



FSP Technology HPT850M Hydro (#2)

Serial Number

Lab ID 435

Certification ID 25435

Test Result Report ID:

Certificate Issue Date: Jul 20, 2018

115V

230V

Scheme: ETA-EMI PSU



115V

230V



Scheme: LAMBDA PSU

A handwritten signature in blue ink, consisting of several loops and strokes, positioned above the name of the General Manager.

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	Cybernetics PSU Test Protocol

DUT Information(Non-accredited measurements)

Product Identification Details	
Brand	FSP Technology
Model	HPT850M Hydro (#2)
OEM/ODM	FSP
Serial Number	
Product Specifications	
Manufacturer-Provided Information	
Rated Voltage (Vrms)	100-240
Rated Current (Arms)	10-5
Rated Frequency (Hz)	50-60

Rated Power (W)	850
Operating Temperature (Continuous Full Load) (°C)	
Type	ATX12V
Cable Design	Fully Modular
Warranty	-
Cybenetics Measurements	
Dimensions (W x H x D)	
Weight	
Cooling	135mm Fluid Dynamic Bearing Fan (MGA13512XF-A25)
Semi-Passive Operation	✓
Cybenetics Testing Information	
Lab ID	435
Date of receipt	Jul 14, 2018
Testing Date	Jul 18, 2018
Report Issued Date	Jul 20, 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	In Cable Capacitors
ATX connector 20+4 pin (600mm)	1	1	16-22AWG	No
4+4 pin EPS12V (700mm)	2	2	16AWG	No
6+2 pin PCIe (650mm+150mm)	2	4	18AWG	No
6+2 pin PCIe (500mm+150mm)	2	4	16-18AWG	No
SATA (500mm+150mm+150mm+150mm)	2	8	18AWG	No
SATA (500mm+160mm) / 4 pin Molex (+160mm+100mm)	1	2 / 2	18AWG	No
SATA (500mm+160mm) / 4 pin Molex (+160mm) / FDD (+160mm)	1	2 / 1 / 1	18-22AWG	No
LED Light Cable (+600mm)	1	1	26AWG	No

AC Power Cord (1360mm) - C13 coupler	1	1	18AWG	-
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Power Specifications

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	20	20	70.83	2.5	0.3
	Watts	100		850	12.5	3.6
Total Max. Power (W)		850				

Parts Description

General Data	
Manufacturer (OEM)	FSP
Platform Model	HPT (M)
Primary Side	
Transient Filter	4x Y caps, 2x X caps, 2x CM chokes, 1x MOV
Inrush Protection	NTC Thermistor & Relay
Bridge Rectifier(s)	3x GBJ1506 (600V, 15A @ 100°C)
APFC MOSFETS	2x Infineon IPA60R120P7 (650V, 16A @ 100°C, 0.12Ohm)
APFC Boost Diode	1x ROHM SCS308AP (650V, 8A @ 135°C)
Hold-up Cap(s)	2x Chemi-Con (420V, 330uF, 2000h @ 105 °C, KMZ)
Main Switchers	2x STi STF28N60M2 (650V, 14A @ 100°C, 0.15Ohm) Driver IC: Silicon Labs Si8233BD
APFC Controller	Infineon ICE2PCS02
LLC Resonant Controller	Champion CM6901T2X
Topology	Primary side: Half-Bridge & LLC Resonant Controller Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	
+12V MOSFETS	6x Infineon BSC010N04LS (40V, 100A @ 100°C, 1mOhm)
5V & 3.3V	DC-DC Converters: 4x Infineon BSC0901NS (30V, 94A @ 100°C, 2.4mOhm) PWM Controller: Anpec APW7159C
Filtering Capacitors	Electrolytics: Chemi-Con (1-5,000 @ 105°C, KZE), Chemi-Con (4-10,000 @ 105°C, KY), 3x Rubycon (105°C) Polymers: Chemi-Con
Supervisor IC	SITI PS223H (4-channel OCP, OVP, UVP, OTP, SCP, PG)

Fan Model	Protechnic Electric MGA13512XF-A25 (135mm, 12V, 0.38A, Fluid Dynamic Bearing)
5VSB Circuit	
Rectifier	1x Infineon IRFR1018E (60V, 56A @ 100°C, 8.4mOhm)
Standby PWM Controller	InnoSwitch3-EP INN3674C

