SILVERSTONE

SilverStone SFX 650W

DE17301005SX650G00

Lab ID 178

Certification ID 25178

Test Result Report ID:

Certificate Issue Date: Sep 21, 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	SilverStone
Model	SFX 650W
OEM/ODM	High Power
Serial Number	DE17301005SX650G00
Product Specifications	
Manufacturer-Provided Information	
□□□□ (Vrms)	100-240
□□□□ (Arms)	10
□□□□ (Hz)	50-60

□□□□ (W)	650
Operating Temperature (Continuous Full Load) (°C)	
□□	SFX
□□□□	Fully Modular
Warranty	-
Cybenetics Measurements	
Dimensions (W x H x D)	
Weight	
□□	92mm Fluid Dynamic Bearing Fan (S0921512HB)
□□□□□	✗
Cybenetics Testing Information	
Lab ID	178
Date of receipt	Sep 14, 2018
Testing Date	Sep 19, 2018
Report Issued Date	Sep 21, 2018
Engineer Name	-
Authorized By the Laboratory Technical Manager	Aristeidis Bitziopoulos
Signature	

□□□□□ (Non-accredited measurements)

□□□□□				
□□	□□□□	□□□□□□	Gauge	In Cable Capacitors
ATX □□ 20+4 pin (300mm)	1	1	16-22AWG	□
4+4 pin EPS 12V □□ (410mm)	1	1	18AWG	□
6+2pin PCIe□□ (560mm+150mm)	2	4	18AWG	□
SATA□□ (310mm+200mm+100mm)	2	6	18AWG	□
□ 4pin Molex□□ (300mm+200mm+200mm)	1	3	18AWG	□
□ 4pin □□ (+105mm)	1	1	22AWG	□
AC Power Cord (1400mm) - C13 coupler	1	1	18AWG	-

□□□□

□		3.3V	5V	12V	5VSB	-12V
□□□□	□□	22	22	54.2	2.5	0.3
	□	110		650	12.5	3.6
□□□□□ (W)		650				

Parts Description

General Data	
Manufacturer (OEM)	High Power
Primary Side	
Transient Filter	4x Y caps, 2x X caps, 3x CM chokes, 1x MOV, 1x CMD02X
Inrush Protection	NTC Thermistor & Diode
Bridge Rectifier(s)	2x GBU1506L (600V, 15A @ 100°C)
APFC MOSFETS	2x Toshiba TK16A60W (600V, 15.8A @ 150°C, 0.19Ohm)
APFC Boost Diode	1x Power Integrations D0665C5 (600V, 8A @ 150°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)
High-side/Low-Side Driver	Silicon Labs Si8233BD
APFC Controller	Infineon ICE3PCS01G
Resonant Controller	Champion CM6901X
Topology	Primary side: Half-Bridge & LLC Resonant Controller Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	
+12V MOSFETS	6x Toshiba TPHR85 04PL (SOP Advance Series, 40V, 150A @ 25C, 0.85mOhm)
5V & 3.3V	DC-DC Converters: 6x Infineon BSC0906NS (30V, 40A @ 100°C, 4.5mOhm) 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 PS224 (OVP, UVP, OCP,SCP, PG)
Micro Controller	STC 15W408AS
Fan Model	Globe Fan S0921512HB (92mm, 12V, 0.45A, Fluid Dynamic Bearing)

5VSB Circuit	
Rectifier	1x P10V45 SBR (45V, 10A)
Standby PWM Controller	Sanken STR-A6069H
-12V Circuit	
Rectifier	KEC KIA7912PI (-12V, 1A)

Test Results

Temperature & Compliance Info

□□□□ (°C /°F)	28-32 / 82.4-89.6
□□ ErP Lot3/6□□	✓
□□ (EU) No 617/2013□□	✓

Performance Summary

115V

Accredited	
□□□□ (>1450 load combinations)	88.304%
Average Noise Output (>1450 Load Combinations)	37.07dBA
PF□□□ (>1450 Load Combinations)	0.990
Efficiency With 10W (≤500W) or 2% (>500W) Load	-
□□□□□□	0.0834W
Non-Accredited	
12V Ripple (Full Load)	44.35mV
5V Ripple (Full Load)	32.79mV
3.3V Ripple (Full Load)	32.97mV
5VSB Ripple (Full Load)	29.62mV
12V Load Regulation	1.26%
5V Load Regulation	1.18%
3.3V Load Regulation	2.06%
5VSB Load Regulation	2.64%

