Thermaltake Toughpower SFX 600W

Serial Number PSSTP0600FPCGUSGMA000060

Lab ID 142

Certification ID 25142

Test Result Report ID:

Certificate Issue Date: Jul 18, 2018

115V 230V

Scheme: ETA-EMI PSU

CYBENETICS GOLD

115V 230V

CYBENETICS STANDARD+

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 SFX 600W
OEM/ODM	Enhance Electronics
Serial Number	PSSTP0600FPCGUSGMA000060
Product Specifications	
Manufacturer-Provided Information	
Rated Voltage (Vrms)	100-240
Rated Current (Arms)	9-4.5
Rated Frequency (Hz)	50-60

Rated Power (W)	600
Operating Temperature (Continuous Full Load) (°C)	
Type	SFX
Cable Design	Fully Modular
Warranty	-
Cybenetics Measurements	
Dimensions (W x H x D)	
Weight	
Cooling	80mm Double Ball-Bearing Fan (R128015SM)
Semi-Passive Operation	✓
Cybenetics Testing Information	
Lab ID	142
Date of receipt	Jul 8, 2018
Testing Date	Jul 15, 2018
Report Issued Date	Jul 18, 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 (305mm)	1	1	18-22AWG
4+4 pin EPS12V (410mm)	1	1	18AWG
6+2 pin PCIe (410mm+150mm)	1	2	18AWG
SATA (300mm+145mm+145mm)	1	3	18AWG
4 pin Molex (310mm+145mm) / FDD (+150mm)	1	2 / 1	18-22AWG

Power Specifications

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	20	15	50	2.5	0.3
	Watts	90		600	12.5	3.6
Total Max. Power (W)		600				

Parts Description

General Data	
Manufacturer (OEM)	Enhance Electronics
Primary Side	
Transient Filter	4x Y caps, 2x X caps, 2x CM chokes, 1x MOV
Inrush Protection	NTC Thermistor
Bridge Rectifier(s)	1x Vishay BU1506 (600 V, 15 A @ 80 °C)
APFC MOSFETS	2x Infineon IPP50R140CP (550 V, 15 A @ 100 °C, 0.14 Ohm)
APFC Boost Diode	1x CREE C3D08060A (600 V, 8 A @ 152 °C)
Hold-up Cap(s)	1x Nippon Chemi-Con (450 V, 330 uF, 2000 h @ 105 °C, KMR)
Main Switchers	2x Infineon IPP50R140CP (550 V, 15 A @ 100 °C, 0.14 Ohm)
FET Driver	1x Silicon Labs Si8230BD
APFC Controller	Champion CM6500
Switching Controller	Champion CM6901
Topology	Primary side: Half-Bridge & LLC Resonant Converter Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	
+12V MOSFETS	6x Inte ational Rectifier IRFH7004PbF (40 V, 164 A @ 100 °C, 1.4 mOhm)
5V & 3.3V	DC-DC Converters: 2x Infineon BSC018NE2LS (25 V, 97 A @ 100 °C, 1.8 mOhm), 2x Infineon BSC050NE2LS (25 V, 37 A @ 100 °C, 5 mOhm) PWM Controllers: 2x ANPEC APW7073
Filtering Capacitors	Electrolytics: Nippon Chemi-Con (105 °C, KZE), United Chemi-Con (105 °C, LXZ) , Rubycon (105 °C, ZL), Suncon (105 °C) Polymers: Unicon
Supervisor IC	SITI PS223 (OVP, UVP, OCP, SCP, OTP)
Fan Model	EverflowR128015SM (80 mm, 12 V, 0.25 A, 3000 RPM, 33.27 CFM, 31 dBA, Dual Ball-Bearing)
5VSB Circuit	

Rectifier	1x STP3NK90ZFP (900 V, 1.89 A @ 100 °C, 4.8 Ohm)

Test Results

Temperature & Compliance Info

Temperature Range (°C /°F)	28-32 / 82.4-89.6
ErP Lot 3/6 Ready	ErP Lot 3/6 2010: ✓ ErP Lot 3/6 2013: ✓ ErP Lot 3/6 2014, CEC: Partially
(EU) No 617/2013 Compliance	✓

