Thermaltake Toughpower Grand Gold 850W

PSTPG0850FPCGUSSLA000243

Lab ID 478

Certification ID 25478

Test Result Report ID:

Certificate Issue Date: Sep 22, 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	Thermaltake
Model	Toughpower Grand Gold 850W
OEM/ODM	Sirfa
Serial Number	PSTPG0850FPCGUSSLA000243
Product Specifications	
Manufacturer-Provided Information	
□□□□ (Vrms)	100-240
□□□□ (Arms)	10
□□□□ (Hz)	50-60

□□□□ (W)	850
Operating Temperature (Continuous Full Load) (°C)	
□□	ATX12V
□□□□	Fully Modular
Warranty	-
Cybenetics Measurements	
Dimensions (W x H x D)	
Weight	
□□	140mm Hydro Dynamic Bearing Fan (TT-1425 (A1425L12S))
□□□□□	✓ (selectable)
Cybenetics Testing Information	
Lab ID	478
Date of receipt	Sep 11, 2018
Testing Date	Sep 19, 2018
Report Issued Date	Sep 22, 2018
Engineer Name	-
Authorized By the Laboratory Technical Manager	Aristeidis Bitziopoulos
Signature	

□□□□ (Non-accredited measurements)

□□□□				
□□	□□□	□□□□□	Gauge	In Cable Capacitors
ATX □□ 20+4 pin (600mm)	1	1	18AWG	□
4+4 pin EPS 12V □□ (650mm+155mm)	1	2	16-18AWG	□
6+2pin PCIe□□ (500mm+155mm)	3	6	16-18AWG	□
SATA□□ (500mm+155mm+155mm+155mm)	3	12	18AWG	□
4-pin Molex (500mm+155mm+155mm+155mm)	1	4	18AWG	□
RGB Cable (580mm+80mm)	1	1	26AWG	□
AC Power Cord (1400mm) - C13 coupler	1	1	16AWG	-

□□□□

□		3.3V	5V	12V	5VSB	-12V
□□□□	□□	22	22	70.9	3	0.3
	□	120		850	15	3.6
□□□□□ (W)		850				

Parts Description

General Data	
Manufacturer (OEM)	Sirfa / High Power
Primary Side	
Transient Filter	4x Y caps, 2x X caps, 2x CM chokes, 1x MOV, 1x Champion CMD02X
Inrush Protection	NTC Thermistor & Relay
Bridge Rectifier(s)	2x GBU1506L (600V, 15A @ 100°C)
APFC MOSFETS	2x Infineon IPA50R140CP (550V, 15A @ 100°C, 0.14Ohm)
APFC Boost Diode	1x UnitedSiC UJD06508TS (650V, 8A @ 152°C)
Hold-up Cap(s)	1x Rubycon (400V, 680uF, 2000h @ 105 °C, MXH)
Main Switchers	2x Infineon IPA50R140CP (550V, 15A @ 100°C, 0.14Ohm)
APFC Controller	Infineon ICE3PCS01G
LLC Resonant Controller	Champion CM6901X
Primary MCU	STC 15W408AS
Topology	Primary side: Half-Bridge & LLC Resonant Controller Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	
+12V MOSFETS	6x Infineon BSC027N04LS G (40V, 88A @ 100°C, 2.7mOhm)
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), 1x Rubycon (4-10,000 @ 105°C, ZLH) Polymers: Nippon Chemi-Con, FPCAP
Supervisor IC	SITI PS224 (OVP, UVP, OCP,SCP, PG)
Serial EEPROM	ATMEL AT24C02N
Fan Model	Thermaltake TT-1425 (Hong Sheng OEM, A1425L12S, 140mm, 12V, 0.30A, 1560 RPM, Hydro Dynamic Bearing)

5VSB Circuit	
Rectifiers	1x PCF P10V45 SBR (45V, 10A) 2x Infineon BSC0906NS (30V, 40A @ 100°C, 4.5mOhm)
Standby PWM Controller	Sanken STR-A6069H
-12V Circuit	
Rectifier	KEC KIA7912PI

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)	88.962%
Average Noise Output (>1450 Load Combinations)	29.45dBA
PF□□□ (>1450 Load Combinations)	0.991
Efficiency With 10W (≤500W) or 2% (>500W) Load	58.956%
□□□□□□	0.0904W
Non-Accredited	
12V Ripple (Full Load)	21.15mV
5V Ripple (Full Load)	20.26mV
3.3V Ripple (Full Load)	19.84mV
5VSB Ripple (Full Load)	10.49mV
12V Load Regulation	1.33%
5V Load Regulation	2.35%
3.3V Load Regulation	3.88%