Inrush Current	33.436A

230V

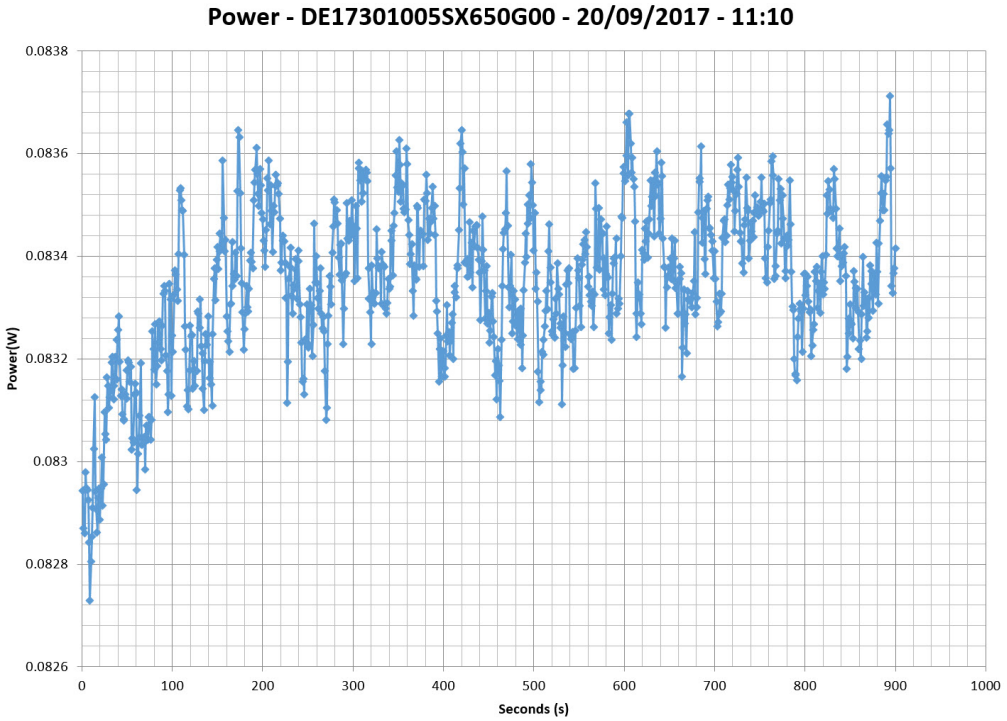
Accredited		
□□□□ (>1450 load combinations)		90.241%
Average Noise Output (>1450 Load Combinations)		37.31dBA
PF□□□ (>1450 Load Combinations)		0.957
Efficiency With 10W (≤500W) or 2% (>500W) Load		-
□□□□□□		0.1400W
Non-Accredited		
12V Ripple (Full Load)		30.08mV
5V Ripple (Full Load)		15.65mV
3.3V Ripple (Full Load)		26.77mV
5VSB Ripple (Full Load)		17.51mV
12V Load Regulation		1.38%
5V Load Regulation		1.36%
3.3V Load Regulation		2.51%
5VSB Load Regulation		2.84%
Inrush Current		48.553A
□□□□ & PG□□		18.80ms
AC Loss to PWR_OK Hold Up Time		16.50ms
PWR_OK Inactive to DC Loss Delay		2.30ms
OPP (0.00°C / 0.00°C)	-	-

□□□□ & PG□□

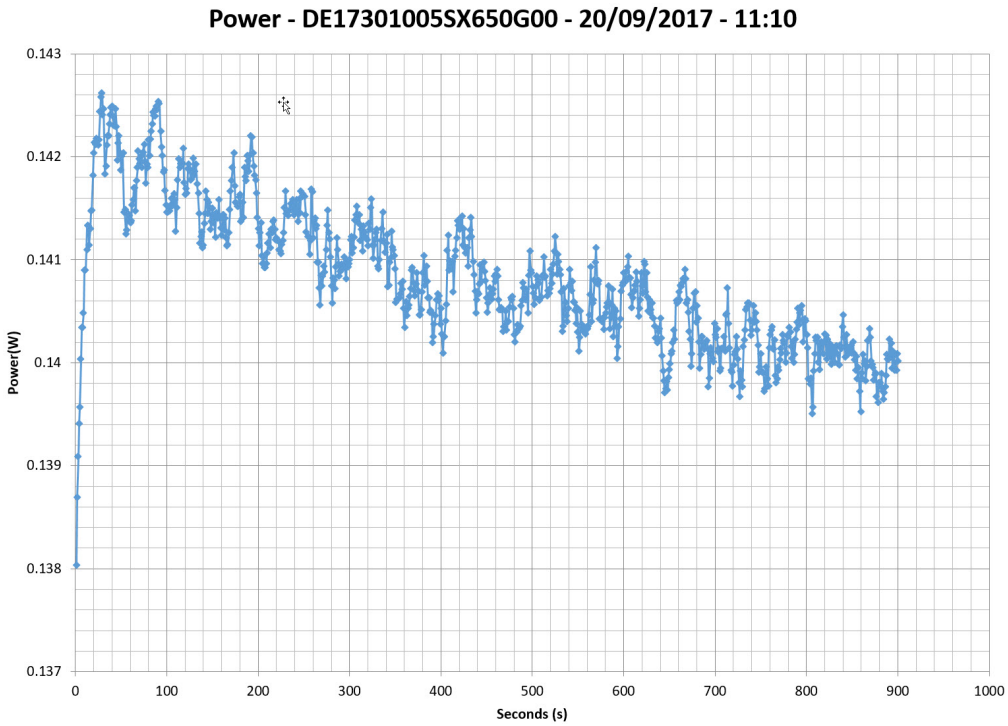
Hold-Up Time (ms)	18.8
AC Loss to PWR_OK Hold Up Time (ms)	16.5
PWR_OK Inactive to DC Loss Delay (ms)	2.3