Performance Summary 115V

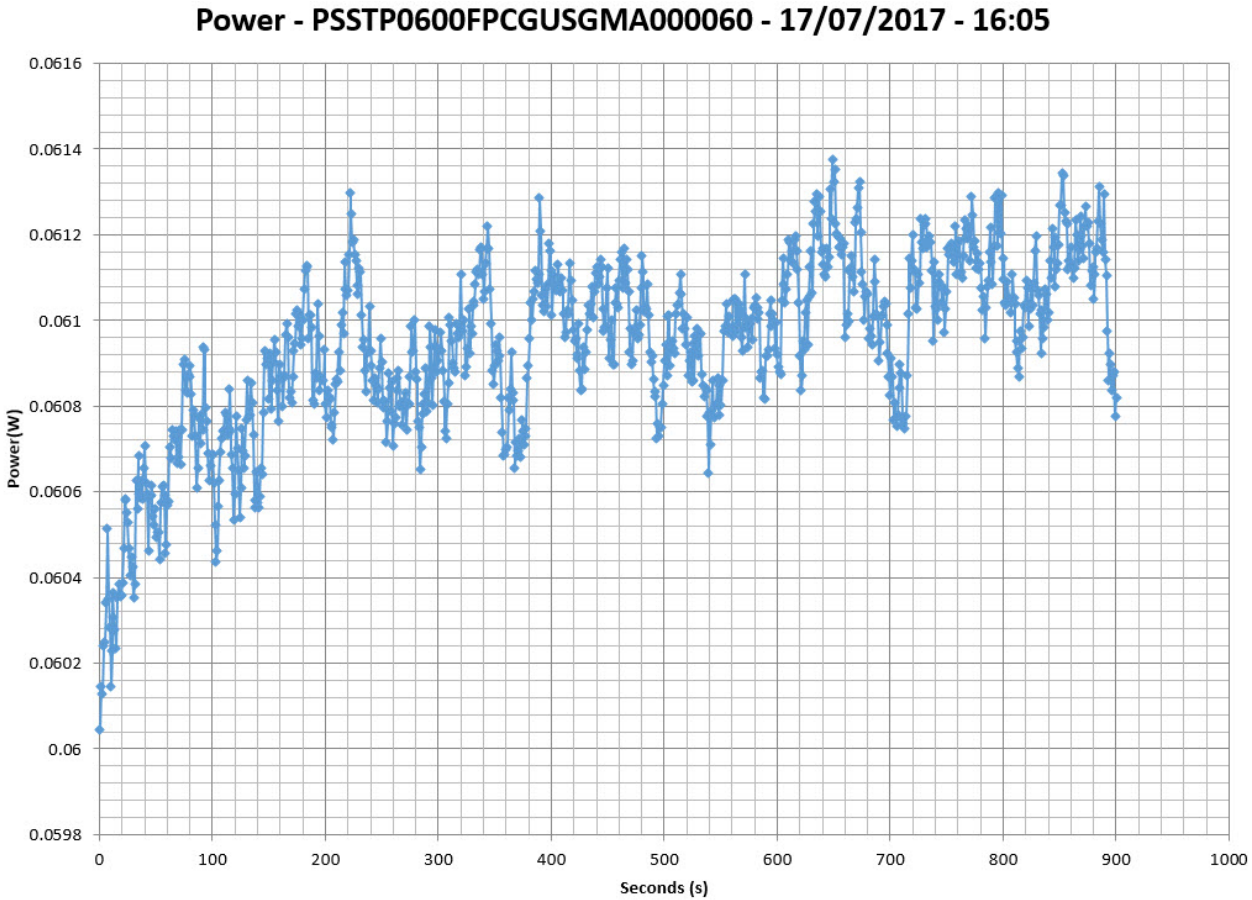
Accredited	
Average Efficiency (>1450 load combinations)	88.401%
Average Noise Output (>1450 Load Combinations)	36.51dBA
Average PF (>1450 Load Combinations)	0.984
Efficiency With 10W (≤500W) or 2% (>500W) Load	-
Standby Power Consumption	0.0608W
Non-Accredited	
12V Ripple (Full Load)	68.00mV
5V Ripple (Full Load)	31.98mV
3.3V Ripple (Full Load)	22.71mV
5VSB Ripple (Full Load)	35.09mV
12V Load Regulation	1.67%
5V Load Regulation	2.25%
3.3V Load Regulation	3.82%
5VSB Load Regulation	3.29%
Inrush Current	33.430A

