

Anex

Thermaltake Toughpower TF1 1550W

Lab ID#: TT15501857
Receipt Date: May 8, 2021
Test Date: Jun 11, 2021

Report: 21PS1857A
Report Date: Jun 14, 2021

DUT INFORMATION

Brand	Thermaltake
Manufacturer (OEM)	Channel Well Technology
Series	Toughpower TF1
Model Number	PS-TPD-1550FNFATU-1
Serial Number	PSTPD1550FNFATU1XR000269
DUT Notes	

DUT SPECIFICATIONS

Rated Voltage (Vrms)	100-240
Rated Current (Arms)	18
Rated Frequency (Hz)	47-63
Rated Power (W)	1550
Type	ATX12V
Cooling	135mm Fluid Dynamic Bearing Fan (HA13525H12SF-Z)
Semi-Passive Operation	✓ (selectable)
Cable Design	Fully Modular

TEST EQUIPMENT

Electronic Loads	Chroma 63601-5 x4 Chroma 63600-2 x2 63640-80-80 x20 63610-80-20 x2
AC Sources	Chroma 6530, Keysight AC6804B
Power Analyzers	N4L PPA1530 x2
Sound Analyzer	Bruel & Kjaer 2270 G4
Microphone	Bruel & Kjaer Type 4955-A
Data Loggers	Picoscope TC-08 x2, Labjack U3-HV x2
Tachometer	UNI-T UT372 x2
Digital Multimeter	Keysight U1273AX, Fluke 289, Keithley 2015 - THD
UPS	CyberPower OLS3000E 3kVA x2
Transformer	3kVA x2

All data and graphs included in this test report can be used by any individual on the following conditions:

- > It should be mentioned that the test results are provided by Cybenetics
- > The link to the original test results document should be provided in any case

PAGE 1/12

Anex

Thermaltake Toughpower TF1 1550W

RESULTS

Temperature Range (°C /°F)	30-32 / 86-89.6
ErP Lot 3/6 Ready	✓
(EU) No 617/2013 Compliance	✓

115V

Average Efficiency	91.051%
Efficiency With 10W (≤500W) or 2% (>500W)	75.729
Average Efficiency 5VSB	77.327%
Standby Power Consumption (W)	0.0117626
Average PF	0.994
Avg Noise Output	36.88 dB(A)
Efficiency Rating (ETA)	TITANIUM
Noise Rating (LAMBDA)	Standard+

POWER SPECIFICATIONS

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	22	22	129.16	3	0.5
	Watts	120		1549.92	15	6
Total Max. Power (W)		1550				

HOLD-UP TIME & POWER OK SIGNAL (230V)

Hold-Up Time (ms)	18.7
AC Loss to PWR_OK Hold Up Time (ms)	17.6
PWR_OK Inactive to DC Loss Delay (ms)	1.1

All data and graphs included in this test report can be used by any individual on the following conditions:

- > It should be mentioned that the test results are provided by Cybenetics
- > The link to the original test results document should be provided in any case

PAGE 2/12

Anex

Thermaltake Toughpower TF1 1550W

CABLES AND CONNECTORS

Modular Cables

Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors
ATX connector 20+4 pin (600mm)	1	1	16AWG	No
4+4 pin EPS12V (650mm)	1	1	16AWG	No
8 pin EPS12V (650mm)	1	1	16AWG	No
6+2 pin PCIe (600mm)	4	4	16AWG	No
8 pin PCIe (600mm)	4	4	16AWG	No
SATA (550mm+150mm+150mm+150mm)	4	16	18AWG	No
4-pin Molex (550mm+150mm+150mm+150mm)	2	8	18AWG	No
FDD Adapter (+100mm)	1	1	22AWG	No
AC Power Cord (1380mm) - C19 coupler	1	1	14AWG	-

All data and graphs included in this test report can be used by any individual on the following conditions:

- › It should be mentioned that the test results are provided by Cybenetics
- › The link to the original test results document should be provided in any case

