient temperatures with 115V and 230V input. For this graph the results of the 10-110% load regulation table are used

5Vsb

5VSB Efficiency: Seasonic Focus GX-1000

Ambient: 34°C - 36°C (93.2°F - 96.8°F)



□

This graph depicts the efficiency levels of the 5VSB rail with 115V and 230V input

5Vsb (ErP Lot3/6 & CEC)

115V

#	5VSB	DC/AC (%)		PF/AC (%)
1	0.045A	0.228W	62.858%	0.036
	5.069V	0.363W		114.86V
2	0.09A	0.456W	71.494%	0.062
	5.067V	0.638W		114.88V
3	0.55A	2.776W	80.912%	0.263
	5.046V	3.431W		114.87V
4	1A	5.027W	80.943%	0.357
	5.026V	6.21W		114.87V
5	1.5A	7.507W	81.014%	0.415
	5.004V	9.266W		114.86V
6	3A	14.81W	78.466%	0.491
	4.937V	18.874W		114.86V

230V

#	5VSB	DC/AC (%)		PF/AC (%)
1	0.045A	0.228W	48.707%	0.014
	5.069V	0.469W		229.94V
2	0.09A	0.456W	60.059%	0.022
	5.067V	0.76W		229.94V
3	0.55A	2.775W	77.701%	0.1
	5.047V	3.572W		229.94V
4	1A	5.027W	79.59%	0.166
	5.027V	6.316W		229.94V
5	1.5A	7.507W	80.044%	0.219
	5.005V	9.379W		229.94V
6	3A	14.814W	79.981%	0.33
	4.938V	18.523W		229.94V

Protection Features

OCP (Cold @ 25.3°C)	12V: 112.00A (134.94%), 12.033V 5V: 33.2A (132.80%), 5.02V 3.3V: 35.4A (141.60%), 3.315V 5VSB: 6.2A (206.67%), 4.79V
OCP (Hot @ 44.2°C)	12V: 106.20A (127.95%), 12.046V 5V: 31.7A (126.80%), 5.022V 3.3V: 34.2A (136.80%), 3.316V 5VSB: 6.3A (210.00%), 4.768V
OPP (Cold @ 26.3°C)	1347.09W (134.71%)
OPP (Hot @ 41.7°C)	1197.04W (119.70%)
OTP	✓ (140°C @ Heat Sink)
SCP	12V to Earth: ✓ 5V to Earth: ✓ 3.3V to Earth: ✓ 5VSB to Earth: ✓ -12V to Earth: ✓
PWR_OK	Proper Operation
NLO	✓
Fan Failure Protection	✗
SIP	Surge: MOV Inrush: NTC & Bypass Relay

Supplementary Tests (For Reference)

10-110%□□□□

115V

□□	12V	5V	3.3V	5VSB	DC/AC (□)	□□	□□□□ (RPM)	□□□□□□ (dB[A])	□□ (□□ /□□)	PF/AC □□
10%	6.495A	1.984A	1.98A	0.997A	99.985	86.819%	0	<6.0	44.44°C	0.939
	12.068V	5.041V	3.334V	5.017V	115.168				40.07°C	114.84V

