Thermaltake Toughpower SFX 750W

Serial Number PSSTP0750FNFAGU1SV000118

Lab ID TT75002128

Certification ID 252128

Test Result Report ID: 23PS2128A

Certificate Issue Date: Feb 8, 2023

Scheme: ETA-EMI PSU



Scheme: LAMBDA PSU







Outside Validation Scope



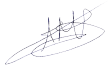
General Information

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	Thermaltake
Model	Toughpower SFX 750W
OEM/ODM	Jiu Zhou Yang Guang Power Supply (HKC)
Serial Number	PSSTP0750FNFAGU1SV000118
Product Specifications	
Manufacturer-Provided Information	
Rated Voltage (Vrms)	100-240

Rated Current (Arms)	10
Rated Frequency (Hz)	50-60
Rated Power (W)	750
Operating Temperature (Continuous Full Load) (°C)	
Type	SFX
Cable Design	Fully Modular
Warranty	-
Cybenetics Measurements	
Dimensions (W x H x D)	
Weight	
Cooling	92mm Fluid Dynamic Bearing Fan [TT-0925 (AV-F9215HS)]
Semi-Passive Operation	✓
Cybenetics Testing Information	
Lab ID	TT75002128
Date of receipt	Dec 19, 2022
Testing Date	Feb 8, 2023
Report Issued Date	Feb 8, 2023
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	In Cable Capacitors
ATX connector 20+4 pin (300mm)	1	1	16-18AWG	No
4+4 pin EPS12V (400mm)	2	2	16AWG	No
6+2 pin PCIe (400mm+150mm)	1	2	16-18AWG	No
12+4 pin PCIe (400mm) (600W)	1	1	16-26AWG	No

SATA (310mm+150mm+150mm+150mm)	2	8	18AWG	No
4-pin Molex (300mm+145mm+145mm+145mm)	1	4	18AWG	No
FDD Adapter (150mm)	1	1	22AWG	No
AC Power Cord (1380mm) - C13 coupler	1	1	18AWG	-

Power Specifications

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	20	20	62.5	3	0.3
	Watts	100		750	15	3.6
Total Max. Power (W)		750				

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	✓
ALPM (Alternative Low Power Mode) compatible	✓
ATX v3.0 Compliance	✓

Performance Summary

115V

Accredited	
Average Efficiency (>1450 load combinations)	90.090%
Average Noise Output (>1450 Load Combinations)	34.30dBA
Average PF (>1450 Load Combinations)	0.985
Efficiency With 10W (≤500W) or 2% (>500W) Load	72.127%
Standby Power Consumption	0.0471W
Non-Accredited	

12V Ripple (Full Load)	17.30mV
5V Ripple (Full Load)	11.19mV
3.3V Ripple (Full Load)	7.35mV
5VSB Ripple (Full Load)	28.66mV
12V Load Regulation	1.15%
5V Load Regulation	1.52%
3.3V Load Regulation	1.95%
5VSB Load Regulation	3.04%
Inrush Current	32.820A

230V

Accredited	
Average Efficiency (>1450 load combinations)	92.152%
Average Noise Output (>1450 Load Combinations)	33.47dBA
Average PF (>1450 Load Combinations)	0.940
Efficiency With 10W (≤500W) or 2% (>500W) Load	71.154%
Standby Power Consumption	0.0988W
Non-Accredited	
12V Ripple (Full Load)	17.55mV
5V Ripple (Full Load)	9.82mV
3.3V Ripple (Full Load)	6.92mV
5VSB Ripple (Full Load)	29.69mV
12V Load Regulation	1.33%
5V Load Regulation	1.52%
3.3V Load Regulation	1.95%
5VSB Load Regulation	3.02%
Inrush Current	66.340A
12V Transient Response (200%)	11.32V
5V Transient Response (200%)	4.954V
3.3V Transient Response (200%)	3.252V
5VSB Transient Response (200%)	4.884V
Hold-Up Time & PWR_OK Signal	20.75ms

AC Loss to PWR_OK Hold Up Time		18.45ms
PWR_OK Inactive to DC Loss Delay		2.30ms
PSU Timings: T1 (20% / 100%)	73.0ms	72.5ms
PSU Timings: T3 (20% / 100%)	126.0ms	125.5ms
OPP (25.12°C / 45.47°C)	114.47%	142.91%

Hold-Up Time & PWR_OK Signal

Hold-Up Time (ms)	20.75
AC Loss to PWR_OK Hold Up Time (ms)	18.45
PWR_OK Inactive to DC Loss Delay (ms)	2.3



Tables

115V

Detailed Results						
	Average	Min	Limit Min	Max	Limit Max	Result
Mains Voltage RMS:	115.14 V	115.13 V	113.85 V	115.16 V	116.15 V	PASS
Mains Frequency:	60.00 Hz	60.00 Hz	59.40 Hz	60.01 Hz	60.60 Hz	PASS
Mains Voltage CF:	1.415	1.415	1.340	1.416	1.490	PASS
Mains Voltage THD:	0.13 %	0.11 %	N/A	0.15 %	2.00 %	PASS
Real Power:	0.047 W	0.042 W	N/A	0.051 W	N/A	N/A
Apparent Power:	10.046 W	10.042 W	N/A	10.049 W	N/A	N/A
Power Factor:	0.005	N/A	N/A	N/A	N/A	N/A