PAGE 3/12

Anex

Thermaltake Toughpower TF1 1550W

General Data	-
Manufacturer (OEM)	CWT
PCB Type	Double Sided
Primary Side	-
Transient Filter	6x Y caps, 2x X caps, 2x CM chokes, 1x MOV, 1x Sync Power SP687 (Discharge IC)
Inrush Protection	NTC Thermistor SCK-0510 (5 Ohm) & Relay
Bridge Rectifier(s)	2x Vishay LVB2560 (600V, 25A @ 105°C)
APFC MOSFETs	1x On Semiconductor FCH040N65S3 (650V, 41A @ 100°C, Rds(on): 0.04Ohm) 2x On Semiconductor FCPF067N65S3 (650V, 28A @ 100°C, Rds(on): 0.067Ohm) 1x Sync Power SPN5003 FET (for reduced no-load consumption)
APFC Boost Diode	2x Infineon IDH10G65C6 (650V, 10A @ 140°C)
Bulk Cap(s)	2x Nippon Chemi-Con (400V, 820uF each or 1640 combined, 2,000h @ 105°C, KMW) & 1x Nippon Chemi-Con (400V, 470uF, 2,000h @ 105°C, KMW)
Main Switchers	4x Alpha & Omega AOTF29S50 (500V, 18A @ 100°C, Rds(on): 0.15Ohm)
Main FET Drivers	2x Silicon Labs Si8233BD
APFC FET Drivers	2x On Semiconductor NCP81071
Digital Controllers	2x Texas Instruments UCD3138A
Topology	Primary side: Semi-Digital, Interleaved PFC, Full-Bridge & LLC converter Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	-
+12V MOSFETs	12x On Semiconductor NTMFS5C612N (60V, 160A @ 100°C, Rds(on): 1.6mOhm)
5V & 3.3V	DC-DC Converters: 6x UBIQ QM3054M6 (30V, 61A @ 100°C, Rds(on): 4.8mOhm) PWM Controller(s): 1x
Filtering Capacitors	Electrolytic: 4x Nichicon (2-4,000h @ 105°C, HD), 2x Nichicon (4-10,000h @ 105°C, HE), 2x Rubycon (6-10,000h @ 105°C, ZLH), 3x Nichicon (1,000h @ 105°C, VZ), 1x Nippon Chemi-Con (6-10,000h @ 105°C, KZN), 3x Nippon Chemi-Con (4-10,000h @ 105°C, KY) Polymer: 52x APAQ
Supervisor IC	Weltrend WT7513 (OCP, OVP, UVP, SCP, PG) & IN1S315I
Fan Model	Thermaltake TT-13525 (Hong Hua HA13525H12SF-Z) (135mm, 12V, 0.50A, Fluid Dynamic Bearing Fan)
5VSB Circuit	-
Rectifier	1x UTC 4N65L FET (650V, 4A, Rds(on): 2.5Ohm) & 1x PS1045L SBR (45V, 10A)
Standby PWM Controller	On-Bright OB5282

All data and graphs included in this test report can be used by any individual on the following conditions:

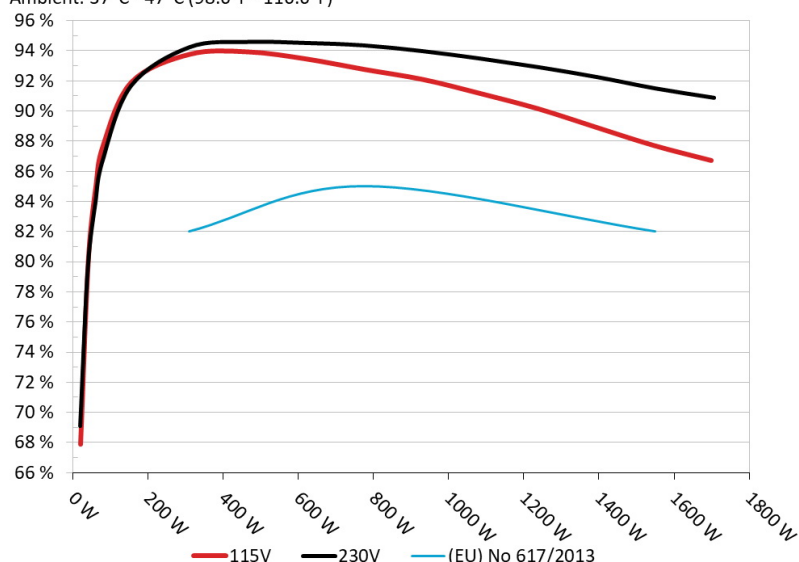
- > It should be mentioned that the test results are provided by Cybenetics
- > The link to the original test results document should be provided in any case