Graphs

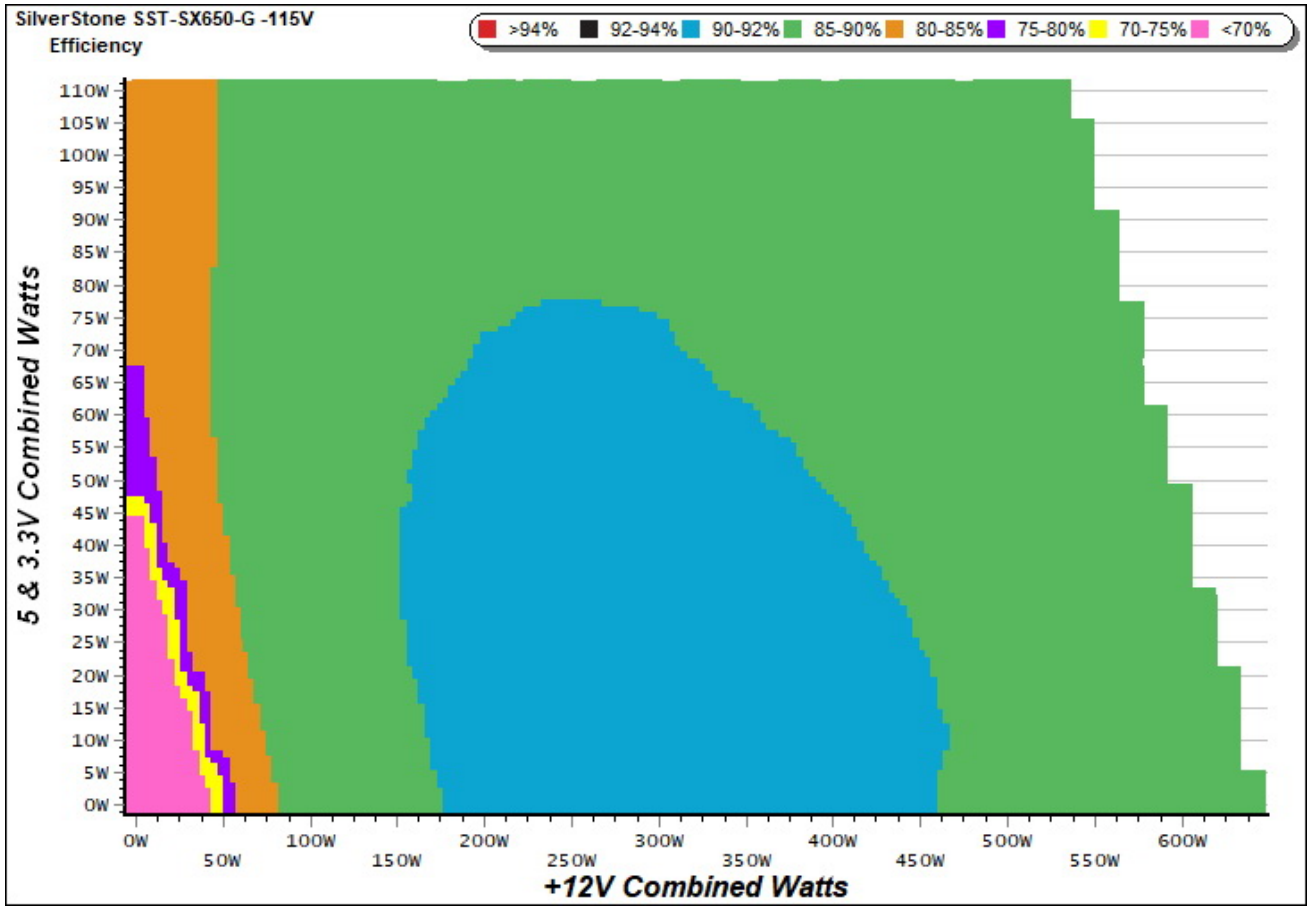
115V



230V



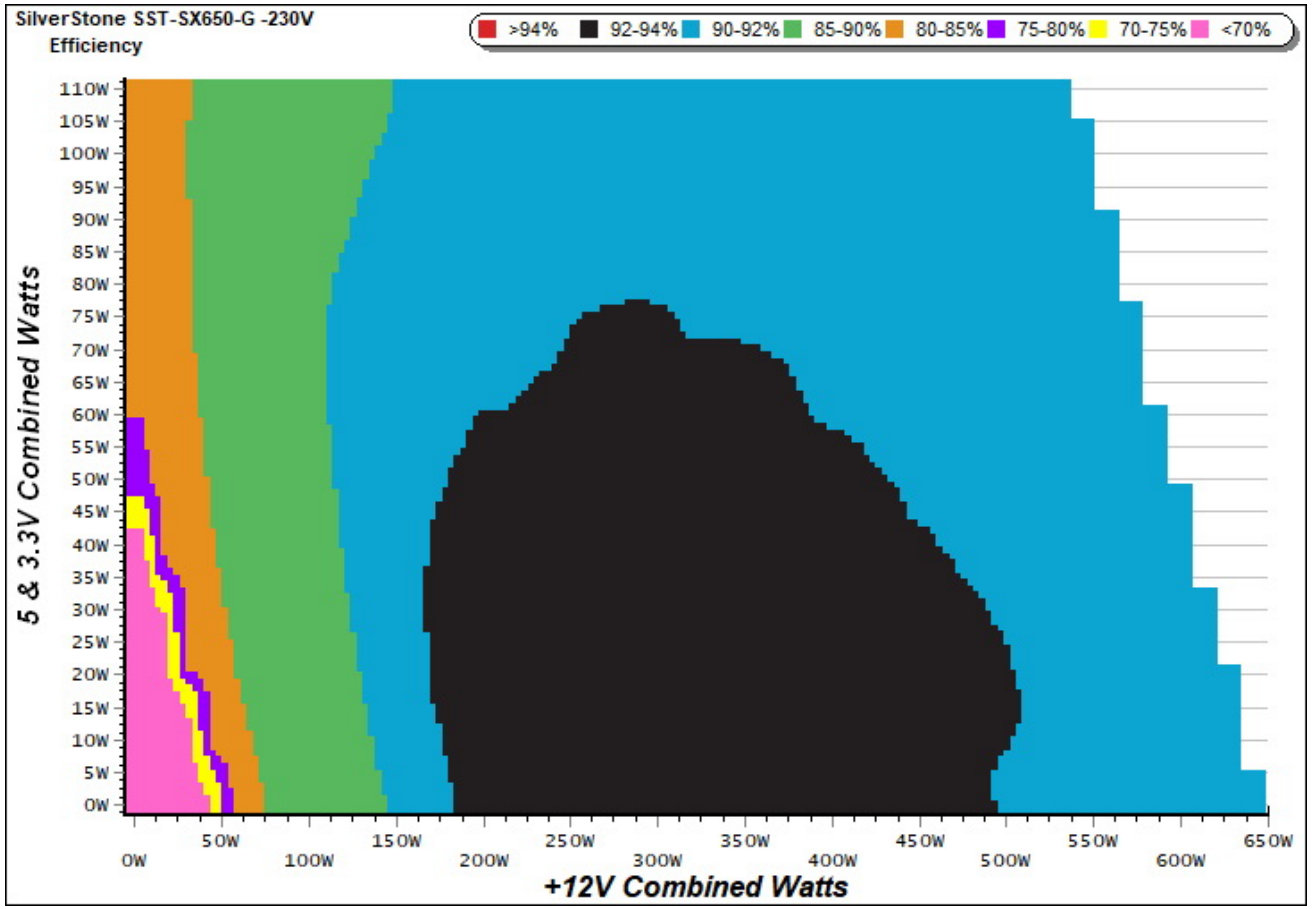
115V



□□