5VSB Load Regulation	5.11%
Inrush Current	33.520A

230V

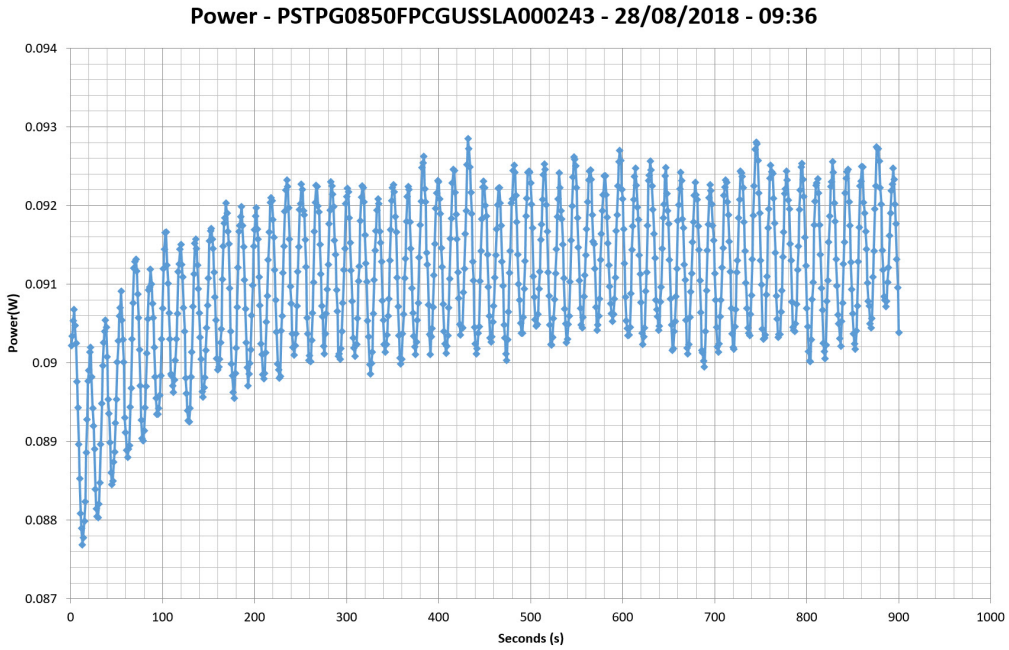
Accredited	
□□□□ (>1450 load combinations)	90.687%
Average Noise Output (>1450 Load Combinations)	29.38dBA
PF□□□ (>1450 Load Combinations)	0.956
Efficiency With 10W (≤500W) or 2% (>500W) Load	-
□□□□□□	0.1759W
Non-Accredited	
12V Ripple (Full Load)	20.00mV
5V Ripple (Full Load)	20.72mV
3.3V Ripple (Full Load)	19.47mV
5VSB Ripple (Full Load)	11.05mV
12V Load Regulation	1.20%
5V Load Regulation	2.31%
3.3V Load Regulation	3.82%
5VSB Load Regulation	5.07%
Inrush Current	66.480A
□□□□ & PG□□	16.00ms
AC Loss to PWR_OK Hold Up Time	13.90ms
PWR_OK Inactive to DC Loss Delay	2.10ms
OPP (0.00°C / 0.00°C)	- -

□□□□ & PG□□

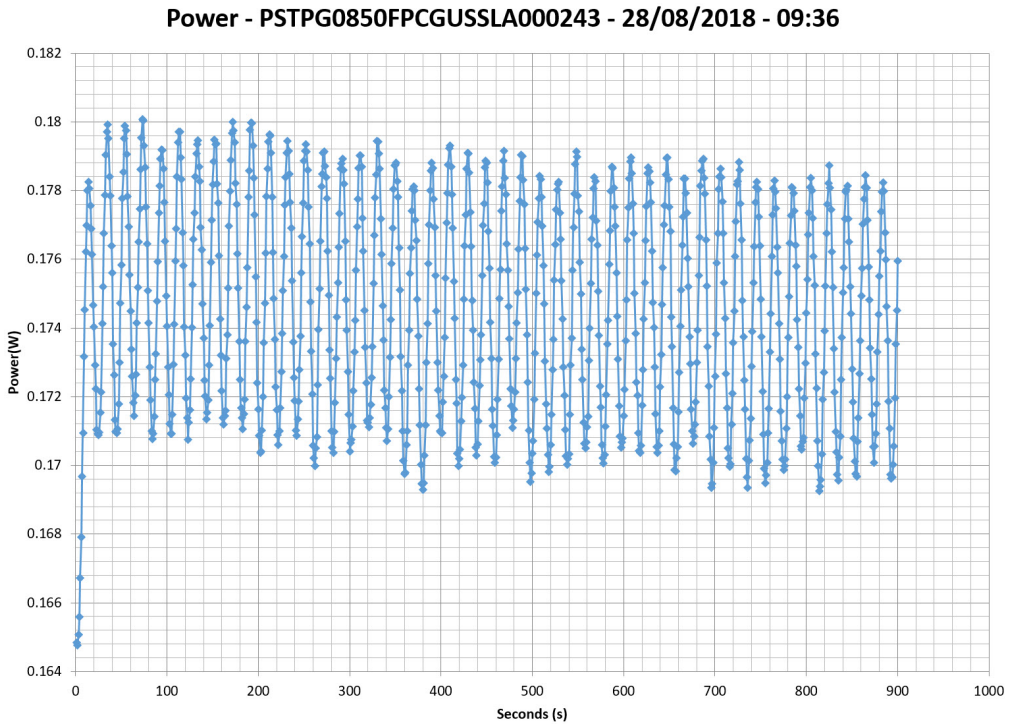
Hold-Up Time (ms)	16
AC Loss to PWR_OK Hold Up Time (ms)	13.9
PWR_OK Inactive to DC Loss Delay (ms)	2.1