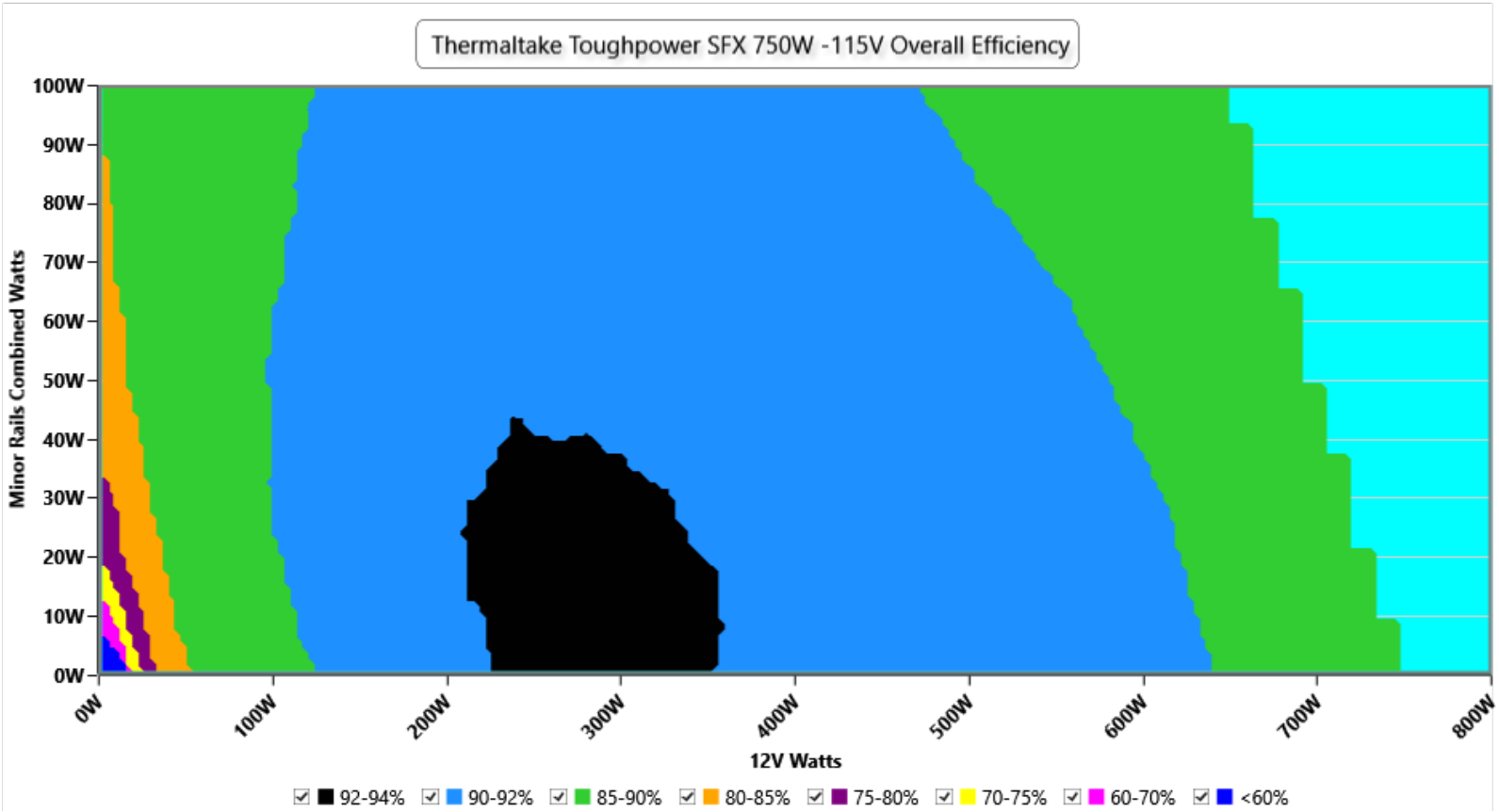
230V

Detailed Results						
	Average	Min	Limit Min	Max	Limit Max	Result

Mains Voltage RMS:	230.36 V	230.33 V	227.70 V	230.36 V	232.30 V	PASS
Mains Frequency:	50.00 Hz	50.00 Hz	49.50 Hz	50.01 Hz	50.50 Hz	PASS
Mains Voltage CF:	1.415	1.415	1.340	1.416	1.490	PASS
Mains Voltage THD:	0.14 %	0.13 %	N/A	0.16 %	2.00 %	PASS
Real Power:	0.099 W	0.085 W	N/A	0.113 W	N/A	N/A
Apparent Power:	33.548 W	33.541 W	N/A	33.555 W	N/A	N/A
Power Factor:	0.003	N/A	N/A	N/A	N/A	N/A