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	✓

Performance Summary 115V

Accredited	
Average Efficiency (>1450 load combinations)	90.632%
Average Noise Output (>1450 Load Combinations)	26.98dBA
Average PF (>1450 Load Combinations)	0.995
Efficiency With 10W (≤500W) or 2% (>500W) Load	69.084%
Standby Power Consumption	0.0585W
Non-Accredited	
12V Ripple (Full Load)	21.40mV
5V Ripple (Full Load)	6.70mV
3.3V Ripple (Full Load)	8.23mV
5VSB Ripple (Full Load)	14.66mV
12V Load Regulation	0.55%
5V Load Regulation	0.38%
3.3V Load Regulation	0.66%
5VSB Load Regulation	1.52%
Inrush Current	38.508A

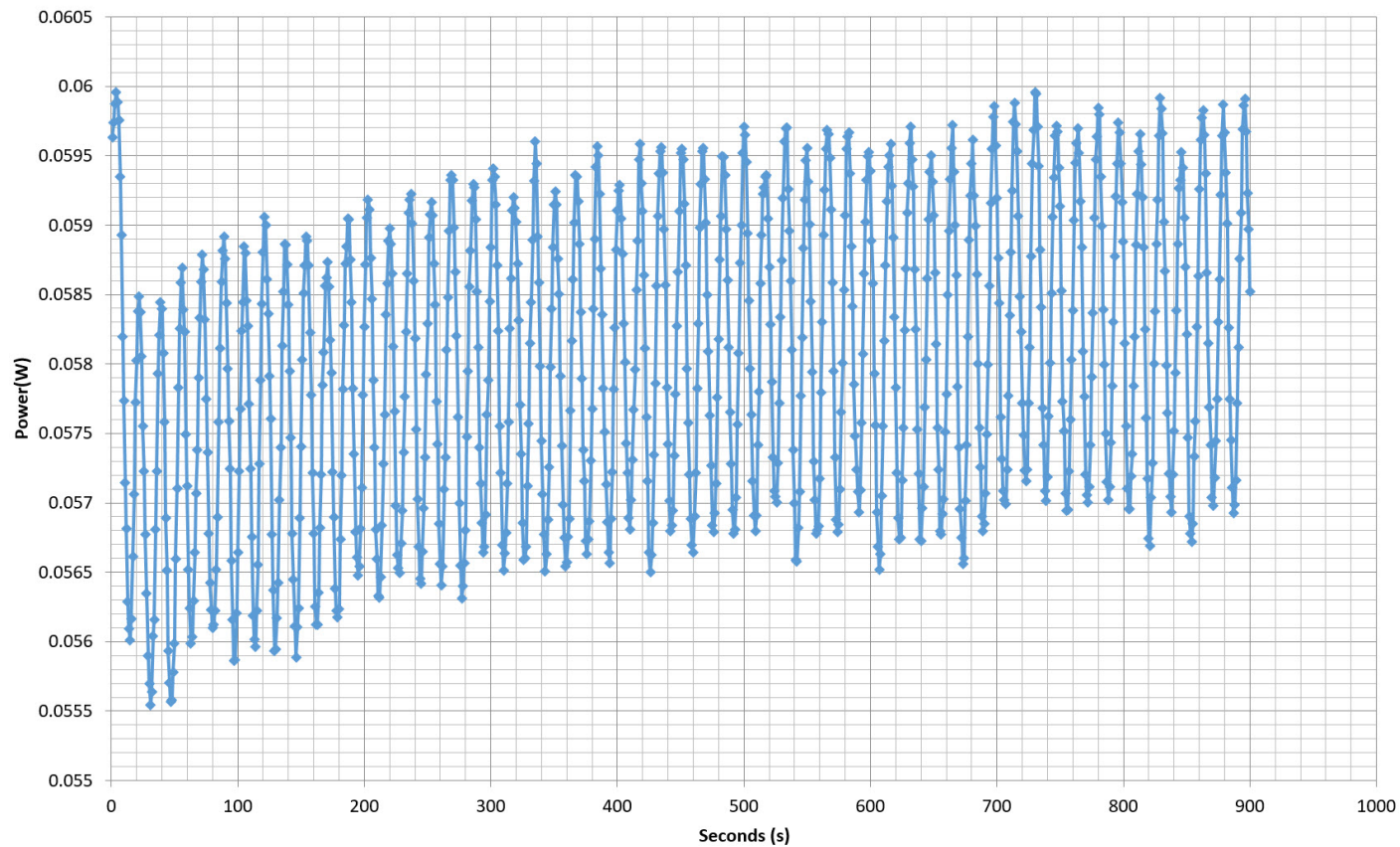
Hold-Up Time & PWR_OK Signal

Hold-Up Time (ms)	17.3
AC Loss to PWR_OK Hold Up Time (ms)	15.5
PWR_OK Inactive to DC Loss Delay (ms)	1.8