Graphs

115V



230V



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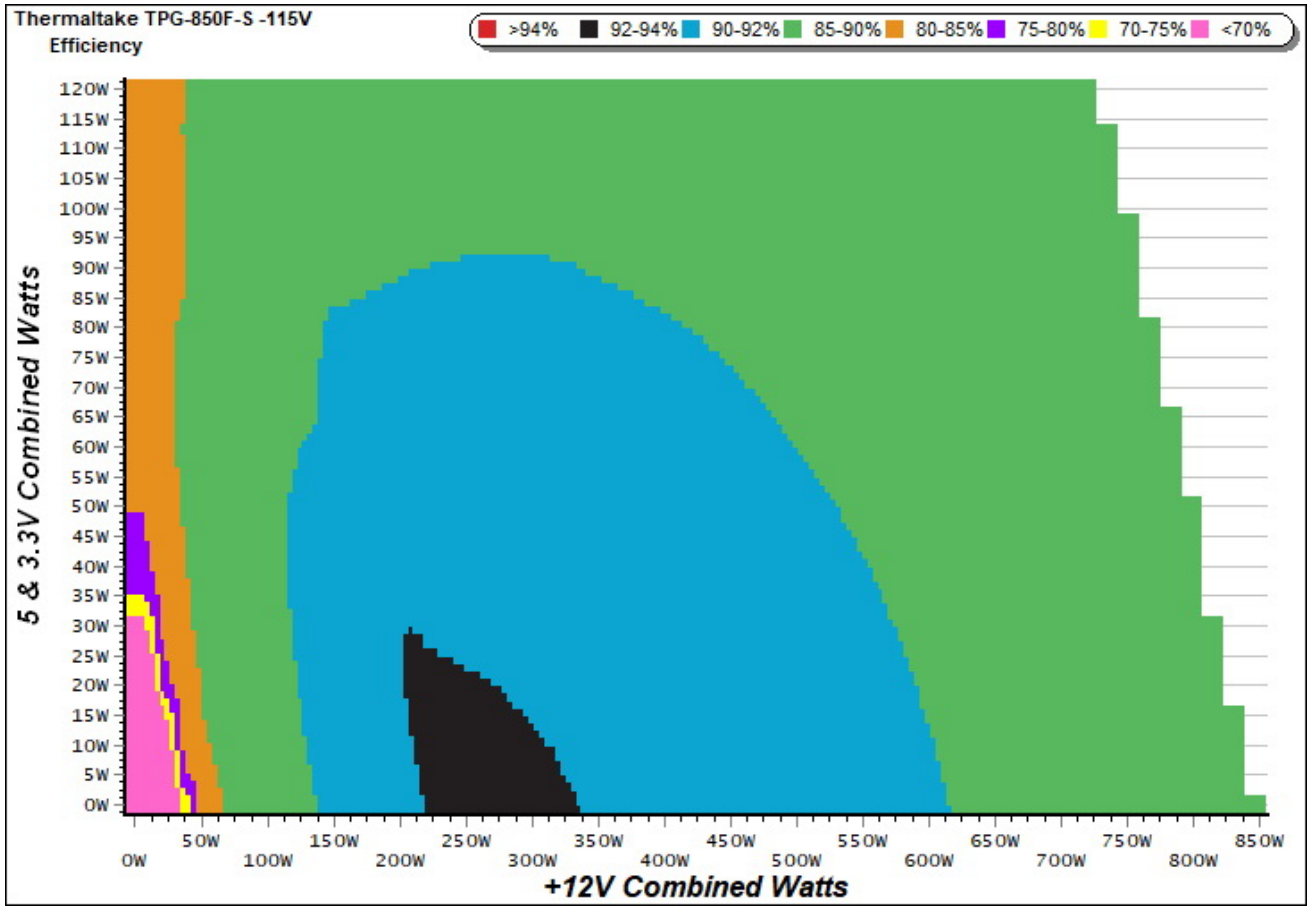
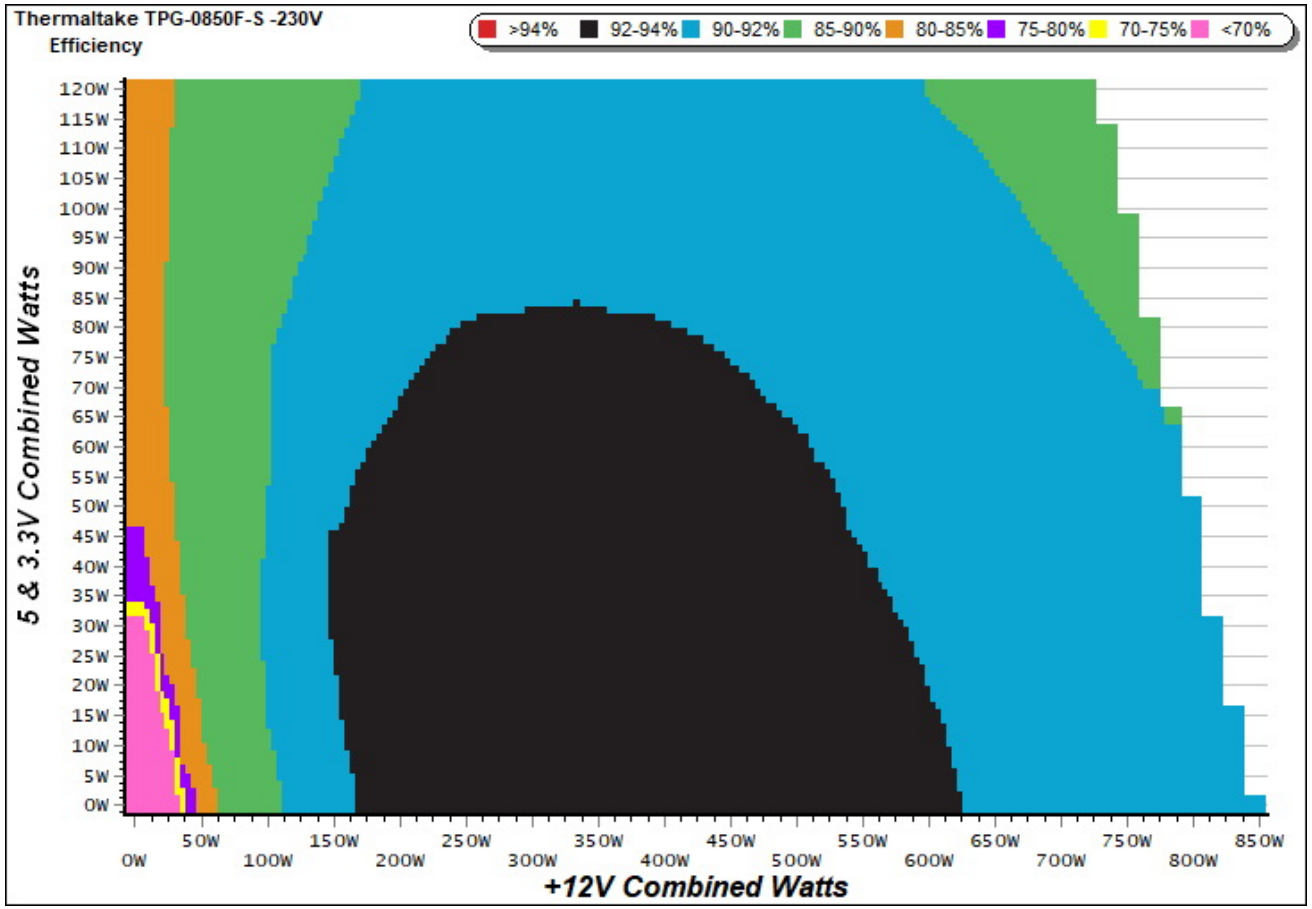
115V