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.

230V



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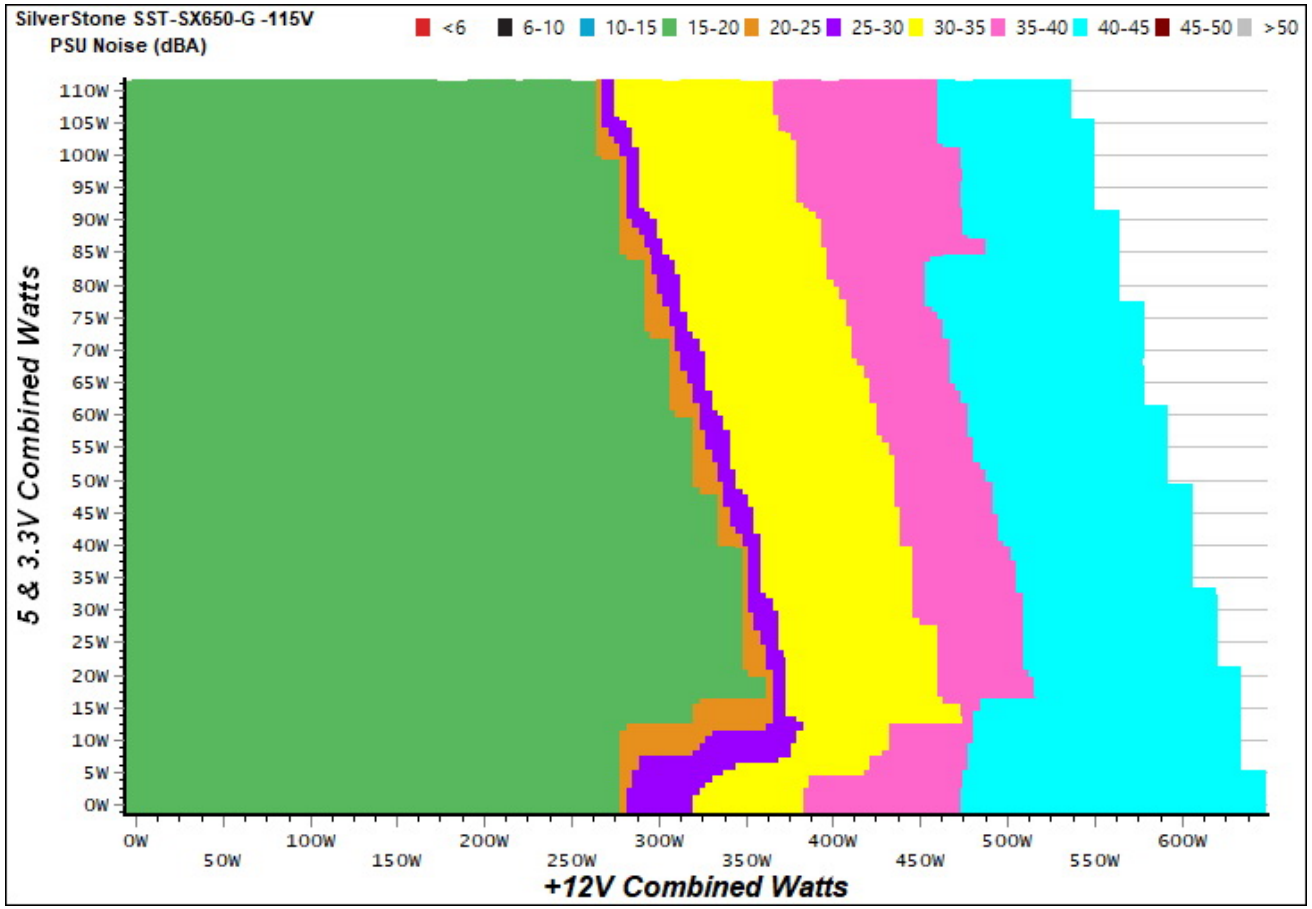
□□□□□