Hold-Up Time & PWR_OK Signal

Hold-Up Time (ms)	5.8
AC Loss to PWR_OK Hold Up Time (ms)	12.8
PWR_OK Inactive to DC Loss Delay (ms)	-7

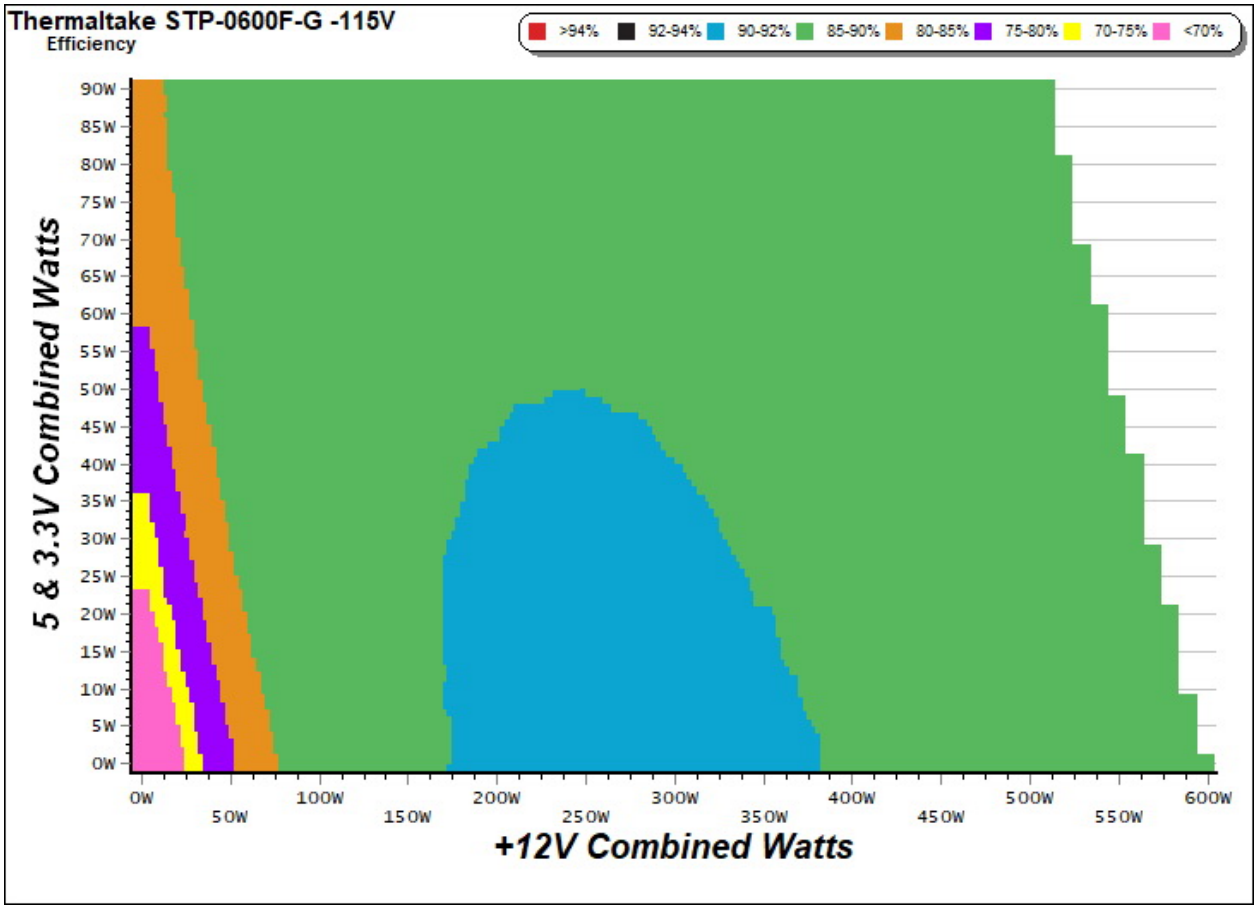