□□

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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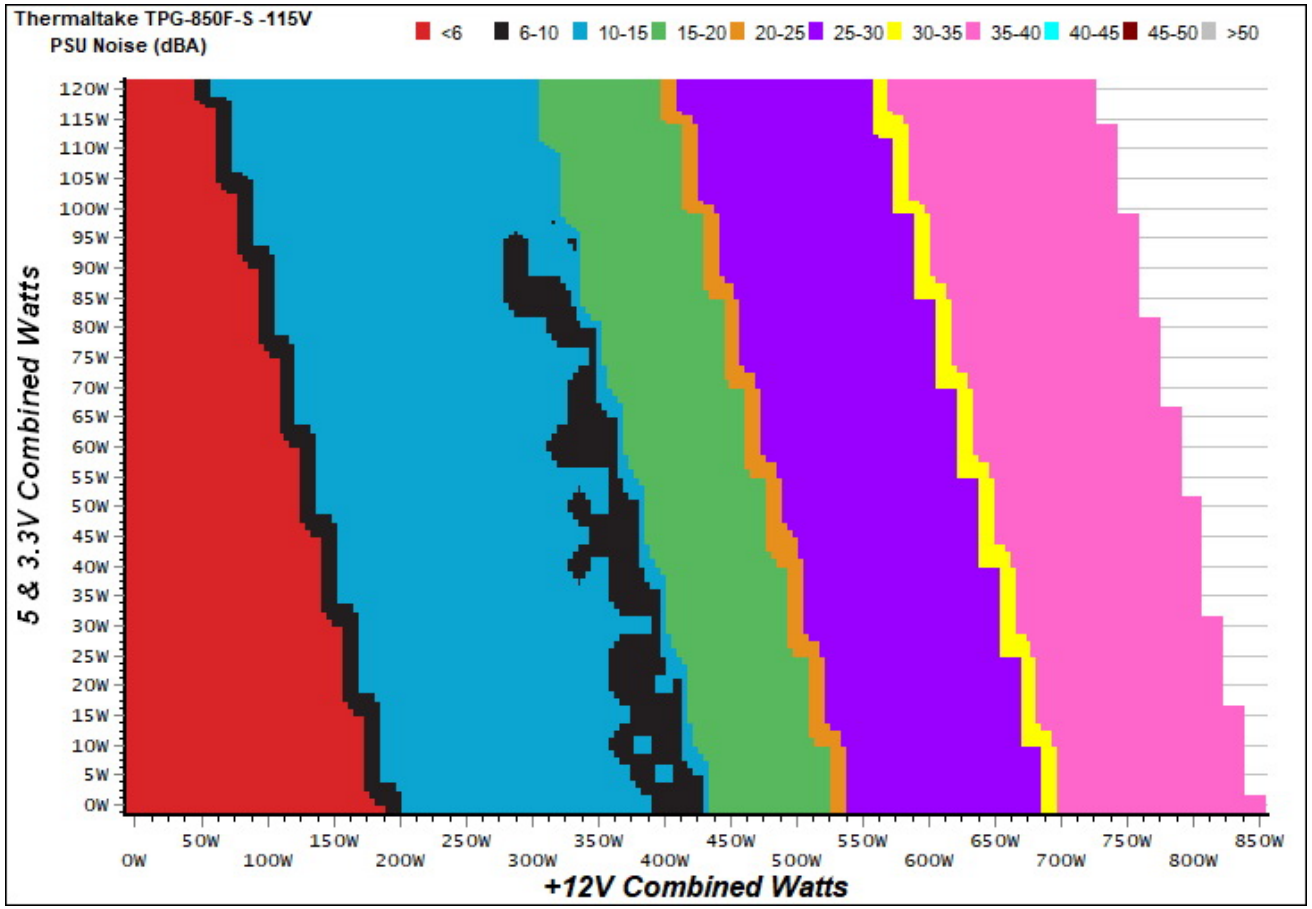
□□□□□