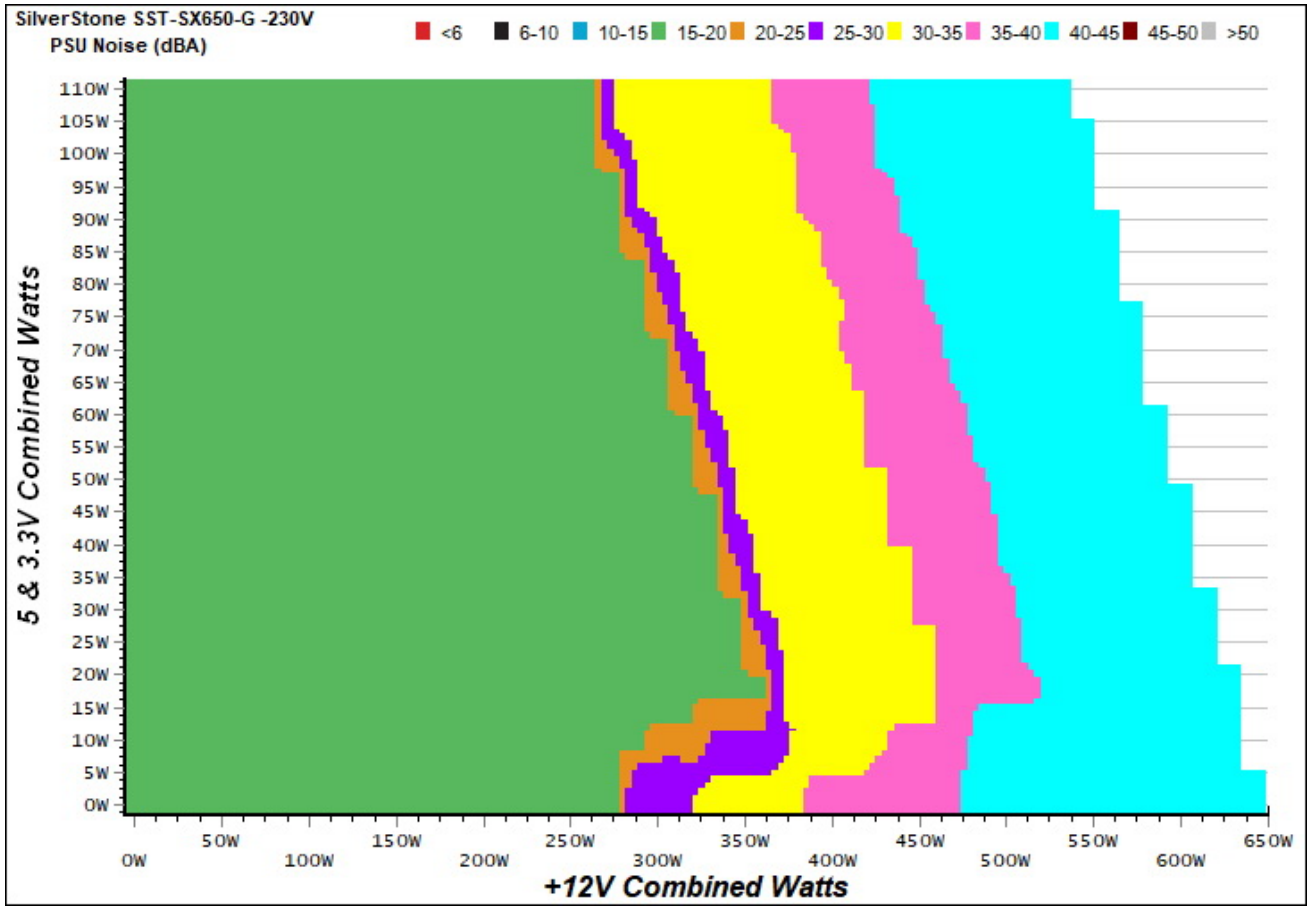
115V



□□

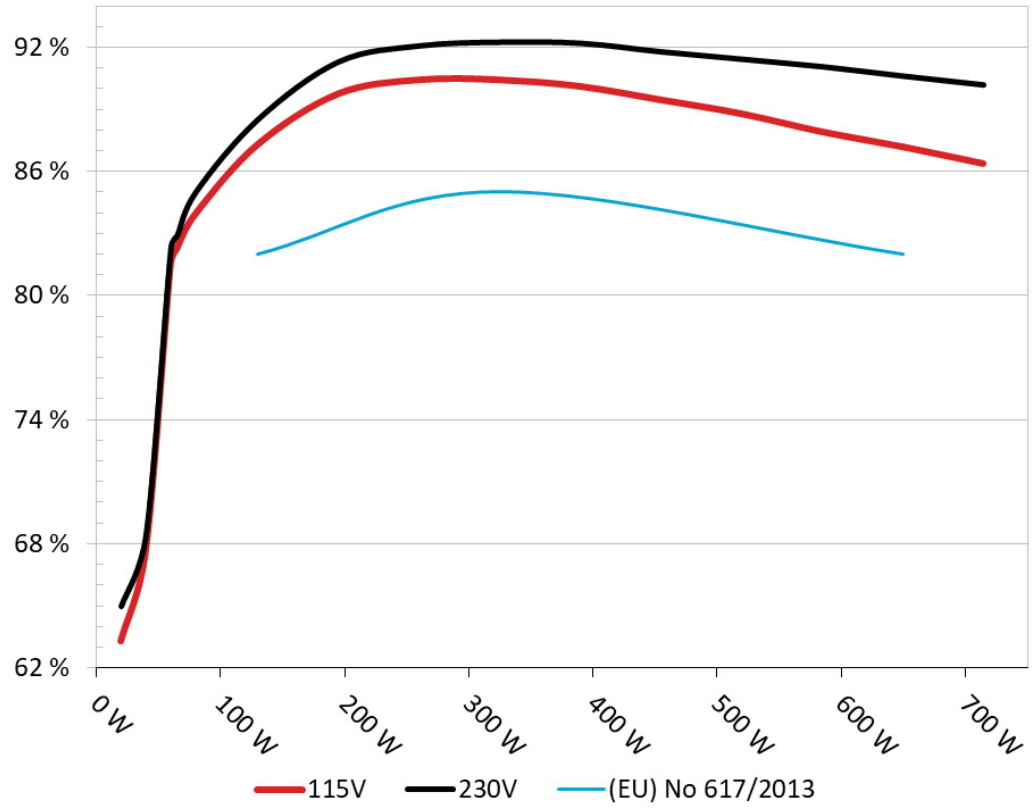
The PSU`s noise in its entire operational range and under 30-32 °C ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails.