Stromverbrauch im Ruhezustand

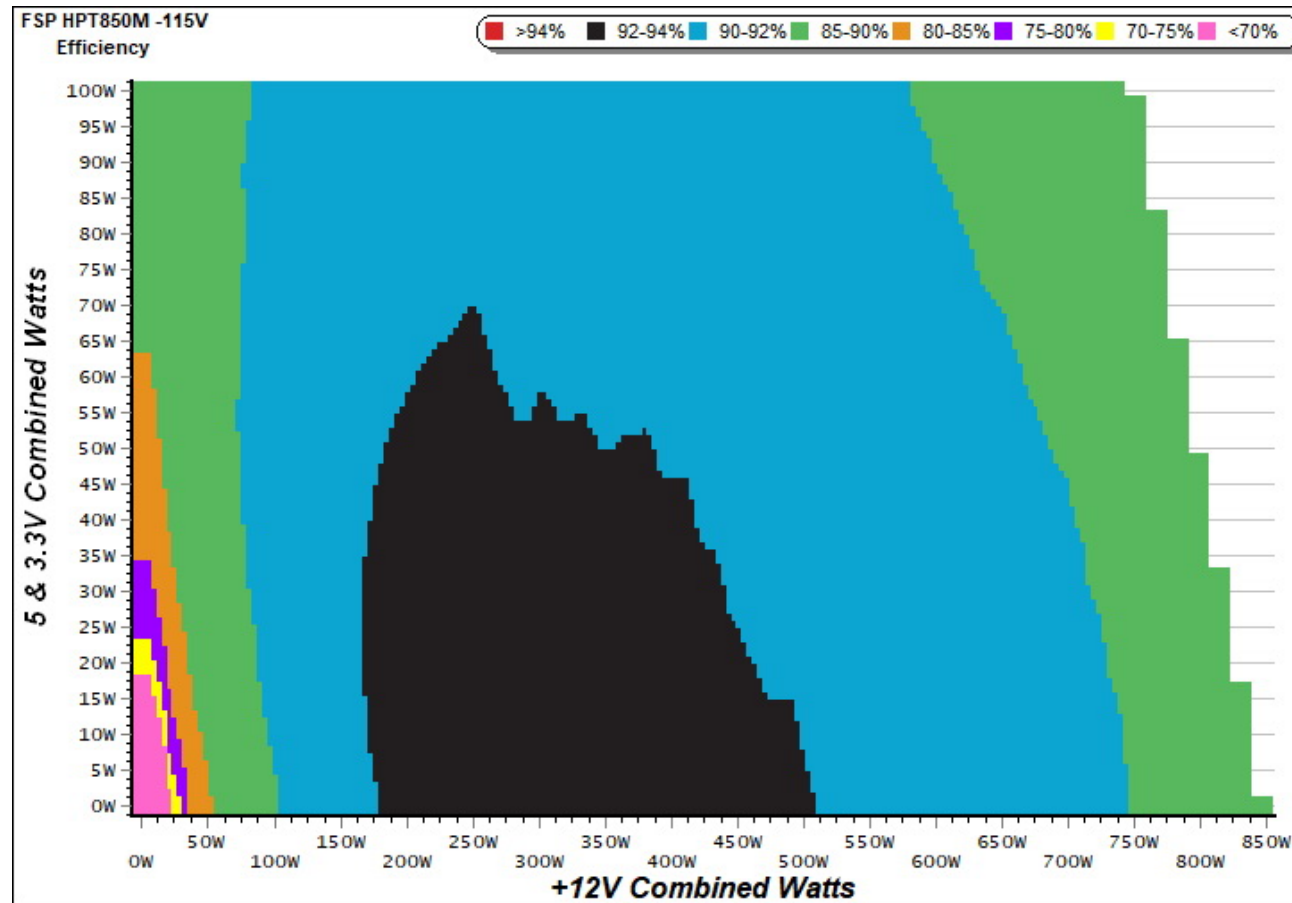
Graphs 115V

Power - 18/07/2018 - 09:08



Efficiency Graph

115V

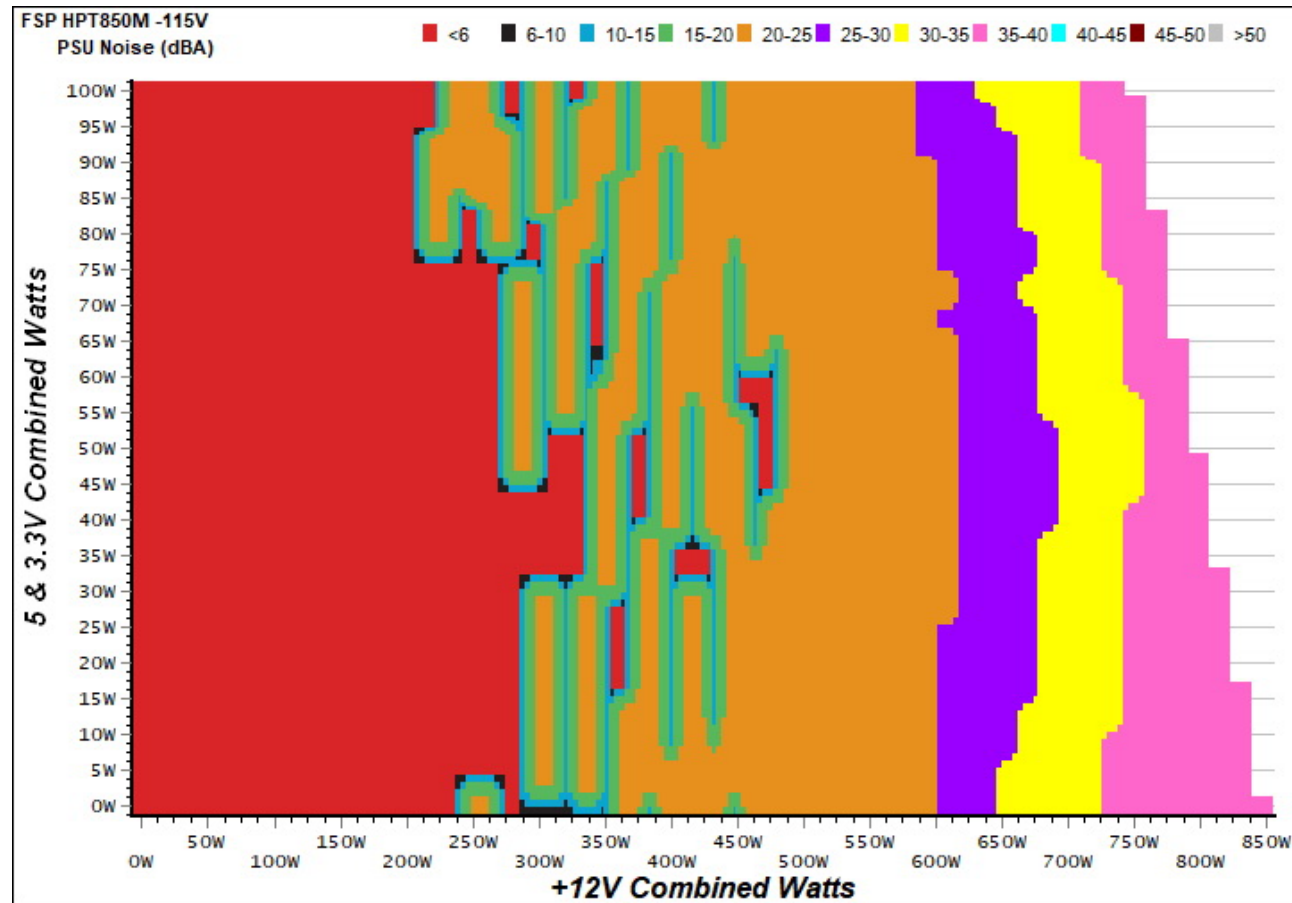


INFO

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