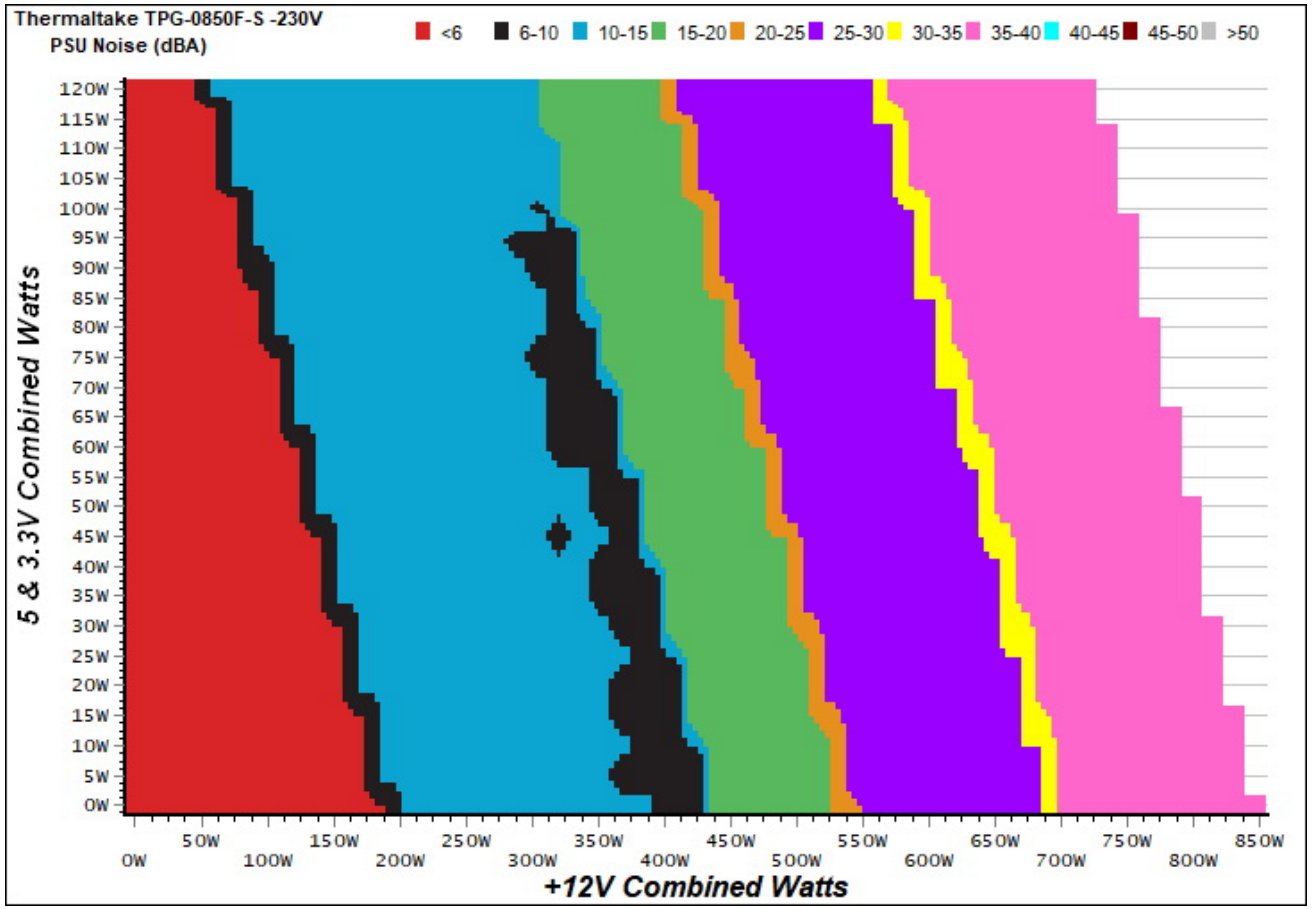
115V



□□

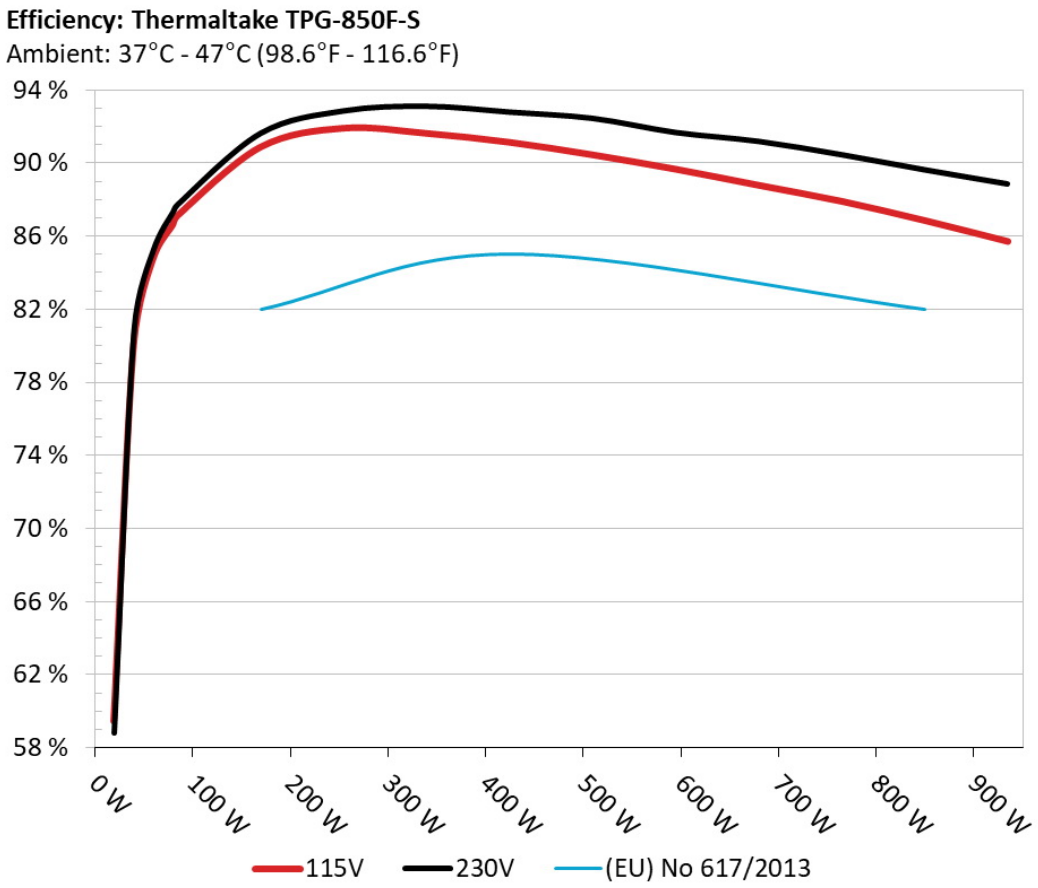
The PSU`s noise in its entire operational range and under 30-32 °C ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails.