20%	14.047A	2.977A	2.973A	1.2A	199.941	90.355%	0	<6.0	45.79°C	0.962
	12.034V	5.038V	3.33V	5V	221.282				40.84°C	114.81V
30%	21.944A	3.475A	3.472A	1.405A	300.002	91.077%	0	<6.0	46.96°C	0.974
	12.028V	5.037V	3.327V	4.983V	329.397				41.33°C	114.78V
40%	29.791A	3.973A	3.971A	1.611A	399.591	90.839%	0	<6.0	50.69°C	0.98
	12.030V	5.035V	3.324V	4.965V	439.883				41.95°C	114.75V
50%	37.306A	4.97A	4.971A	1.819A	499.278	90.268%	920	26.3	42.17°C	0.983
	12.029V	5.031V	3.319V	4.948V	553.108				51.05°C	114.71V
60%	44.891A	5.967A	5.973A	2A	599.65	89.646%	908	25.8	42.94°C	0.986
	12.029V	5.028V	3.315V	4.932V	668.906				52.66°C	114.67V
70%	52.400A	6.964A	6.975A	2.239A	699.512	88.697%	949	27.4	43.16°C	0.989
	12.030V	5.026V	3.312V	4.912V	788.647				56.02°C	114.63V
80%	59.974A	7.961A	7.979A	2.348A	799.517	87.764%	1065	31.2	43.8°C	0.991
	12.032V	5.024V	3.309V	4.898V	910.983				59.79°C	114.59V
90%	67.882A	8.462A	8.471A	2.457A	899.316	86.803%	1164	33.7	44.45°C	0.993
	12.033V	5.022V	3.305V	4.884V	1036.05				63.49°C	114.55V
100%	75.587A	8.963A	8.994A	3.097A	999.328	85.822%	1444	39.7	45.23°C	0.994
	12.034V	5.02V	3.302V	4.844V	1164.426				66.84°C	114.5V
110%	83.239A	9.964A	10.096A	3.102A	1099.926	84.682%	2011	49.8	46.09°C	0.995
	12.033V	5.018V	3.298V	4.835V	1298.904				65.38°C	114.46V
CL1	0.116A	14.969A	14.916A	0A	126.294	82.768%	940	26.9	40.93°C	0.949
	12.073V	5.03V	3.325V	5.049V	152.587				48.7°C	114.83V
CL2	0.115A	24.837A	0A	0A	126.255	80.751%	938	26.8	40.41°C	0.95
	12.071V	5.028V	3.339V	5.055V	156.352				54.5°C	114.83V
CL3	0.114A	0A	24.84A	0A	83.881	74.863%	944	27	40.42°C	0.938
	12.068V	5.044V	3.321V	5.051V	112.045				51.25°C	114.85V
CL4	83.117A	0A	0A	0A	999.896	86.437%	1228	35.2	45.57°C	0.993
	12.030V	5.031V	3.311V	5.002V	1156.808				60.57°C	114.51V

The results above are not used in the certification process

230V

項目	12V	5V	3.3V	5VSB	DC/AC (項目)	項目	項目 (RPM)	項目項目 (dB[A])	項目 (項目 /項目)	PF/AC 項目
10%	6.496A	1.984A	1.98A	0.997A	99.999	88.153%	0	<6.0	47.9°C	0.834
	12.069V	5.041V	3.334V	5.016V	113.439				40.1°C	229.92V
20%	14.047A	2.977A	2.973A	1.2A	199.94	92.229%	0	<6.0	48.9°C	0.914
	12.033V	5.039V	3.33V	5V	216.787				40.85°C	229.91V
30%	21.942A	3.474A	3.471A	1.405A	299.983	93.108%	0	<6.0	50.76°C	0.941
	12.028V	5.037V	3.327V	4.983V	322.187				41.14°C	229.89V
40%	29.784A	3.972A	3.971A	1.611A	399.503	93.077%	0	<6.0	51.58°C	0.957
	12.030V	5.036V	3.324V	4.966V	429.217				41.95°C	229.88V
50%	37.305A	4.968A	4.971A	1.819A	499.22	92.665%	921	26.3	42.33°C	0.965
	12.028V	5.032V	3.32V	4.949V	538.739				53.65°C	229.86V
60%	44.892A	5.966A	5.972A	2A	599.611	92.366%	908	25.8	42.97°C	0.971
	12.028V	5.029V	3.316V	4.933V	649.168				54.55°C	229.85V
70%	52.406A	6.963A	6.975A	2.239A	699.482	91.866%	955	27.7	43.17°C	0.975
	12.028V	5.027V	3.312V	4.913V	761.419				56.51°C	229.83V
80%	59.982A	7.959A	7.978A	2.347A	799.484	91.341%	1064	31	43.85°C	0.978
	12.030V	5.025V	3.309V	4.899V	875.274				58.49°C	229.81V
90%	67.889A	8.46A	8.47A	2.456A	899.277	90.755%	1167	33.7	44.39°C	0.981
	12.032V	5.023V	3.306V	4.885V	990.885				60.55°C	229.8V
100%	75.594A	8.962A	8.994A	3.096A	999.292	90.049%	1471	40.3	45.11°C	0.983
	12.033V	5.021V	3.302V	4.845V	1109.72				63.3°C	229.78V
110%	83.248A	9.963A	10.095A	3.102A	1099.891	89.282%	2011	49.8	46.75°C	0.984
	12.031V	5.018V	3.298V	4.836V	1231.929				63.48°C	229.76V
CL1	0.116A	14.968A	14.917A	0A	126.293	84.3%	943	27	40.57°C	0.877
	12.073V	5.031V	3.325V	5.049V	149.815				53.37°C	229.93V
CL2	0.114A	24.834A	0A	0A	126.243	82.29%	937	26.8	40.08°C	0.88
	12.071V	5.028V	3.339V	5.055V	153.411				50.8°C	229.93V
CL3	0.114A	0A	24.839A	0A	83.877	76.04%	944	27	40.15°C	0.83
	12.068V	5.044V	3.321V	5.051V	110.305				48.53°C	229.93V