Stromverbrauch im Ruhezustand

Graphs 115V



Efficiency Graph

115V

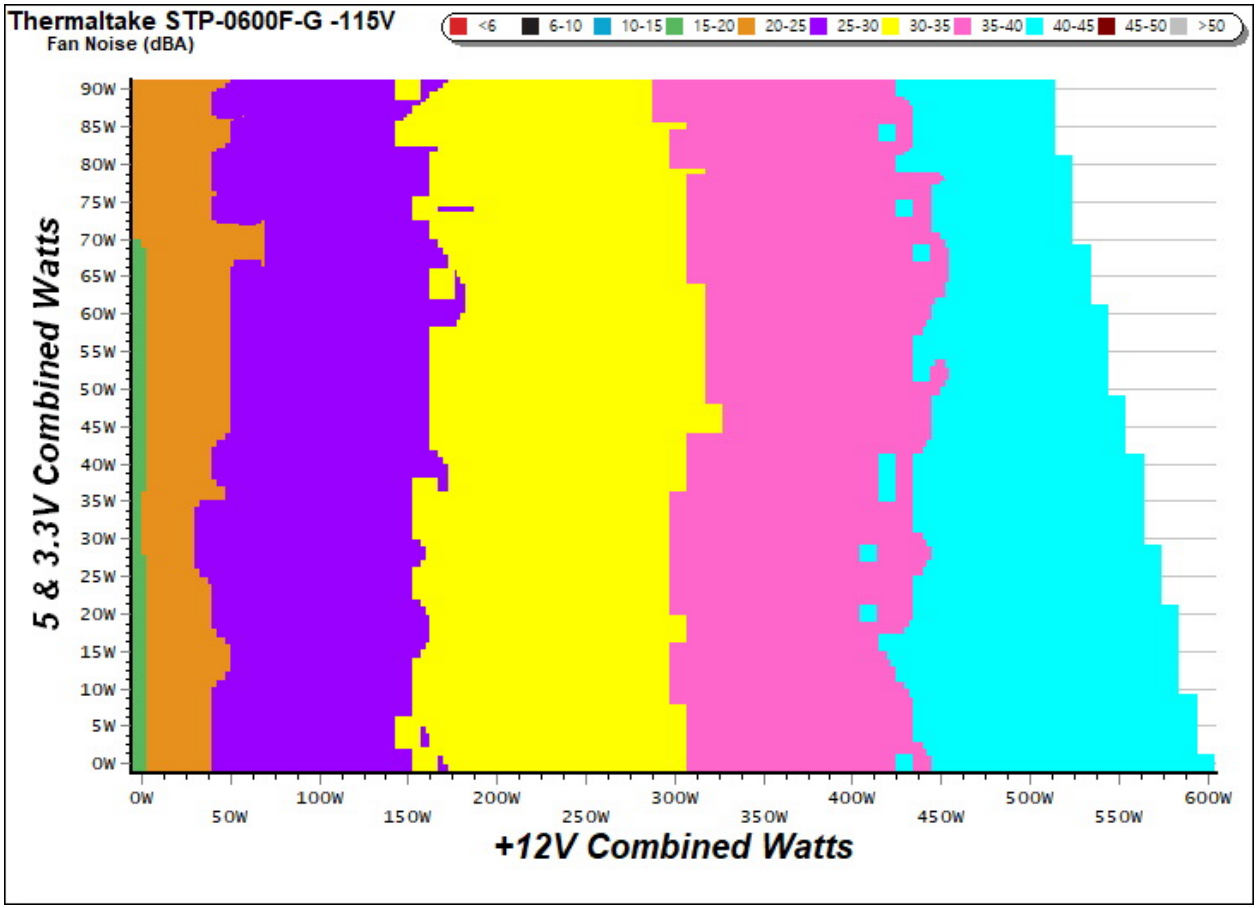


INFO

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.