230V



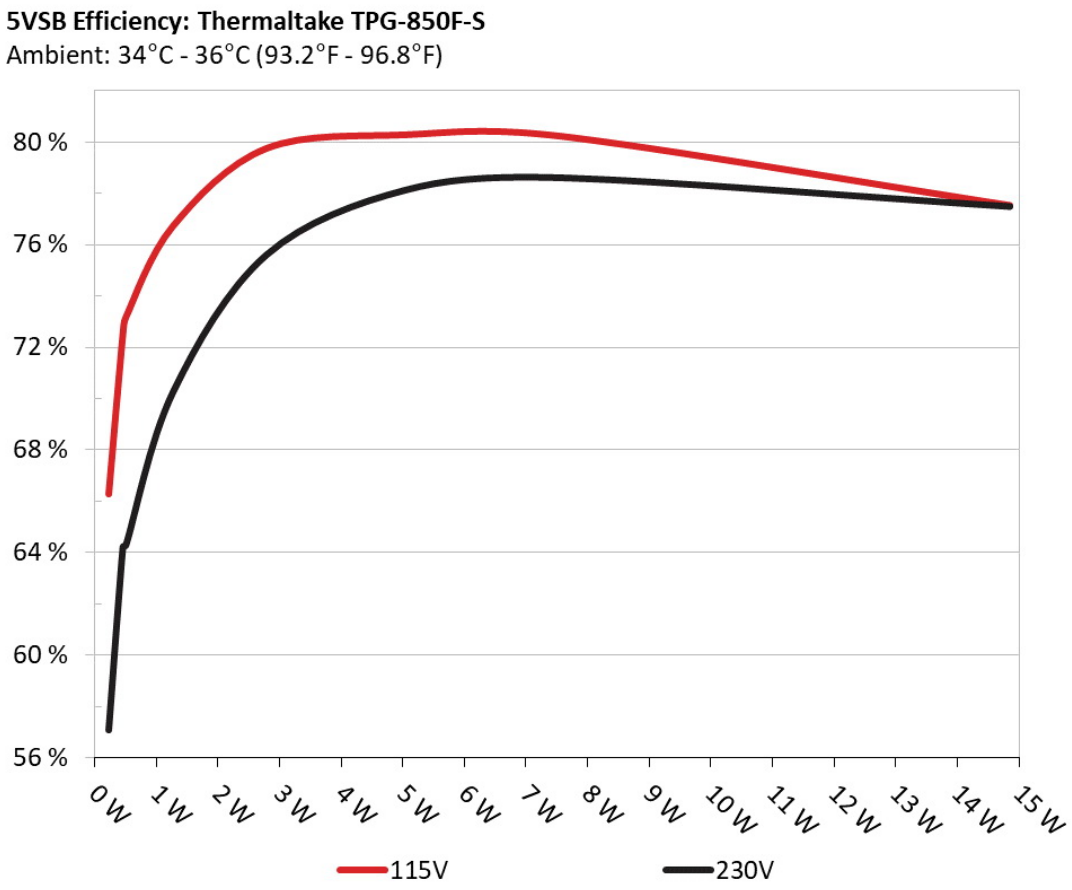
The PSU`s noise in its entire operational range and under 30-32 °C ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails.