PAGE 4/12

EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE

Efficiency: Thermaltake Toughpower TF1 1550W

Ambient: 37°C - 47°C (98.6°F - 116.6°F)



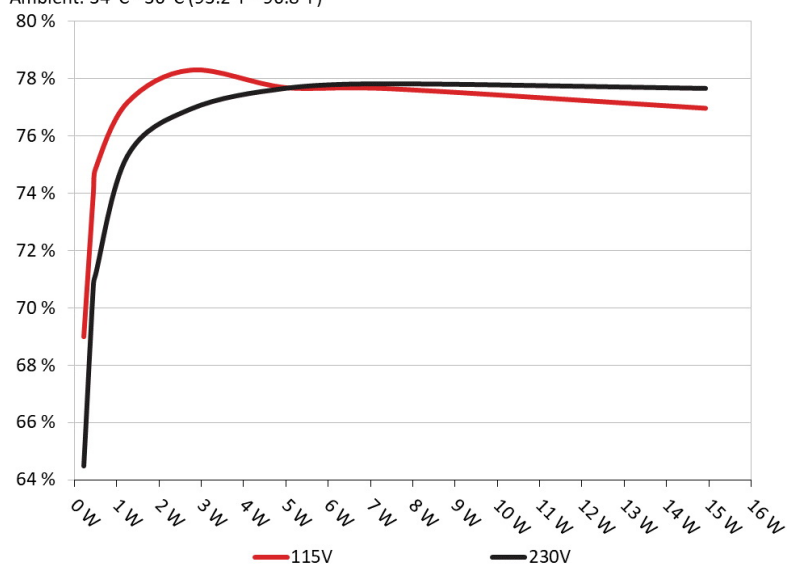
INFO

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

5VSB Efficiency: Thermaltake Toughpower TF1 1550W

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



INFO

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

All data and graphs included in this test report can be used by any individual on the following conditions:

- > It should be mentioned that the test results are provided by Cybenetics
- > The link to the original test results document should be provided in any case

Anex

Thermaltake Toughpower TF1 1550W

5VSB EFFICIENCY -115V (ERP LOT 3/6 & CEC)

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.227	68.997%	0.030
	5.036V	0.329		115.11V
2	0.090A	0.453	74.020%	0.056
	5.034V	0.612		115.12V
3	0.550A	2.763	78.294%	0.256
	5.023V	3.529		115.11V
4	1.000A	5.015	77.680%	0.357
	5.014V	6.456		115.11V
5	1.500A	7.508	77.642%	0.414
	5.004V	9.670		115.11V
6	3.001A	14.927	76.963%	0.488
	4.974V	19.395		115.12V

5VSB EFFICIENCY -230V (ERP LOT 3/6 & CEC)

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.227	64.489%	0.010
	5.034V	0.352		230.25V
2	0.090A	0.453	70.781%	0.018
	5.032V	0.640		230.26V
3	0.550A	2.763	76.921%	0.098
	5.022V	3.592		230.28V
4	1.000A	5.014	77.640%	0.164
	5.013V	6.458		230.27V
5	1.500A	7.507	77.793%	0.223
	5.004V	9.650		230.26V
6	3.000A	14.925	77.633%	0.331
	4.975V	19.225		230.26V

All data and graphs included in this test report can be used by any individual on the following conditions:

- > It should be mentioned that the test results are provided by Cybenetics
- > The link to the original test results document should be provided in any case

PAGE 6/12

Anex

Thermaltake Toughpower TF1 1550W

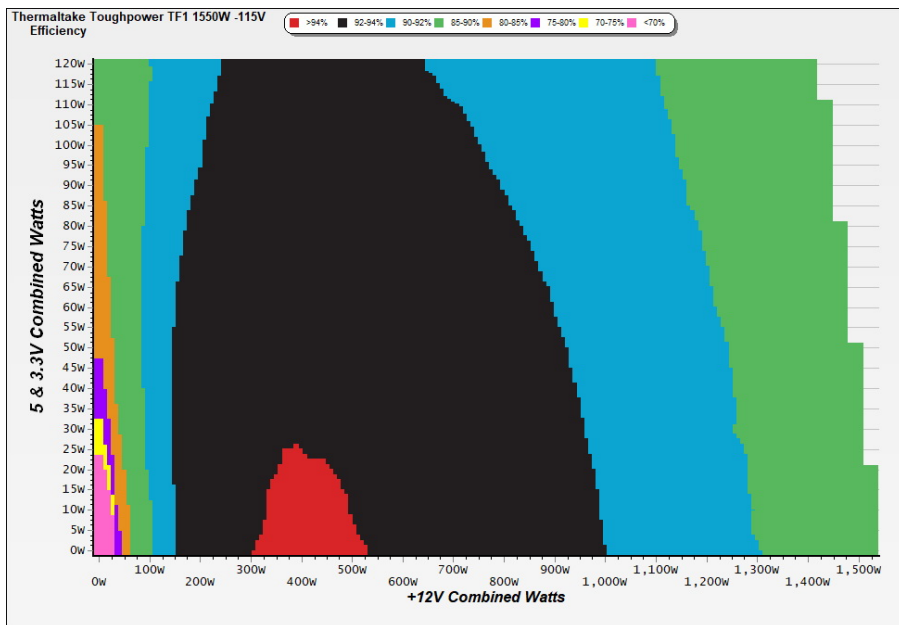
115V

All data and graphs included in this test report can be used by any individual on the following conditions:

- › It should be mentioned that the test results are provided by Cybenetics
- › The link to the original test results document should be provided in any case