Noise Graph

115V

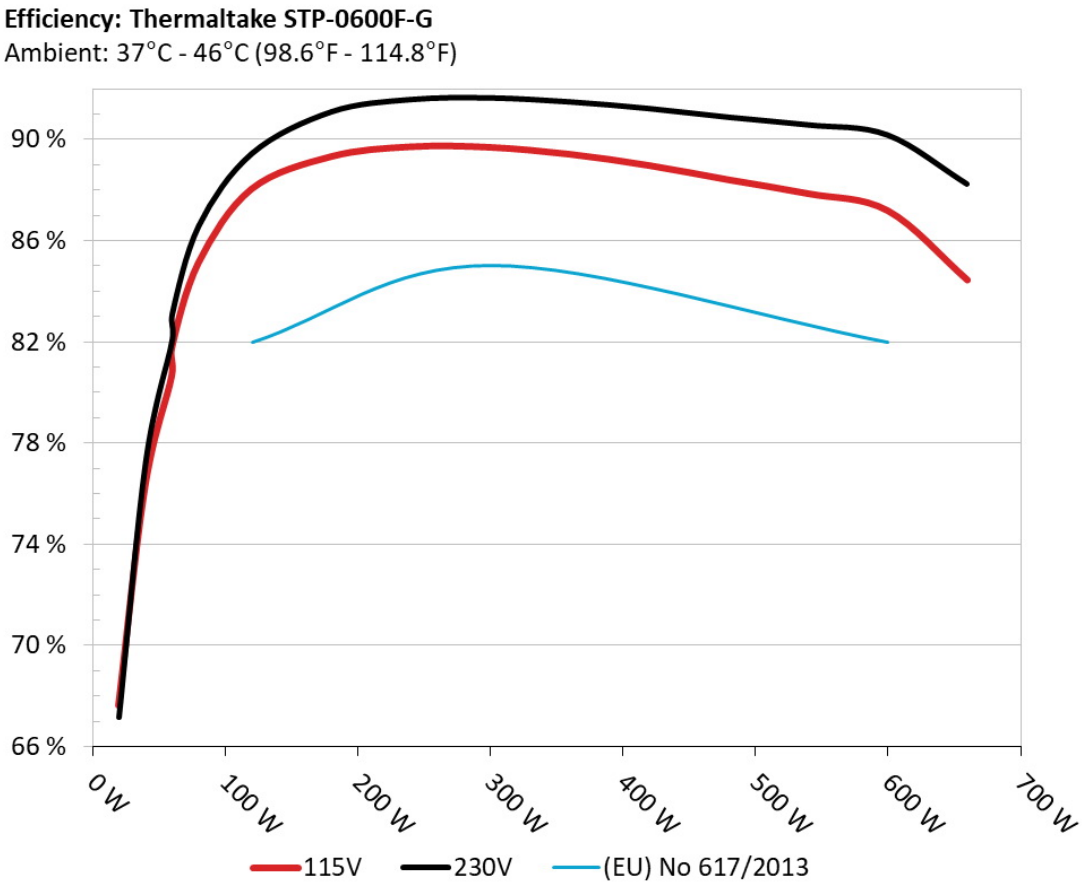


INFO

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.