Efficiency Graph

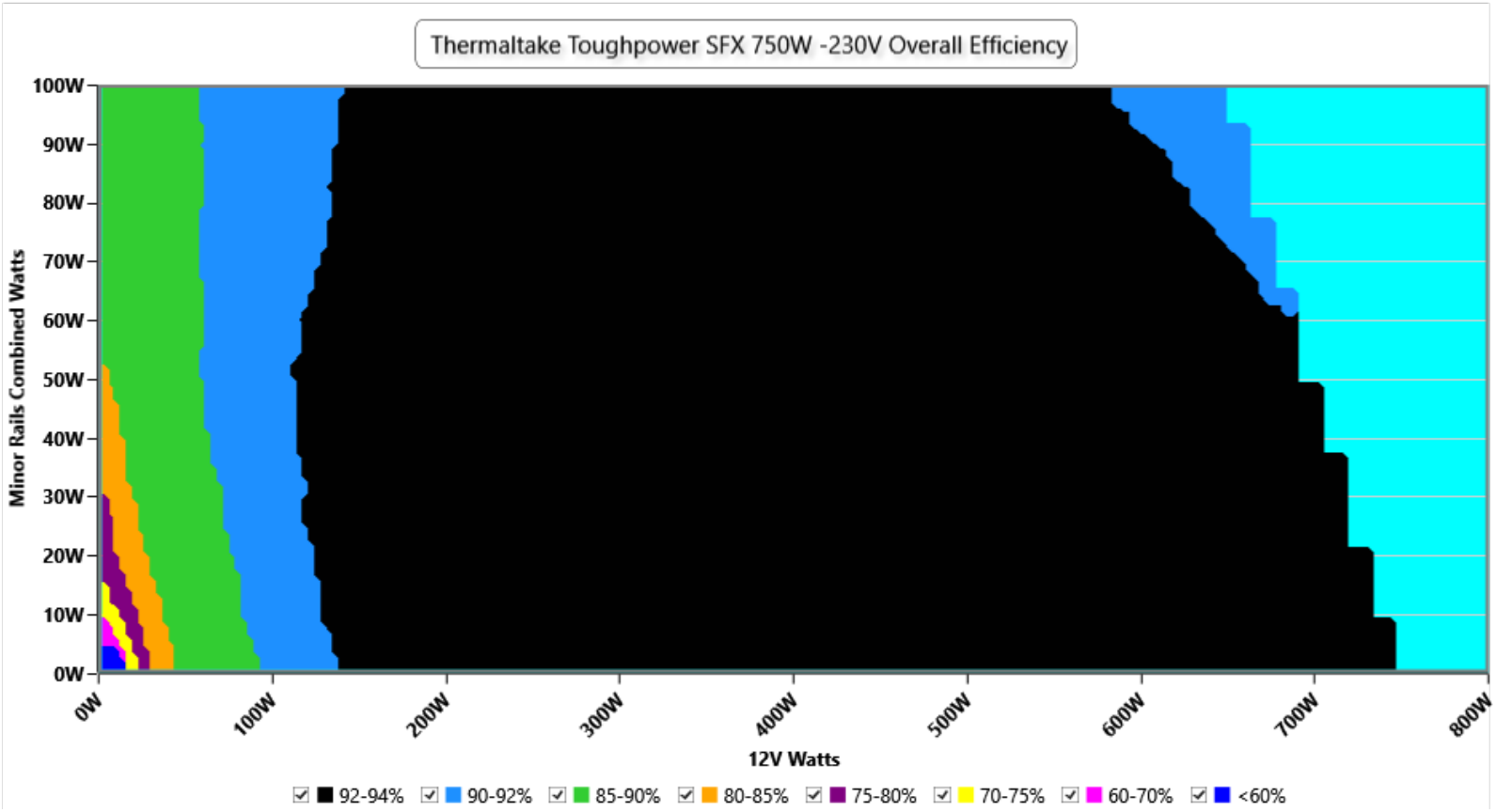
115V



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

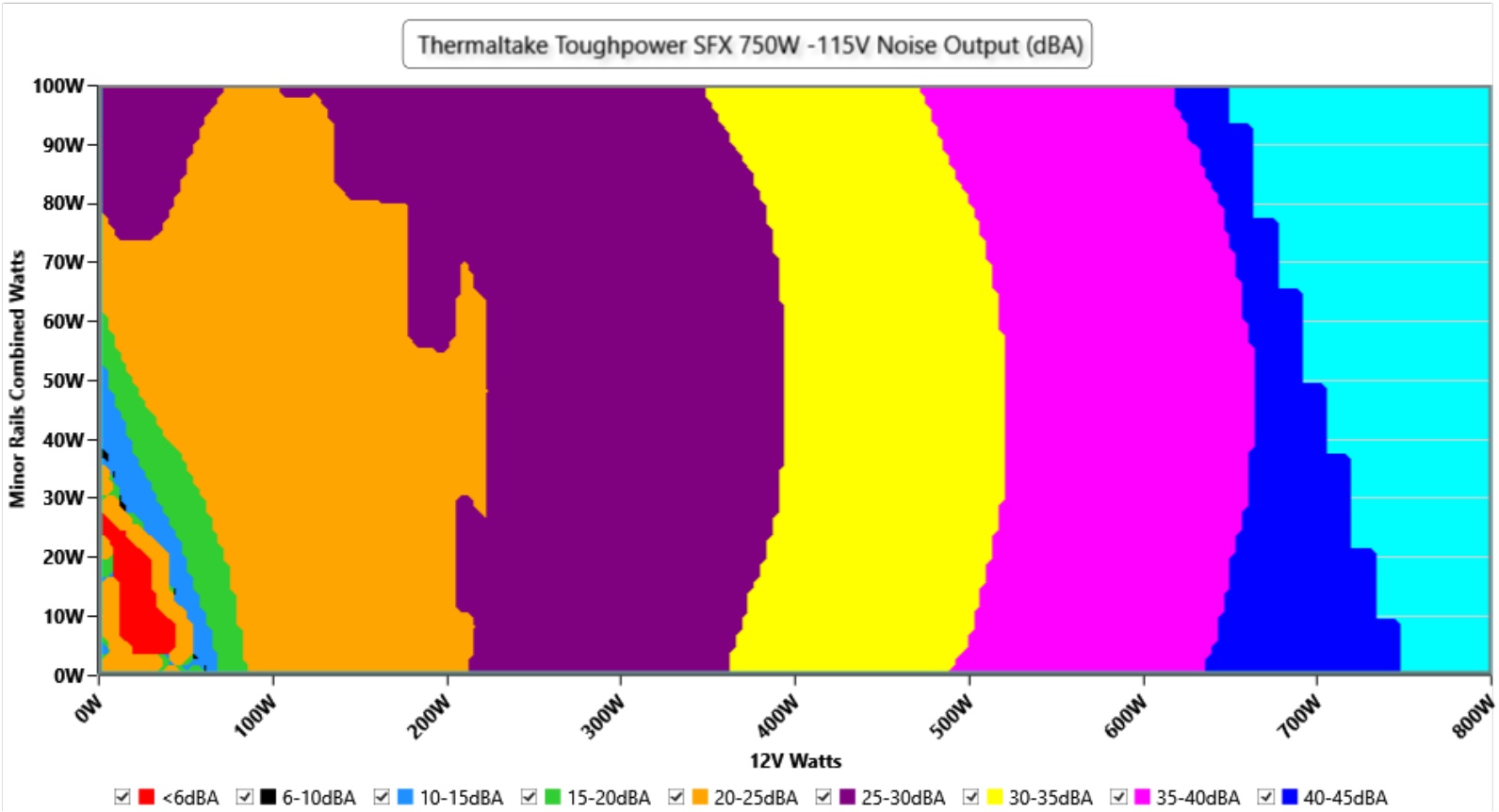


INFO

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

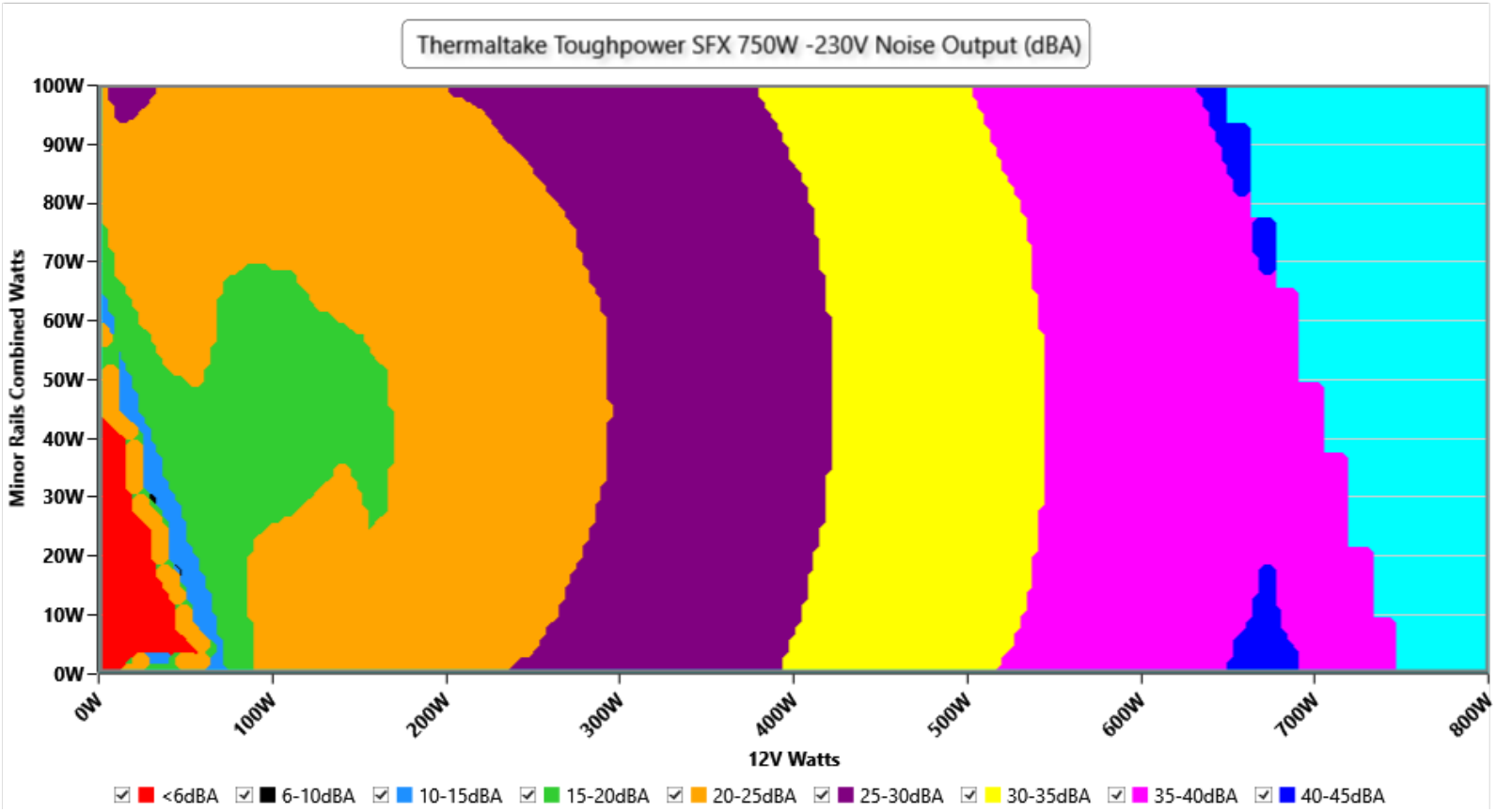
115V



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

Noise under high ambient temperature (indicative)

115V