230V



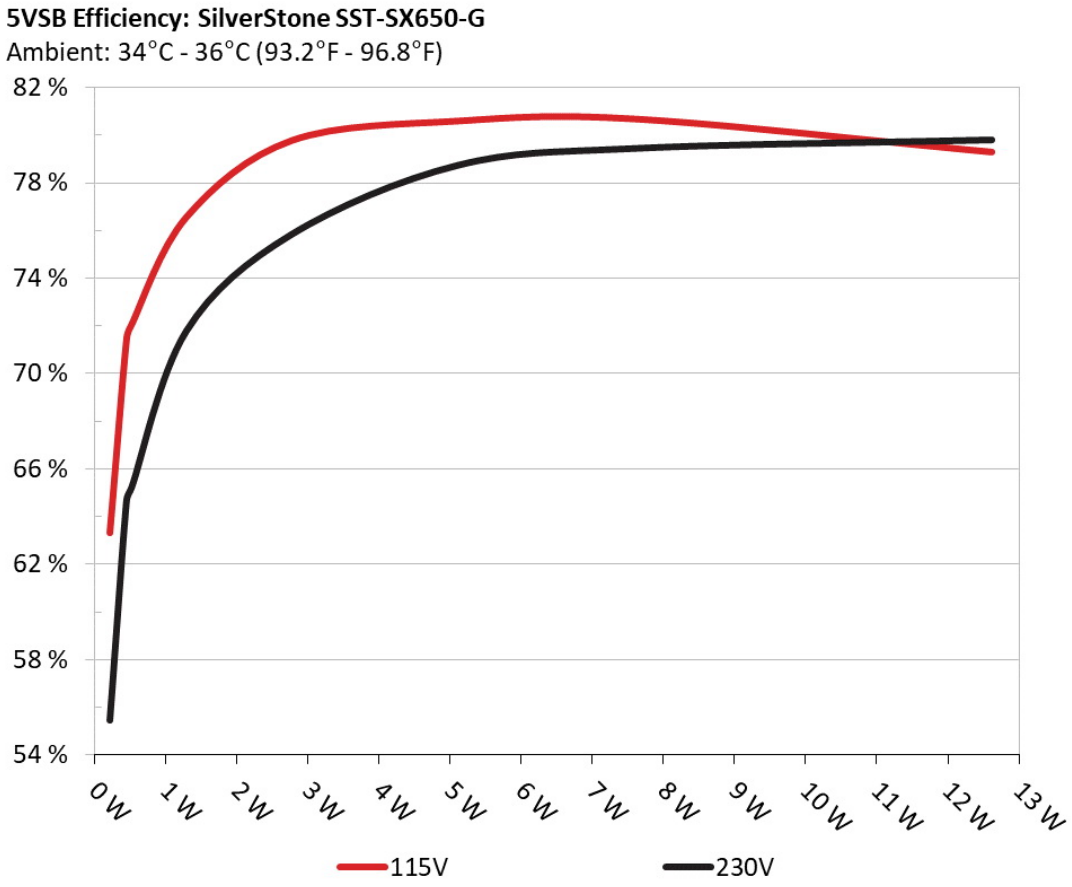
The PSU`s noise in its entire operational range and under 30-32 °C ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails.