Indicative Performance

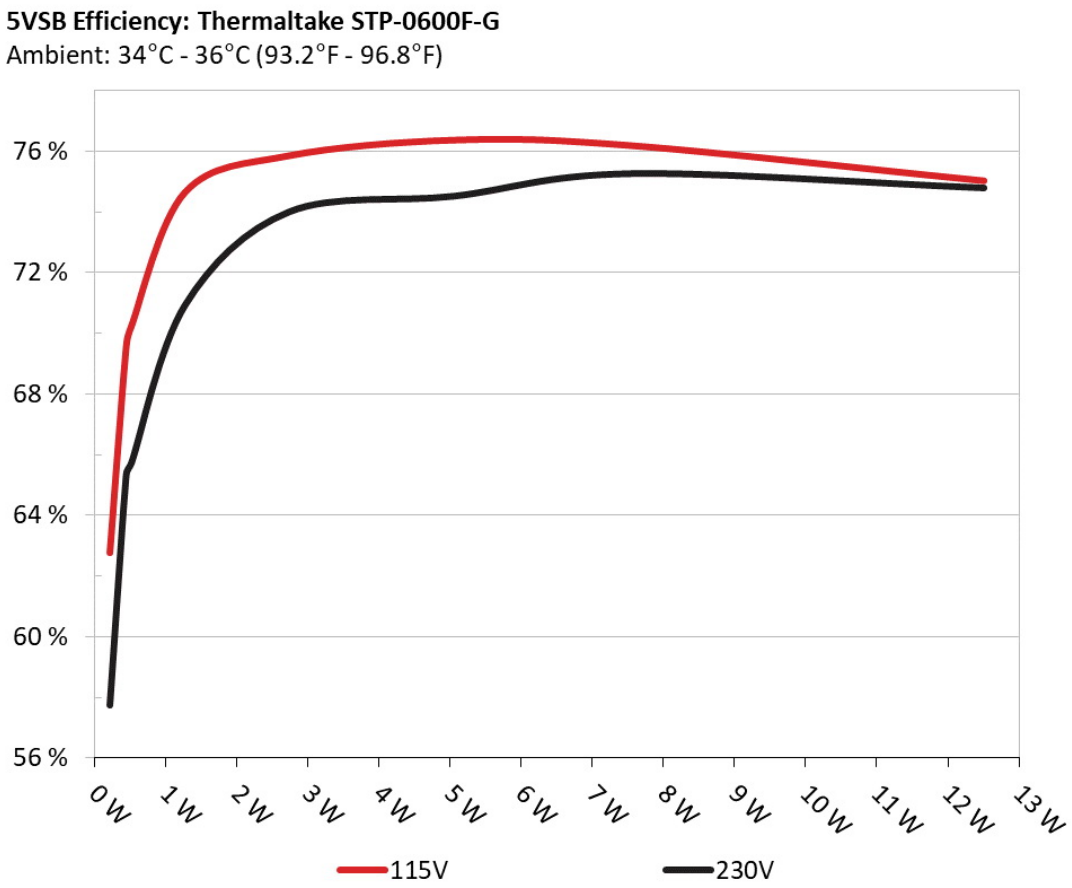
Efficiency under high ambient temperature



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	0.041A	0.209	62.763%	0.036
	5.057V	0.333		115.17V

2	0.087A	0.438	69.524%	0.067
	5.055V	0.630		115.17V
3	0.542A	2.732	75.847%	0.274
	5.045V	3.602		115.16V
4	1.002A	5.043	76.363%	0.354
	5.035V	6.604		115.16V
5	1.501A	7.543	76.184%	0.395
	5.024V	9.901		115.16V
6	2.501A	12.513	75.022%	0.436
	5.003V	16.679		115.16V

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	3.161A	1.996A	1.984A	0.995A	59.768	80.665%	2122	33.8	38.48°C	0.964
	12.080V	5.010V	3.319V	5.024V	74.094				41.34°C	115.17V
2	7.370A	2.998A	2.993A	1.196A	119.779	88.031%	2122	33.8	38.68°C	0.976
	12.064V	4.999V	3.305V	5.007V	136.064				41.69°C	115.17V
3	11.941A	3.510A	3.518A	1.400A	179.867	89.318%	2245	25.9	39.13°C	0.969
	12.042V	4.986V	3.293V	4.991V	201.378				42.54°C	115.17V
4	16.522A	4.023A	4.019A	1.605A	239.771	89.704%	2306	36.8	39.83°C	0.981
	12.019V	4.975V	3.282V	4.977V	267.291				43.89°C	115.17V
5	20.776A	5.033A	5.047A	1.810A	299.704	89.682%	2465	36.9	40.33°C	0.987
	11.997V	4.963V	3.268V	4.962V	334.187				45.17°C	115.17V
6	25.045A	6.061A	6.085A	2.020A	359.731	89.409%	2590	38.5	40.82°C	0.991
	11.976V	4.951V	3.253V	4.945V	402.344				46.22°C	115.18V
7	29.328A	7.085A	7.127A	2.230A	419.655	88.964%	2777	42.2	41.91°C	0.993
	11.954V	4.939V	3.239V	4.928V	471.714				48.31°C	115.18V
8	33.634A	8.118A	8.185A	2.441A	479.656	88.398%	2916	41.3	42.36°C	0.994
	11.931V	4.927V	3.224V	4.909V	542.611				50.04°C	115.17V