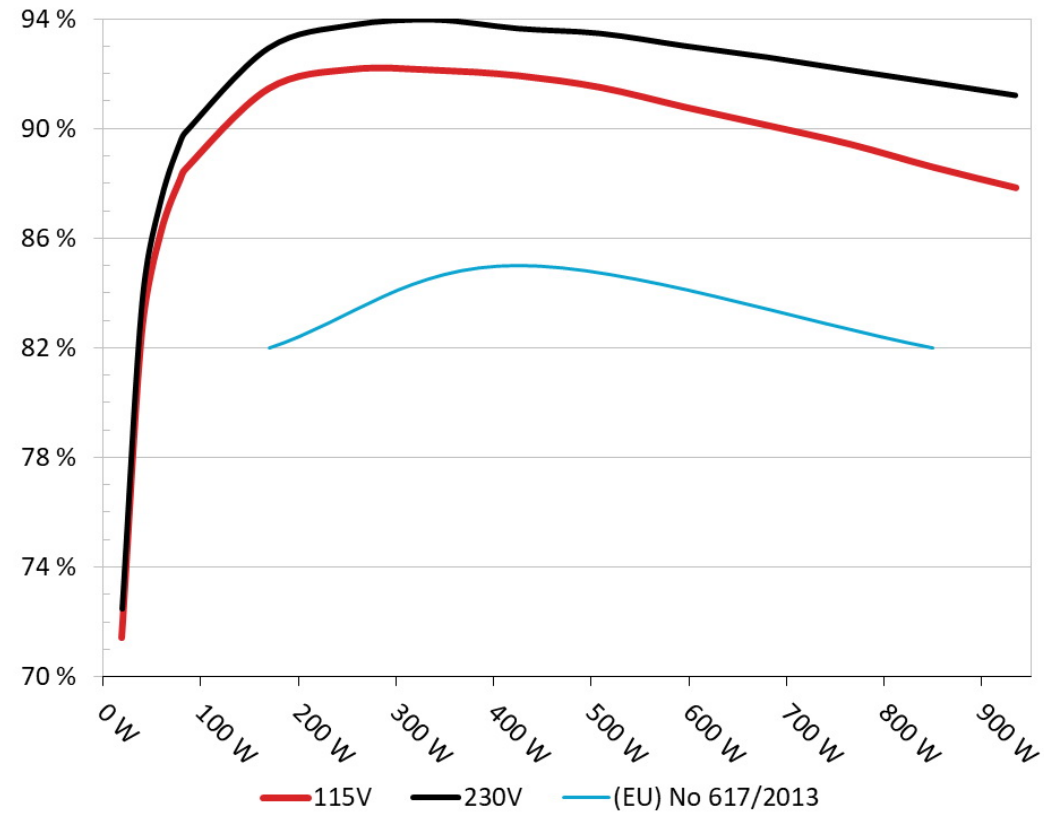
The PSU's noise in its entire operational range and under 30-32 °C ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails.

Indicative Performance

Efficiency under high ambient temperature