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	0.046A	0.230	66.282%	0.199
	5.023V	0.347		115.36V
2	0.090A	0.459	72.512%	0.048
	5.091V	0.633		115.37V
3	0.550A	2.789	79.731%	0.211
	5.069V	3.498		115.37V
4	1.000A	5.050	80.261%	0.290
	5.049V	6.292		115.37V
5	1.500A	7.540	80.213%	0.335
	5.026V	9.400		115.36V
6	3.000A	14.852	77.516%	0.395
	4.950V	19.160		115.35V

230V

□□ #	5VSB	DC/AC (□)	□□	PF/AC □□
1	0.045A	0.230	57.072%	0.011
	5.094V	0.403		230.93V
2	0.090A	0.459	64.196%	0.019
	5.091V	0.715		230.93V
3	0.550A	2.788	75.576%	0.095
	5.068V	3.689		230.92V
4	1.000A	5.048	78.106%	0.155
	5.048V	6.463		230.92V
5	1.500A	7.538	78.586%	0.207
	5.024V	9.592		230.92V
6	3.000A	14.861	77.466%	0.300
	4.953V	19.184		230.91V

Supplementary Tests (For Reference)

10-110%□□□□

115V

□□ #	12V	5V	3.3V	5VSB	DC/AC (□)	□□	□□□□ (RPM)	□□□□□□□ (dB[A])	□□ (□□ /□□)	PF/AC □□
1	5.230A	1.982A	1.960A	1.000A	84.927	87.123%	415	6.9	40.31°C	0.934
	12.108V	5.048V	3.367V	4.999V	97.479				47.67°C	115.05V
2	11.464A	2.980A	2.953A	1.205A	169.458	90.859%	542	8.9	40.71°C	0.982
	12.086V	5.035V	3.353V	4.979V	186.507				48.67°C	115.05V
3	18.099A	3.485A	3.441A	1.412A	254.535	91.901%	565	9.4	41.37°C	0.995
	12.074V	5.024V	3.341V	4.959V	276.967				49.72°C	115.04V
4	24.756A	3.992A	3.965A	1.620A	339.719	91.622%	565	9.4	41.72°C	0.994
	12.058V	5.013V	3.329V	4.938V	370.785				50.74°C	115.04V
5	31.096A	5.002A	4.977A	1.830A	425.035	91.130%	562	9.3	42.48°C	0.996
	12.044V	5.001V	3.315V	4.918V	466.405				52.39°C	115.04V
6	37.388A	6.017A	5.999A	2.043A	509.561	90.449%	805	19.0	43.06°C	0.996
	12.029V	4.988V	3.301V	4.897V	563.367				53.39°C	115.04V
7	43.758A	7.038A	7.029A	2.257A	594.877	89.659%	990	26.0	43.66°C	0.997
	12.015V	4.975V	3.287V	4.876V	663.488				54.34°C	115.03V
8	50.150A	8.063A	8.069A	2.473A	680.214	88.776%	1105	29.8	44.23°C	0.997
	12.000V	4.962V	3.272V	4.854V	766.212				55.73°C	115.03V
9	56.956A	8.588A	8.590A	2.478A	765.134	87.901%	1380	35.8	44.94°C	0.998
	11.985V	4.950V	3.260V	4.844V	870.453				57.10°C	115.03V
10	63.512A	9.114A	9.149A	3.130A	849.960	86.850%	1385	35.9	45.81°C	0.998
	11.970V	4.939V	3.246V	4.795V	978.652				58.65°C	115.03V
11	70.676A	9.131A	9.181A	3.138A	934.721	85.710%	1390	35.9	46.88°C	0.984
	11.956V	4.929V	3.236V	4.781V	1090.561				60.10°C	115.09V
CL1	0.146A	14.005A	14.001A	0.000A	118.289	81.716%	678	13.2	42.46°C	0.964
	12.101V	5.007V	3.314V	5.067V	144.757				52.27°C	115.05V

CL2	70.842A	1.001A	1.001A	1.000A	861.155	87.409%	1388	35.9	45.68°C	0.998
	11.970V	4.970V	3.284V	4.915V	985.197				58.33°C	115.03V

The results above are not used in the certification process

230V

□□ #	12V	5V	3.3V	5VSB	DC/AC (□)	□□	□□□□ (RPM)	□□□□□□□ (dB[A])	□□ (□□ /□□)	PF/AC □□
1	5.230A	1.981A	1.961A	1.000A	84.933	87.713%	147	5.0	39.67°C	0.847
	12.109V	5.048V	3.367V	5.000V	96.831				46.55°C	230.02V
2	11.465A	2.980A	2.952A	1.205A	169.470	91.597%	520	8.3	40.21°C	0.891
	12.086V	5.035V	3.353V	4.980V	185.017				47.73°C	230.20V
3	18.100A	3.484A	3.443A	1.412A	254.549	92.823%	565	9.4	40.83°C	0.920
	12.074V	5.024V	3.341V	4.960V	274.231				48.81°C	230.20V
4	24.758A	3.991A	3.964A	1.620A	339.737	93.073%	562	9.3	41.22°C	0.964
	12.058V	5.013V	3.329V	4.939V	365.022				49.48°C	230.19V
5	31.100A	5.002A	4.977A	1.830A	425.050	92.759%	558	9.3	41.81°C	0.978
	12.043V	5.001V	3.315V	4.918V	458.228				50.43°C	230.19V
6	37.390A	6.016A	5.998A	2.043A	509.576	92.417%	805	19.0	42.29°C	0.986
	12.029V	4.988V	3.301V	4.897V	551.389				51.50°C	230.02V
7	43.763A	7.038A	7.029A	2.257A	594.893	91.643%	990	26.0	43.05°C	0.989
	12.014V	4.975V	3.287V	4.876V	649.145				52.74°C	230.18V
8	50.145A	8.062A	8.069A	2.472A	680.097	91.155%	1105	29.8	43.63°C	0.992
	11.999V	4.962V	3.272V	4.855V	746.087				53.93°C	230.02V
9	56.956A	8.589A	8.590A	2.478A	765.092	90.424%	1385	35.9	44.13°C	0.995
	11.984V	4.951V	3.260V	4.844V	846.117				55.26°C	230.02V
10	63.513A	9.115A	9.147A	3.130A	849.966	89.603%	1385	35.9	45.40°C	0.997
	11.970V	4.939V	3.246V	4.794V	948.594				57.22°C	230.18V
11	70.681A	9.133A	9.182A	3.138A	934.727	88.832%	1390	35.9	46.92°C	0.997
	11.955V	4.929V	3.236V	4.782V	1052.239				59.77°C	230.19V
CL1	0.148A	14.004A	14.000A	0.000A	118.305	82.522%	678	13.2	41.84°C	0.867
	12.101V	5.007V	3.314V	5.067V	143.362				50.94°C	230.19V