Indicative Performance



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□□□□



□□

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	0.042A	0.214	63.314%	0.056
	5.131V	0.338		115.18V
2	0.087A	0.447	71.406%	0.100
	5.130V	0.626		115.18V
3	0.542A	2.773	79.776%	0.314
	5.114V	3.476		115.16V
4	1.002A	5.112	80.593%	0.376
	5.101V	6.343		115.16V
5	1.502A	7.637	80.670%	0.408
	5.086V	9.467		115.17V
6	2.501A	12.611	79.290%	0.442
	5.042V	15.905		115.17V

230V

□□ #	5VSB	DC/AC (□)	□□	PF/AC □□
1	0.042A	0.213	55.469%	0.019
	5.131V	0.384		230.42V
2	0.087A	0.446	64.638%	0.035
	5.129V	0.690		230.44V
3	0.542A	2.767	75.850%	0.158
	5.107V	3.648		230.42V
4	1.002A	5.103	78.750%	0.232
	5.093V	6.480		230.43V
5	1.501A	7.624	79.466%	0.282
	5.078V	9.594		230.43V
6	2.501A	12.622	79.820%	0.335
	5.047V	15.813		230.43V

Supplementary Tests (For Reference)

10-110%□□□□

115V

□□ #	12V	5V	3.3V	5VSB	DC/AC (□)	□□	□□□□ (RPM)	□□□□□□□ (dB[A])	□□ (□□ /□□)	PF/AC □□
1	3.576A	1.976A	1.973A	0.981A	64.838	82.269%	1117	19.4	38.04°C	0.983
	12.095V	5.066V	3.341V	5.080V	78.812				46.87°C	115.17V
2	8.189A	2.955A	2.965A	1.181A	129.760	87.294%	1117	19.4	38.52°C	0.993
	12.082V	5.060V	3.334V	5.066V	148.647				47.99°C	115.16V
3	13.156A	3.464A	3.483A	1.381A	194.902	89.754%	1117	19.4	38.70°C	0.994
	12.072V	5.054V	3.328V	5.057V	217.151				50.84°C	115.16V
4	18.128A	3.964A	3.970A	1.583A	259.795	90.430%	1117	19.4	39.16°C	0.996
	12.059V	5.049V	3.321V	5.048V	287.289				54.21°C	115.16V
5	22.775A	4.961A	4.976A	1.786A	324.763	90.430%	1117	19.4	39.75°C	0.997
	12.043V	5.042V	3.313V	5.031V	359.133				57.74°C	115.15V
6	27.436A	5.951A	5.987A	1.991A	389.724	90.114%	1117	19.4	40.35°C	0.998
	12.027V	5.036V	3.306V	5.017V	432.479				59.31°C	115.15V
7	32.109A	6.964A	7.003A	2.196A	454.685	89.461%	1997	34.1	41.89°C	0.998
	12.009V	5.028V	3.296V	5.005V	508.248				61.20°C	115.15V
8	36.796A	7.966A	8.020A	2.401A	519.667	88.794%	2265	36.8	43.22°C	0.998
	11.993V	5.021V	3.290V	4.994V	585.248				62.77°C	115.15V
9	41.934A	8.476A	8.558A	2.404A	584.728	87.917%	2491	41.0	44.42°C	0.998
	11.974V	5.017V	3.283V	4.988V	665.092				65.51°C	115.14V
10	47.041A	8.987A	9.063A	2.508A	649.626	87.191%	2790	44.7	45.93°C	0.998
	11.956V	5.010V	3.276V	4.979V	745.061				68.71°C	115.14V
11	52.553A	8.994A	9.075A	2.510A	714.580	86.381%	2755	44.6	46.55°C	0.998
	11.938V	5.007V	3.271V	4.974V	827.246				72.33°C	115.14V
CL1	0.099A	13.019A	13.006A	0.005A	109.914	81.634%	1117	19.4	43.82°C	0.992
	12.082V	5.047V	3.305V	5.096V	134.642				65.68°C	115.16V

CL2	54.123A	1.003A	1.003A	1.002A	660.507	87.522%	2790	44.7	45.63°C	0.998
	11.956V	5.034V	3.305V	5.039V	754.678				68.88°C	115.15V

The results above are not used in the certification process

230V

□□ #	12V	5V	3.3V	5VSB	DC/AC (□)	□□	□□□□ (RPM)	□□□□□□□ (dB[A])	□□ (□□ /□□)	PF/AC □□
1	3.574A	1.972A	1.975A	0.986A	64.808	83.005%	1117	19.4	37.95°C	0.853
	12.092V	5.067V	3.340V	5.074V	78.077				45.54°C	230.72V
2	8.147A	2.965A	2.970A	1.186A	129.273	88.524%	1117	19.4	38.44°C	0.943
	12.076V	5.059V	3.330V	5.059V	146.031				46.52°C	230.85V
3	13.129A	3.464A	3.458A	1.387A	194.381	91.317%	1117	19.4	38.65°C	0.965
	12.064V	5.052V	3.323V	5.048V	212.864				47.44°C	230.81V
4	18.126A	3.963A	3.983A	1.589A	259.596	92.111%	1117	19.4	38.97°C	0.981
	12.048V	5.047V	3.316V	5.037V	281.831				47.99°C	230.75V
5	22.809A	4.962A	4.989A	1.793A	324.890	92.231%	1117	19.4	39.86°C	0.987
	12.030V	5.039V	3.306V	5.020V	352.255				48.99°C	230.70V
6	27.445A	5.962A	6.003A	1.999A	389.435	92.152%	1117	19.4	40.66°C	0.991
	12.011V	5.032V	3.297V	5.003V	422.601				50.04°C	230.48V
7	32.160A	6.968A	7.027A	2.204A	454.737	91.691%	1997	34.1	41.49°C	0.994
	11.991V	5.024V	3.287V	4.992V	495.944				51.21°C	230.61V
8	36.890A	7.975A	8.055A	2.411A	520.053	91.283%	2265	36.8	42.27°C	0.995
	11.972V	5.016V	3.277V	4.980V	569.715				52.54°C	230.66V
9	42.044A	8.485A	8.566A	2.414A	584.976	90.870%	2491	41.0	43.96°C	0.995
	11.951V	5.009V	3.269V	4.973V	643.747				54.71°C	230.60V
10	47.152A	8.997A	9.109A	2.520A	649.697	90.354%	2790	44.7	45.00°C	0.996
	11.929V	5.003V	3.261V	4.962V	719.054				56.82°C	230.55V
11	52.680A	9.005A	9.125A	2.523A	714.514	89.838%	2800	44.7	46.58°C	0.996
	11.908V	4.998V	3.254V	4.955V	795.337				59.68°C	230.50V
CL1	0.735A	13.000A	13.000A	0.000A	117.257	82.989%	1117	19.4	45.38°C	0.894
	12.076V	5.040V	3.297V	5.097V	141.293				56.69°C	230.93V