CL4	83.130A	0A	0A	0.001A	999.867	90.678%	1239	35.4	45.35°C	0.982
	12.027V	5.031V	3.311V	5.003V	1102.665				58.45°C	229.77V

The results above are not used in the certification process

20-80

115V

	12V	5V	3.3V	5VSB	DC/AC ()		(RPM)	(dB[A])	(/)	PF/AC
20W	1.248A	0.496A	0.494A	0.198A	19.996	69.839%	0	<6.0	40.55°C	0.811
	11.893V	5.044V	3.337V	5.06V	28.632				36.04°C	114.86V
40W	2.708A	0.694A	0.692A	0.297A	39.995	74.844%	0	<6.0	43.43°C	0.896
	12.074V	5.044V	3.337V	5.054V	53.434				37.84°C	114.86V
60W	4.184A	0.892A	0.89A	0.396A	59.995	82.385%	0	<6.0	46.22°C	0.915
	12.074V	5.043V	3.336V	5.048V	72.824				38.45°C	114.85V
80W	5.660A	1.091A	1.088A	0.496A	79.935	85.451%	0	<6.0	45.74°C	0.929
	12.069V	5.043V	3.336V	5.042V	93.547				39.24°C	114.85V

The results above are not used in the certification process

230V

	12V	5V	3.3V	5VSB	DC/AC ()		(RPM)	(dB[A])	(/)	PF/AC
20W	1.248A	0.496A	0.494A	0.198A	19.992	70.303%	0	<6.0	42.87°C	0.464
	11.894V	5.044V	3.337V	5.06V	28.438				36.35°C	229.95V
40W	2.708A	0.694A	0.692A	0.297A	39.993	75.591%	0	<6.0	42.6°C	0.651
	12.072V	5.044V	3.337V	5.054V	52.907				37.13°C	229.95V
60W	4.186A	0.892A	0.89A	0.396A	59.997	83.384%	0	<6.0	44.79°C	0.738
	12.072V	5.044V	3.336V	5.048V	71.954				38.45°C	229.94V
80W	5.660A	1.091A	1.088A	0.496A	79.945	86.825%	0	<6.0	45.54°C	0.795
	12.070V	5.043V	3.335V	5.041V	92.074				39.12°C	229.93V

The results above are not used in the certification process



115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	29.7 mV	12.9 mV	12.2 mV	22.4 mV	Pass
20% Load	18.1 mV	11.1 mV	11.3 mV	16.5 mV	Pass
30% Load	15.3 mV	13.7 mV	13.5 mV	17.5 mV	Pass
40% Load	16.0 mV	12.2 mV	12.1 mV	19.0 mV	Pass
50% Load	16.6 mV	12.7 mV	12.9 mV	19.3 mV	Pass
60% Load	17.4 mV	13.5 mV	13.3 mV	21.0 mV	Pass
70% Load	18.8 mV	15.7 mV	13.3 mV	22.0 mV	Pass
80% Load	19.5 mV	15.5 mV	16.8 mV	23.1 mV	Pass
90% Load	19.8 mV	15.3 mV	14.7 mV	23.5 mV	Pass
100% Load	27.9 mV	16.6 mV	16.9 mV	25.4 mV	Pass
110% Load	28.6 mV	17.3 mV	17.7 mV	27.1 mV	Pass
Crossload 1	16.5 mV	14.6 mV	17.4 mV	21.3 mV	Pass
Crossload 2	21.7 mV	25.8 mV	17.1 mV	19.5 mV	Pass
Crossload 3	29.8 mV	14.4 mV	17.8 mV	22.2 mV	Pass
Crossload 4	27.9 mV	14.8 mV	13.3 mV	24.6 mV	Pass

The results above are not used in the certification process

230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	30.2 mV	13.4 mV	14.0 mV	22.7 mV	Pass
20% Load	19.5 mV	12.9 mV	12.8 mV	18.1 mV	Pass
30% Load	17.2 mV	15.5 mV	15.9 mV	19.9 mV	Pass
40% Load	18.1 mV	13.8 mV	13.7 mV	19.5 mV	Pass
50% Load	16.9 mV	13.9 mV	13.3 mV	20.7 mV	Pass
60% Load	17.3 mV	15.4 mV	13.7 mV	22.0 mV	Pass