CL2	70.846A	1.001A	1.002A	1.000A	861.136	90.180%	1392	35.9	45.34°C	0.997
	11.969V	4.970V	3.284V	4.915V	954.909				57.29°C	230.19V

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	1.192A	0.495A	0.474A	0.198A	19.626	59.480%	0	<6.0	0.878
	12.178V	5.062V	3.382V	5.053V	32.996				115.05V
2	2.449A	0.990A	0.979A	0.397A	40.023	80.075%	0	<6.0	0.876
	12.131V	5.058V	3.377V	5.039V	49.982				115.05V
3	3.641A	1.484A	1.454A	0.597A	59.514	84.717%	377	6.8	0.921
	12.115V	5.053V	3.373V	5.026V	70.250				115.05V
4	4.899A	1.983A	1.961A	0.798A	79.938	86.625%	388	6.8	0.926
	12.109V	5.049V	3.368V	5.012V	92.280				115.05V

The results above are not used in the certification process

230V

□□ #	12V	5V	3.3V	5VSB	DC/AC (□)	□□	□□□□ (RPM)	□□□□□□□ (dB[A])	PF/AC □□
1	1.193A	0.494A	0.472A	0.198A	19.622	58.798%	0	<6.0	0.634
	12.175V	5.062V	3.382V	5.052V	33.372				230.19V
2	2.450A	0.989A	0.977A	0.397A	40.024	80.870%	0	<6.0	0.751
	12.131V	5.058V	3.377V	5.039V	49.492				230.19V
3	3.642A	1.484A	1.452A	0.597A	59.521	85.167%	0	<6.0	0.813
	12.115V	5.054V	3.373V	5.027V	69.887				230.20V
4	4.900A	1.982A	1.958A	0.798A	79.951	87.297%	460	7.4	0.841
	12.111V	5.050V	3.369V	5.013V	91.585				230.02V

The results above are not used in the certification process

□□□□

115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	23.0 mV	8.1 mV	7.3 mV	5.0 mV	Pass
20% Load	8.4 mV	8.9 mV	8.4 mV	4.3 mV	Pass
30% Load	10.4 mV	9.1 mV	9.1 mV	4.3 mV	Pass
40% Load	10.7 mV	9.9 mV	10.2 mV	5.0 mV	Pass
50% Load	12.5 mV	14.6 mV	12.7 mV	9.2 mV	Pass
60% Load	13.9 mV	14.1 mV	12.7 mV	6.6 mV	Pass
70% Load	15.5 mV	15.5 mV	13.8 mV	7.2 mV	Pass
80% Load	17.1 mV	17.2 mV	17.1 mV	8.8 mV	Pass
90% Load	18.9 mV	18.4 mV	18.3 mV	8.9 mV	Pass
100% Load	21.2 mV	20.3 mV	19.8 mV	10.5 mV	Pass
110% Load	24.5 mV	22.3 mV	21.2 mV	12.0 mV	Pass
Crossload 1	23.8 mV	12.9 mV	15.5 mV	4.9 mV	Pass
Crossload 2	21.0 mV	16.3 mV	13.0 mV	9.0 mV	Pass

The results above are not used in the certification process

230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	23.1 mV	8.1 mV	7.0 mV	4.7 mV	Pass
20% Load	8.7 mV	8.5 mV	8.4 mV	4.3 mV	Pass
30% Load	9.7 mV	9.0 mV	9.0 mV	4.3 mV	Pass
40% Load	9.6 mV	9.7 mV	10.1 mV	5.2 mV	Pass
50% Load	11.6 mV	14.7 mV	13.6 mV	9.0 mV	Pass
60% Load	13.0 mV	13.9 mV	12.8 mV	6.5 mV	Pass
70% Load	14.2 mV	15.6 mV	13.9 mV	7.3 mV	Pass
80% Load	15.6 mV	17.1 mV	16.8 mV	8.6 mV	Pass





Test	12V	5V	3.3V	5VSB	Pass/Fail
90% Load	18.0 mV	18.2 mV	17.9 mV	8.8 mV	Pass
100% Load	20.0 mV	20.7 mV	19.5 mV	11.1 mV	Pass
110% Load	22.4 mV	22.3 mV	20.9 mV	12.4 mV	Pass
Crossload 1	22.4 mV	13.2 mV	15.9 mV	4.7 mV	Pass
Crossload 2	19.1 mV	16.7 mV	12.8 mV	9.4 mV	Pass

The results above are not used in the certification process

Thermaltake Toughpower Grand Gold 850W

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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