9	38.387A	8.653A	8.746A	2.448A	539.704	87.850%	2987	41.6	43.90°C	0.995
	11.908V	4.914V	3.211V	4.897V	614.346				52.27°C	115.18V
10	43.113A	9.182A	9.280A	2.557A	599.559	87.177%	3025	41.9	44.99°C	0.996
	11.884V	4.903V	3.200V	4.884V	687.747				55.03°C	115.17V
11	48.259A	9.202A	9.310A	2.562A	659.464	84.442%	3025	41.9	46.42°C	0.996
	11.858V	4.893V	3.190V	4.873V	780.970				59.00°C	115.17V
CL1	0.099A	11.018A	11.004A	0.004A	92.235	84.028%	3055	42.0	45.26°C	0.989
	12.080V	4.987V	3.278V	5.020V	109.767				52.10°C	115.18V
CL2	49.959A	1.004A	1.003A	1.002A	606.605	87.825%	3025	41.9	45.19°C	0.996
	11.879V	4.922V	3.239V	4.941V	690.698				55.31°C	115.18V

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	1.206A	0.492A	0.477A	0.195A	19.629	67.642%	1875	30.1	0.878
	12.093V	5.020V	3.333V	5.050V	29.019				115.17V
2	2.442A	0.990A	0.991A	0.395A	39.768	76.339%	1920	30.9	0.942
	12.086V	5.016V	3.327V	5.042V	52.094				115.17V
3	3.676A	1.487A	1.503A	0.596A	59.847	81.778%	2010	31.5	0.963
	12.079V	5.012V	3.321V	5.034V	73.182				115.17V
4	4.899A	1.996A	1.989A	0.796A	79.772	85.112%	2100	33.1	0.972
	12.080V	5.008V	3.316V	5.025V	93.726				115.17V

The results above are not used in the certification process

Ripple Measurements 115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	30.0 mV	14.9 mV	11.7 mV	12.2 mV	Pass
20% Load	26.9 mV	16.1 mV	11.8 mV	13.7 mV	Pass
30% Load	28.7 mV	17.0 mV	11.2 mV	14.6 mV	Pass
40% Load	30.9 mV	18.7 mV	11.4 mV	19.1 mV	Pass

Test	12V	5V	3.3V	5VSB	Pass/Fail
50% Load	33.4 mV	20.1 mV	12.3 mV	20.9 mV	Pass
60% Load	37.6 mV	22.2 mV	13.5 mV	22.4 mV	Pass
70% Load	44.7 mV	23.7 mV	14.2 mV	25.0 mV	Pass
80% Load	54.3 mV	24.6 mV	16.3 mV	29.1 mV	Pass
90% Load	61.5 mV	27.3 mV	17.8 mV	32.3 mV	Pass
100% Load	68.0 mV	32.0 mV	22.7 mV	35.1 mV	Pass
110% Load	83.9 mV	34.1 mV	24.9 mV	38.6 mV	Pass
Crossload 1	30.7 mV	19.6 mV	13.9 mV	21.1 mV	Pass
Crossload 2	63.4 mV	30.0 mV	21.2 mV	30.6 mV	Pass

The results above are not used in the certification process

Thermaltake Toughpower SFX 600W

Top side

Power specifications label

Cybenetics bietet freiwillige Zertifizierungsprogramme für Netzteile – ETA für Effizienz, LAMBDA für Lautstärke und SAFE für Sicherheit und korrekten Betrieb – sowie für Kühlprodukte mit DELTA für die Schalldämmung von Gehäusen und PHI für Luftstrom und statischen Druck von Lüftern

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