Load	Normal ambient fan · noise · intake	High ambient fan · noise · intake	Noise change
10%	1442 RPM · 26.4 dB(A) · 39.4 °C	1442 RPM · 26.4 dB(A) · 39.4 °C	**+0.0 dB(A)**
20%	2136 RPM · 39.3 dB(A) · 40.6 °C	2136 RPM · 39.3 dB(A) · 40.6 °C	**+0.0 dB(A)**
50%	2400 RPM · 42.0 dB(A) · 42.4 °C	2400 RPM · 42.0 dB(A) · 42.4 °C	**+0.0 dB(A)**
100%	2988 RPM · 46.7 dB(A) · 45.8 °C	2988 RPM · 46.7 dB(A) · 45.8 °C	**+0.0 dB(A)**

230V

Load	Normal ambient fan · noise · intake	High ambient fan · noise · intake	Noise change
10%	1504 RPM · 27.2 dB(A) · 40.2 °C	1504 RPM · 27.2 dB(A) · 40.2 °C	**+0.0 dB(A)**
20%	2089 RPM · 37.2 dB(A) · 40.8 °C	2089 RPM · 37.2 dB(A) · 40.8 °C	**+0.0 dB(A)**
50%	2373 RPM · 41.1 dB(A) · 42.0 °C	2373 RPM · 41.1 dB(A) · 42.0 °C	**+0.0 dB(A)**
100%	2927 RPM · 46.3 dB(A) · 45.6 °C	2927 RPM · 46.3 dB(A) · 45.6 °C	**+0.0 dB(A)**