Efficiency: FSP HPT850M

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

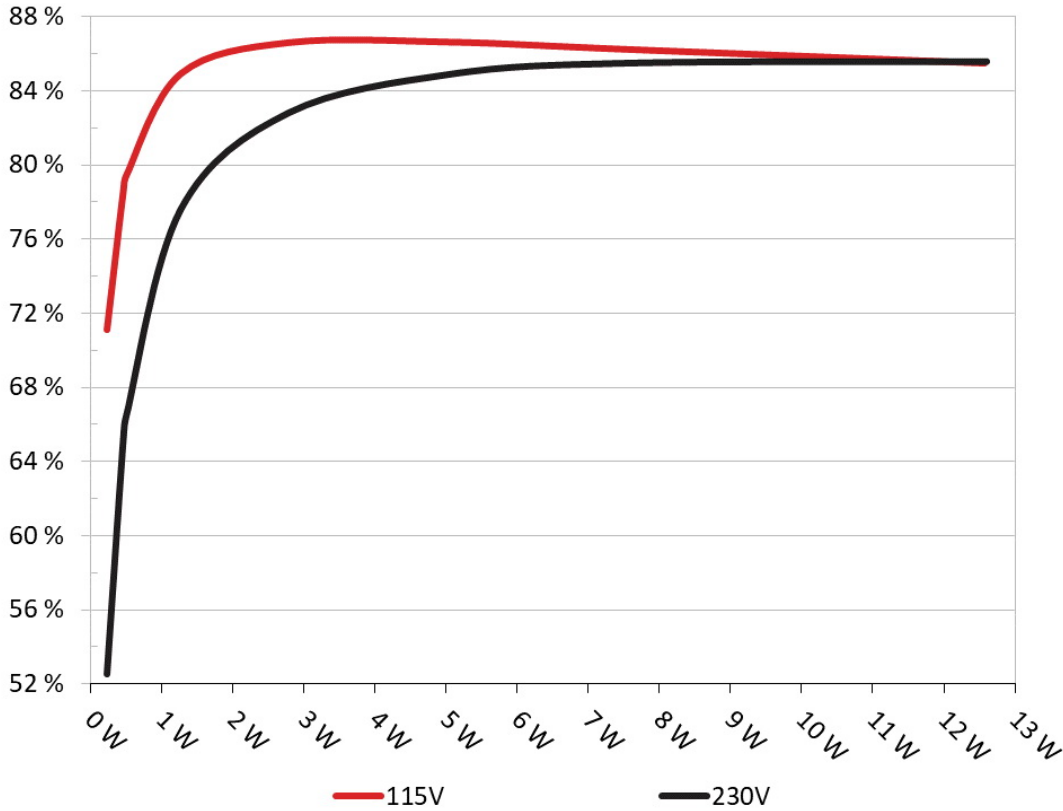


INFO

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: FSP HPT850M
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.