PAGE 7/12

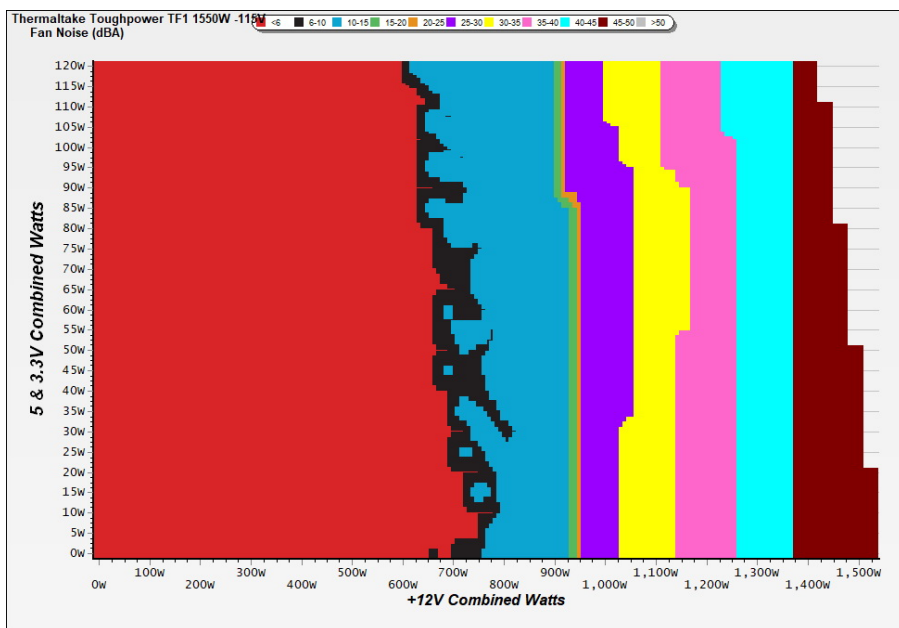
EFFICIENCY GRAPH 115V



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

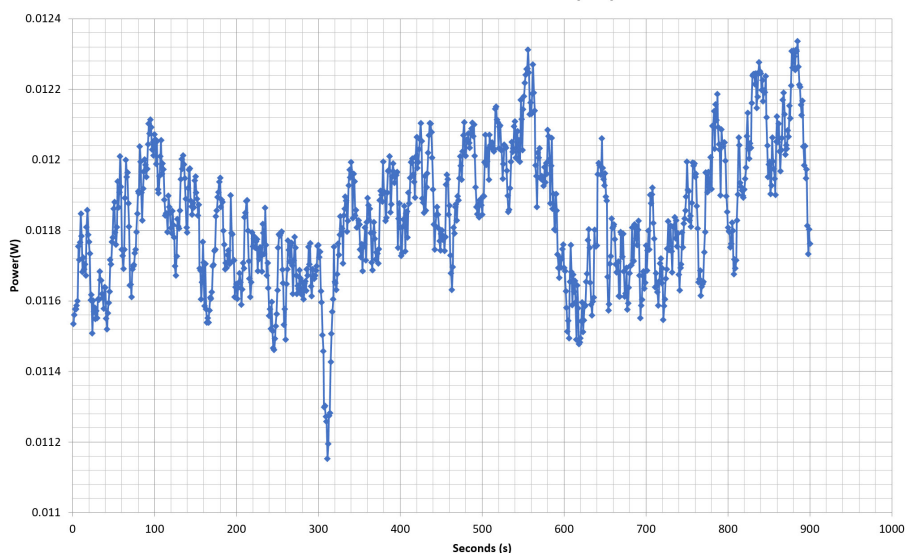
The PSU's noise in its entire operational range and under 30-32 °C ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails

All data and graphs included in this test report can be used by any individual on the following conditions:

- › It should be mentioned that the test results are provided by Cybenetics
- › The link to the original test results document should be provided in any case

VAMPIRE POWER -115V

Power - PSTPD1550FNFATU1XR000269 - 08/06/2021 - 09:16



INFO

This graph is generated by the PPA Standby Power Analysis software which takes full control of the power analyzer during the whole procedure. This application features all of the EN50564 & IEC62301 test limits for standby power software testing

All data and graphs included in this test report can be used by any individual on the following conditions:

- › It should be mentioned that the test results are provided by Cybenetics
- › The link to the original test results document should be provided in any case