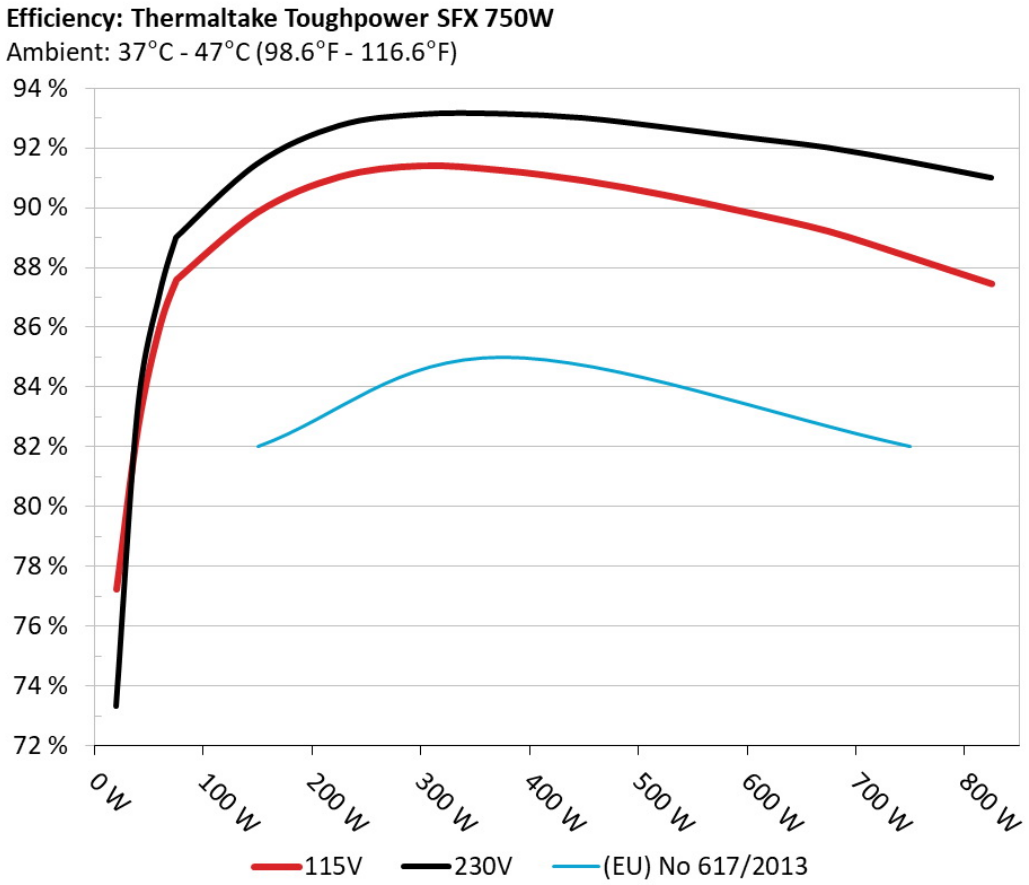
INFO

Fan speed, noise and the measured intake temperature at 10, 20, 50 and 100 % load, from the two load regulation tests: at normal ambient (about 30-32 °C) and at high ambient (about 40-47 °C). These are stabilized readings at fixed loads, not averages over the certification sweep, so they are indicative of how the fan behaves when it is hot. "<6.0" is the floor of our sound meter: the fan is stopped or too quiet to measure (the fan speed column says which); with the fan stopped, the intake sensor can read higher than the chamber air.

Informational. Not part of the ETA or LAMBDA rating.

Indicative Performance

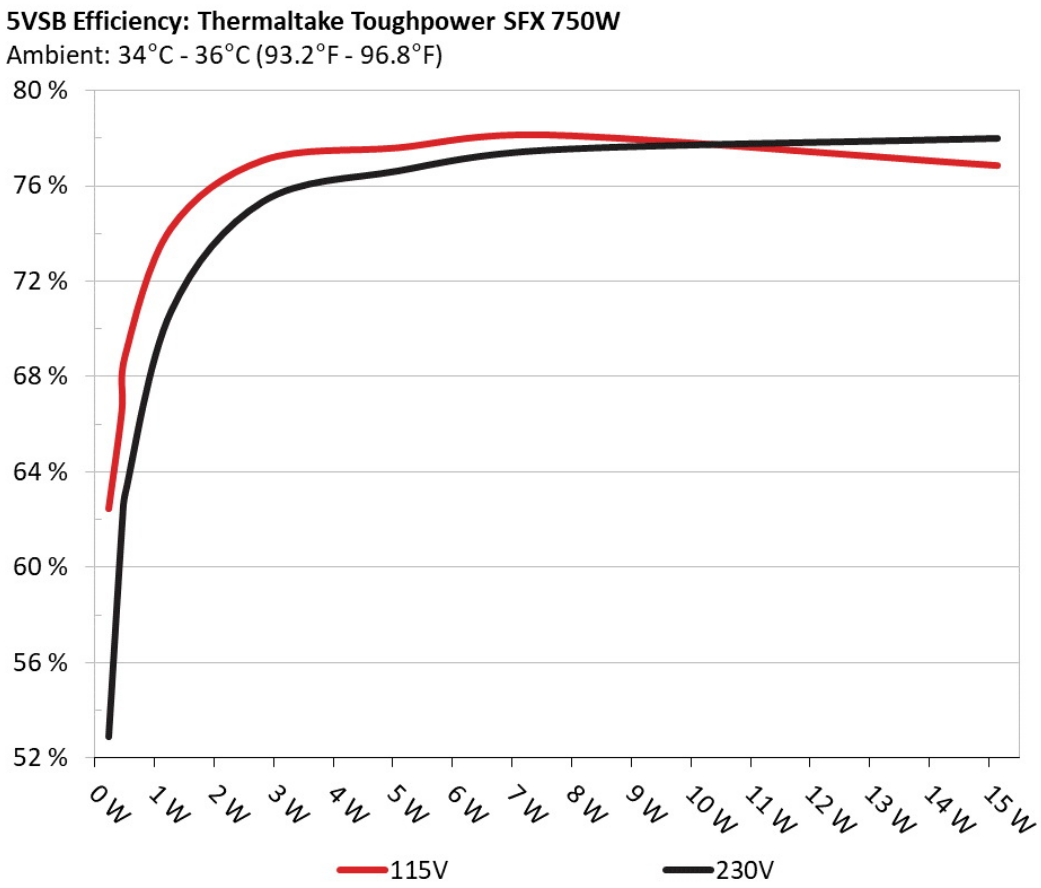
Efficiency under high ambient temperature



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	0.045A	0.231W	62.471%	0.037
	5.127V	0.37W		115.11V
2	0.09A	0.449W	66.542%	0.066
	4.99V	0.675W		115.12V
3	0.55A	2.812W	77.087%	0.264
	5.113V	3.649W		115.12V
4	1A	5.082W	77.62%	0.345
	5.081V	6.548W		115.12V
5	1.5A	7.626W	78.155%	0.391
	5.083V	9.758W		115.12V
6	3A	15.134W	76.875%	0.449
	5.044V	19.685W		115.12V

230V

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.231W	52.878%	0.013
	5.127V	0.437W		230.33V
2	0.09A	0.461W	62.028%	0.022
	5.126V	0.743W		230.33V
3	0.55A	2.813W	75.316%	0.105
	5.113V	3.735W		230.34V
4	1A	5.102W	76.617%	0.172
	5.101V	6.66W		230.34V
5	1.5A	7.632W	77.489%	0.225
	5.087V	9.849W		230.34V
6	3A	15.136W	77.973%	0.318
	5.045V	19.411W		230.34V