CL2	54.170A	1.001A	1.001A	1.000A	659.552	90.789%	2790	44.7	45.07°C	0.996
	11.929V	5.029V	3.293V	5.028V	726.468				57.03°C	230.56V

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 □□
1	1.207A	0.491A	0.475A	0.196A	19.700	63.287%	1117	19.4	0.883
	12.109V	5.072V	3.349V	5.114V	31.128				115.17V
2	2.436A	0.980A	0.983A	0.391A	39.749	67.701%	1117	19.4	0.967
	12.109V	5.070V	3.345V	5.100V	58.713				115.17V
3	3.672A	1.475A	1.494A	0.586A	59.868	81.586%	1117	19.4	0.977
	12.095V	5.068V	3.344V	5.093V	73.380				115.17V
4	4.895A	1.975A	1.974A	0.786A	79.781	83.941%	1117	19.4	0.981
	12.091V	5.065V	3.340V	5.087V	95.044				115.17V

The results above are not used in the certification process

230V

□□ #	12V	5V	3.3V	5VSB	DC/AC (□)	□□	□□□□ (RPM)	□□□□□□□ (dB[A])	PF/AC □□
1	1.192A	0.492A	0.475A	0.196A	19.527	64.995%	1117	19.4	0.526
	12.111V	5.075V	3.350V	5.111V	30.044				230.93V
2	2.449A	0.984A	0.985A	0.392A	39.938	68.653%	1117	19.4	0.787
	12.108V	5.072V	3.346V	5.098V	58.174				230.91V
3	3.639A	1.480A	1.463A	0.590A	59.404	82.315%	1117	19.4	0.835
	12.094V	5.069V	3.342V	5.088V	72.167				230.90V
4	4.901A	1.972A	1.976A	0.787A	79.821	85.073%	1117	19.4	0.892
	12.087V	5.065V	3.338V	5.081V	93.827				230.88V

The results above are not used in the certification process

□□□□

115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	14.5 mV	12.0 mV	14.2 mV	13.1 mV	Pass
20% Load	58.7 mV	22.4 mV	14.3 mV	17.1 mV	Pass
30% Load	31.4 mV	26.1 mV	19.4 mV	25.0 mV	Pass
40% Load	29.3 mV	32.5 mV	20.0 mV	22.8 mV	Pass
50% Load	29.7 mV	29.1 mV	20.7 mV	24.6 mV	Pass
60% Load	29.8 mV	28.1 mV	25.3 mV	26.1 mV	Pass
70% Load	31.7 mV	31.3 mV	27.5 mV	33.0 mV	Pass
80% Load	34.1 mV	32.6 mV	28.5 mV	30.0 mV	Pass
90% Load	38.4 mV	32.2 mV	30.7 mV	32.6 mV	Pass
100% Load	44.4 mV	32.8 mV	33.0 mV	29.6 mV	Pass
110% Load	43.8 mV	28.7 mV	31.0 mV	28.8 mV	Pass
Crossload 1	60.2 mV	25.2 mV	24.6 mV	33.7 mV	Pass
Crossload 2	41.4 mV	27.9 mV	25.6 mV	25.1 mV	Pass

The results above are not used in the certification process

230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	13.7 mV	6.5 mV	6.9 mV	7.1 mV	Pass
20% Load	54.8 mV	8.3 mV	13.2 mV	9.1 mV	Pass
30% Load	21.3 mV	7.2 mV	10.2 mV	13.3 mV	Pass
40% Load	18.2 mV	15.9 mV	27.0 mV	11.8 mV	Pass
50% Load	16.5 mV	9.3 mV	19.1 mV	10.9 mV	Pass
60% Load	17.8 mV	10.7 mV	18.8 mV	12.9 mV	Pass
70% Load	21.1 mV	12.2 mV	21.6 mV	18.1 mV	Pass
80% Load	25.3 mV	15.9 mV	25.1 mV	17.9 mV	Pass





Test	12V	5V	3.3V	5VSB	Pass/Fail
90% Load	27.5 mV	17.7 mV	27.0 mV	18.4 mV	Pass
100% Load	30.1 mV	15.7 mV	26.8 mV	17.5 mV	Pass
110% Load	32.7 mV	14.6 mV	28.0 mV	18.3 mV	Pass
Crossload 1	56.8 mV	15.0 mV	20.6 mV	17.8 mV	Pass
Crossload 2	30.1 mV	10.4 mV	18.6 mV	13.4 mV	Pass

The results above are not used in the certification process

SilverStone SFX 650W

Top side

Power specifications label

本测试报告中包含的所有数据和图表均可在以下条件下由任何人使用：使用过程需提及测试结果由 Cybenetics提供。
在任何情况下都应提供原始测试结果文档的网站链接

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