PAGE 9/12

Anex

Thermaltake Toughpower TF1 1550W

10-110% 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
1	11.114A	1.999A	2.001A	1.000A	155.697	91.912%	308	<6.0	40.08°C	0.984
	12.044V	5.084V	3.306V	5.062V	169.397				42.88°C	115.13V
2	23.262A	3.000A	3.000A	1.200A	311.181	93.758%	309	<6.0	40.56°C	0.995
	12.035V	5.083V	3.302V	5.057V	331.899				44.16°C	115.12V
3	35.759A	3.500A	3.501A	1.400A	466.444	93.914%	310	<6.0	41.10°C	0.997
	12.026V	5.081V	3.299V	5.052V	496.670				45.27°C	115.11V
4	48.252A	4.000A	4.002A	1.600A	621.438	93.443%	310	<6.0	41.27°C	0.998
	12.017V	5.081V	3.297V	5.047V	665.045				46.15°C	115.09V
5	60.392A	5.001A	5.001A	1.800A	776.146	92.748%	589	14.5	42.41°C	0.999
	12.008V	5.081V	3.294V	5.042V	836.836				48.03°C	115.08V
6	72.542A	6.003A	6.000A	2.000A	930.588	92.090%	1109	34.1	42.74°C	0.999
	11.997V	5.079V	3.290V	5.036V	1010.521				48.89°C	115.08V
7	84.678A	7.002A	7.000A	2.200A	1084.644	91.153%	1342	39.0	43.34°C	0.999
	11.987V	5.077V	3.285V	5.029V	1189.921				50.13°C	115.06V
8	96.826A	8.002A	8.000A	2.401A	1238.514	90.141%	1537	43.0	43.66°C	0.999
	11.976V	5.075V	3.282V	5.023V	1373.976				51.06°C	115.05V
9	109.391A	8.502A	8.500A	2.401A	1392.022	88.921%	1892	48.3	44.37°C	0.998
	11.966V	5.073V	3.278V	5.021V	1565.466				52.54°C	115.04V
10	121.722A	9.005A	8.999A	3.001A	1545.321	87.717%	2205	52.1	45.11°C	0.998
	11.955V	5.070V	3.274V	5.004V	1761.711				54.25°C	115.03V
11	134.643A	9.004A	9.000A	3.001A	1698.527	86.718%	2205	52.1	47.28°C	0.998
	11.946V	5.068V	3.271V	5.002V	1958.675				56.98°C	115.02V
CL1	0.121A	14.005A	14.001A	0.000A	119.310	85.791%	328	<6.0	41.89°C	0.977
	12.040V	5.110V	3.306V	5.121V	139.071				47.61°C	115.14V
CL2	129.184A	1.000A	0.998A	1.000A	1558.811	87.977%	2055	50.4	45.52°C	0.998
	11.963V	5.069V	3.281V	5.040V	1771.830				54.63°C	115.03V

All data and graphs included in this test report can be used by any individual on the following conditions:

- > It should be mentioned that the test results are provided by Cybenetics
- > The link to the original test results document should be provided in any case

PAGE 10/12

Anex

Thermaltake Toughpower TF1 1550W

20-80W LOAD TESTS 115V

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	PF/AC Volts
1	1.240A	0.501A	0.501A	0.200A	20.163	67.912%	305	<6.0	0.777
	12.051V	5.082V	3.308V	5.077V	29.690				115.13V
2	2.472A	1.001A	1.001A	0.400A	40.215	79.876%	306	<6.0	0.905
	12.050V	5.082V	3.308V	5.073V	50.347				115.13V
3	3.712A	1.501A	1.501A	0.600A	60.362	84.896%	307	<6.0	0.944
	12.049V	5.083V	3.307V	5.070V	71.101				115.13V
4	4.952A	2.000A	2.002A	0.800A	80.507	87.732%	307	<6.0	0.960
	12.048V	5.085V	3.307V	5.068V	91.765				115.13V

RIPPLE MEASUREMENTS 115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	11.72mV	6.38mV	11.04mV	4.04mV	Pass
20% Load	14.97mV	6.74mV	23.06mV	4.20mV	Pass
30% Load	18.86mV	6.54mV	11.40mV	4.55mV	Pass
40% Load	15.43mV	6.74mV	11.35mV	4.25mV	Pass
50% Load	14.48mV	8.07mV	11.91mV	4.66mV	Pass
60% Load	17.07mV	7.46mV	12.74mV	5.07mV	Pass
70% Load	15.30mV	7.81mV	13.40mV	5.17mV	Pass
80% Load	15.86mV	7.71mV	18.87mV	4.86mV	Pass
90% Load	16.32mV	8.22mV	13.45mV	5.84mV	Pass
100% Load	21.15mV	8.62mV	14.50mV	6.02mV	Pass
110% Load	22.25mV	8.30mV	14.78mV	5.76mV	Pass
Crossload1	13.30mV	7.36mV	12.94mV	4.58mV	Pass
Crossload2	21.96mV	8.67mV	14.45mV	5.67mV	Pass

All data and graphs included in this test report can be used by any individual on the following conditions:

- > It should be mentioned that the test results are provided by Cybenetics
- > The link to the original test results document should be provided in any case

PAGE 11/12

Thermaltake Toughpower TF1 1550W



- It should be mentioned that the test results are provided by Cybenetics
- The link to the original test results document should be provided in any case