Supplementary Tests (For Reference)

Typical Load Tests

115V

Test	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
10%	4.385A	1.968A	1.975A	0.982A	75.001	86.517%	1442	26.4	39.42°C	0.962
	12.178V	5.082V	3.343V	5.093V	86.689				43.51°C	115.14V
20%	9.789A	2.957A	2.967A	1.181A	149.965	89.85%	2136	39.3	40.63°C	0.98
	12.162V	5.075V	3.336V	5.081V	166.906				44.99°C	115.12V
30%	15.547A	3.454A	3.468A	1.381A	224.972	91.027%	2311	40.3	41.71°C	0.982
	12.150V	5.068V	3.331V	5.069V	247.147				46.46°C	115.09V
40%	21.335A	3.953A	3.97A	1.582A	300.062	91.396%	2237	38.8	41.7°C	0.984
	12.133V	5.061V	3.325V	5.057V	328.309				46.77°C	115.07V
50%	26.744A	4.949A	4.973A	1.785A	374.594	91.244%	2400	42	42.36°C	0.987
	12.118V	5.053V	3.318V	5.045V	410.545				47.88°C	115.05V
60%	32.196A	5.948A	5.98A	1.988A	449.512	90.901%	2496	42	43°C	0.99
	12.103V	5.045V	3.312V	5.031V	494.508				49.11°C	115.04V
70%	37.663A	6.951A	6.991A	2.192A	524.441	90.415%	2592	43.2	43.1°C	0.992
	12.089V	5.037V	3.305V	5.018V	580.045				50.16°C	115.01V
80%	43.212A	7.957A	8.004A	2.297A	599.656	89.839%	2702	44	43.59°C	0.993
	12.074V	5.029V	3.298V	5.008V	667.478				51.64°C	114.99V
90%	49.107A	8.465A	8.505A	2.402A	674.681	89.207%	2814	45.4	44.56°C	0.994
	12.059V	5.021V	3.291V	4.997V	756.317				53.59°C	114.97V
100%	54.808A	8.977A	9.04A	3.019A	749.912	88.34%	2988	46.7	45.8°C	0.995
	12.046V	5.013V	3.285V	4.97V	848.897				55.89°C	114.96V
110%	60.394A	9.993A	10.16A	3.024A	824.942	87.449%	3008	47.2	46.54°C	0.996
	12.032V	5.004V	3.277V	4.961V	943.338				57.44°C	114.94V
CL1	0.115A	11.868A	11.929A	0A	101.297	85.064%	2421	42.2	44.02°C	0.975
	12.195V	5.072V	3.327V	5.105V	119.077				49.51°C	115.13V

Test	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
CL2	0.115A	19.701A	0A	0A	101.391	83.944%	2306	40.3	41.42°C	0.974
	12.187V	5.076V	3.328V	5.117V	120.788				48.52°C	115.13V
CL4	62.282A	0A	0A	0A	749.706	89.209%	2631	44.3	47.63°C	0.995
	12.037V	5.024V	3.3V	5.078V	840.393				58.58°C	114.96V

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
10%	2.192A	1.968A	1.974A	0.982A	74.996	87.893%	1504	27.2	40.21°C	0.805
	12.180V	5.082V	3.343V	5.093V	85.328				44.23°C	230.24V
20%	9.786A	2.956A	2.967A	1.181A	149.927	91.477%	2089	37.2	40.77°C	0.903
	12.163V	5.075V	3.336V	5.081V	163.897				45.13°C	230.26V
30%	15.548A	3.454A	3.467A	1.381A	224.923	92.748%	2164	39.4	41.55°C	0.935
	12.147V	5.068V	3.331V	5.07V	242.512				46.3°C	230.26V
40%	21.331A	3.953A	3.969A	1.582A	300.007	93.128%	2311	40.3	41.95°C	0.951
	12.133V	5.061V	3.325V	5.058V	322.143				47.02°C	230.25V
50%	26.731A	4.948A	4.972A	1.784A	374.45	93.145%	2373	41.1	41.99°C	0.96
	12.118V	5.053V	3.318V	5.045V	402.011				47.45°C	230.25V
60%	32.188A	5.947A	5.979A	1.988A	449.381	93.007%	2485	42.3	42.56°C	0.966
	12.103V	5.045V	3.312V	5.032V	483.167				48.59°C	230.24V
70%	37.655A	6.95A	6.99A	2.192A	524.356	92.694%	2636	44.3	43.66°C	0.97
	12.090V	5.037V	3.305V	5.018V	565.684				50.74°C	230.24V
80%	43.197A	7.956A	8.004A	2.297A	599.574	92.35%	2756	44.7	44.25°C	0.974
	12.076V	5.029V	3.298V	5.007V	649.247				52.27°C	230.23V
90%	49.103A	8.464A	8.505A	2.401A	674.618	92.013%	2795	45	44.6°C	0.976
	12.059V	5.021V	3.291V	4.998V	733.179				53.89°C	230.23V
100%	54.815A	8.977A	9.04A	3.018A	749.84	91.535%	2927	46.3	45.63°C	0.978
	12.043V	5.013V	3.285V	4.971V	819.194				55.65°C	230.22V

Test	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
110%	60.408A	9.992A	10.159A	3.023A	824.893	91.006%	3017	47.6	46.57°C	0.98
	12.028V	5.004V	3.277V	4.963V	906.414				57.52°C	230.21V
CL1	0.115A	11.868A	11.929A	0A	101.296	86.52%	2403	42	43.87°C	0.859
	12.194V	5.073V	3.327V	5.105V	117.072				49.32°C	230.31V
CL2	0.115A	19.701A	0A	0A	101.393	85.326%	2303	40.3	41.93°C	0.861
	12.187V	5.076V	3.328V	5.117V	118.833				49.01°C	230.31V
CL4	62.304A	0A	0A	0A	749.652	92.365%	2508	42.8	45.6°C	0.977
	12.032V	5.024V	3.3V	5.079V	811.618				56.53°C	230.23V

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)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
20W	1.226A	0.491A	0.493A	0.195A	20.001	77.229%	404	21	36.51°C	0.841
	12.113V	5.089V	3.349V	5.121V	25.898				39.54°C	115.15V
40W	2.682A	0.688A	0.69A	0.293A	39.998	82.7%	804	9.3	37.01°C	0.931
	12.184V	5.087V	3.347V	5.116V	48.368				40.32°C	115.15V
60W	4.148A	0.885A	0.888A	0.391A	59.998	86.047%	1166	18.2	39.35°C	0.953
	12.181V	5.085V	3.345V	5.112V	69.726				43.07°C	115.14V
80W	5.612A	1.083A	1.086A	0.49A	79.963	87.584%	1493	26.7	39.08°C	0.964
	12.176V	5.083V	3.344V	5.108V	91.299				43.05°C	115.13V

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
20W	1.217A	0.491A	0.493A	0.195A	19.998	73.338%	922	12.2	36.51°C	0.506
	12.203V	5.089V	3.349V	5.121V	27.268				39.58°C	230.26V

Test	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
40W	2.682A	0.688A	0.69A	0.293A	39.995	83.332%	919	12.2	37.48°C	0.668
	12.187V	5.087V	3.347V	5.117V	47.993				40.73°C	230.26V
60W	4.148A	0.885A	0.887A	0.391A	59.992	87.121%	1181	18.8	37.98°C	0.759
	12.181V	5.085V	3.346V	5.113V	68.86				41.51°C	230.27V
80W	5.610A	1.082A	1.085A	0.489A	79.937	89.008%	1550	27.7	39.64°C	0.815
	12.177V	5.083V	3.344V	5.108V	89.803				43.48°C	230.27V

The results above are not used in the certification process

Ripple Measurements

115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	15.00mV	6.14mV	5.22mV	12.03mV	Pass
20% Load	11.59mV	7.62mV	5.12mV	12.90mV	Pass
30% Load	10.25mV	11.45mV	5.84mV	14.94mV	Pass
40% Load	11.53mV	11.96mV	6.19mV	15.81mV	Pass
50% Load	10.81mV	11.61mV	5.84mV	16.06mV	Pass
60% Load	10.25mV	12.63mV	6.04mV	18.96mV	Pass
70% Load	10.10mV	17.95mV	6.55mV	20.08mV	Pass
80% Load	10.76mV	17.90mV	7.27mV	20.14mV	Pass
90% Load	11.78mV	15.90mV	7.98mV	20.90mV	Pass
100% Load	17.30mV	11.19mV	7.35mV	28.66mV	Pass
110% Load	19.28mV	11.56mV	7.96mV	28.87mV	Pass
Crossload1	17.17mV	8.88mV	9.75mV	7.19mV	Pass
Crossload2	12.43mV	10.13mV	8.19mV	6.78mV	Pass
Crossload3	0.00mV	0.00mV	0.00mV	0.00mV	Pass
Crossload4	18.27mV	8.93mV	5.72mV	11.76mV	Pass

The results above are not used in the certification process

230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	16.31mV	5.98mV	4.76mV	11.42mV	Pass
20% Load	11.51mV	7.11mV	5.22mV	12.54mV	Pass
30% Load	10.90mV	11.61mV	5.63mV	14.22mV	Pass
40% Load	10.71mV	11.66mV	5.58mV	14.99mV	Pass
50% Load	11.17mV	10.79mV	5.58mV	16.16mV	Pass
60% Load	10.05mV	11.45mV	6.50mV	18.30mV	Pass
70% Load	11.07mV	15.80mV	7.16mV	20.29mV	Pass
80% Load	10.56mV	16.36mV	7.88mV	20.39mV	Pass
90% Load	10.91mV	14.73mV	7.27mV	19.73mV	Pass
100% Load	17.55mV	9.82mV	6.92mV	29.69mV	Pass
110% Load	19.65mV	10.05mV	7.78mV	28.92mV	Pass
Crossload1	18.50mV	8.87mV	9.65mV	6.92mV	Pass
Crossload2	12.53mV	8.95mV	7.73mV	6.32mV	Pass
Crossload3	0.00mV	0.00mV	0.00mV	0.00mV	Pass
Crossload4	18.95mV	7.66mV	5.64mV	11.19mV	Pass

The results above are not used in the certification process

Thermaltake Toughpower SFX 750W



Top side



Power specifications label

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