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.229	71.118%	0.036
	5.080V	0.322		115.38V

2	0.090A	0.457	78.522%	0.064
	5.076V	0.582		115.38V
3	0.550A	2.792	86.600%	0.264
	5.073V	3.224		115.37V
4	1.000A	5.070	86.622%	0.353
	5.068V	5.853		115.37V
5	1.500A	7.594	86.227%	0.404
	5.061V	8.807		115.37V
6	2.501A	12.578	85.489%	0.455
	5.030V	14.713		115.36V

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
1	5.245A	1.982A	1.975A	0.986A	84.868	88.519%	0	<6.0	46.88°C	0.981
	12.062V	5.046V	3.342V	5.072V	95.876				39.81°C	115.26V
2	11.487A	2.975A	2.964A	1.185A	169.373	91.434%	0	<6.0	47.70°C	0.996
	12.054V	5.044V	3.340V	5.065V	185.240				40.45°C	115.14V
3	18.130A	3.473A	3.447A	1.385A	254.462	92.147%	0	<6.0	49.22°C	0.996
	12.049V	5.041V	3.337V	5.057V	276.149				41.54°C	115.14V
4	24.785A	3.971A	3.959A	1.585A	339.670	92.118%	793	21.9	41.81°C	0.997
	12.042V	5.039V	3.334V	5.048V	368.735				50.49°C	115.01V
5	31.116A	4.967A	4.951A	1.786A	424.988	91.917%	885	24.8	42.14°C	0.998
	12.035V	5.036V	3.331V	5.040V	462.363				51.24°C	114.89V
6	37.388A	5.960A	5.949A	1.988A	509.513	91.487%	1055	30.4	42.81°C	0.998
	12.028V	5.034V	3.329V	5.032V	556.922				52.52°C	114.87V
7	43.730A	6.959A	6.943A	2.192A	594.838	90.779%	1375	37.9	43.11°C	0.998
	12.022V	5.032V	3.326V	5.021V	655.258				53.48°C	114.74V
8	50.085A	7.954A	7.942A	2.397A	680.133	90.107%	1695	43.7	43.79°C	0.999
	12.014V	5.030V	3.324V	5.008V	754.809				54.64°C	114.62V

9	56.843A	8.454A	8.429A	2.399A	765.081	89.419%	1975	47.7	44.65°C	0.999
	12.008V	5.028V	3.322V	5.003V	855.610				55.95°C	114.59V
10	63.545A	8.955A	8.945A	2.501A	849.821	88.581%	2120	49.1	45.93°C	0.999
	12.001V	5.027V	3.320V	4.999V	959.375				57.78°C	114.44V
11	70.649A	8.958A	8.951A	2.504A	934.592	87.834%	2115	49.0	46.67°C	0.999
	11.994V	5.026V	3.318V	4.994V	1064.047				58.91°C	114.39V
CL1	0.142A	12.003A	12.000A	0.000A	102.287	86.272%	985	28.0	42.72°C	0.986
	12.053V	5.041V	3.339V	5.065V	118.564				52.51°C	115.22V
CL2	70.841A	1.001A	1.000A	1.000A	863.903	88.938%	2010	47.9	45.44°C	0.999
	12.006V	5.030V	3.321V	5.031V	971.355				57.24°C	114.45V

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])	PF/AC Volts
1	1.197A	0.496A	0.477A	0.197A	19.532	71.441%	0	<6.0	0.883
	12.060V	5.046V	3.342V	5.068V	27.340				115.34V
2	2.457A	0.991A	0.986A	0.394A	39.944	82.515%	0	<6.0	0.949
	12.067V	5.046V	3.342V	5.075V	48.408				115.32V
3	3.650A	1.486A	1.466A	0.591A	59.435	86.194%	0	<6.0	0.968
	12.065V	5.046V	3.342V	5.076V	68.955				115.30V
4	4.913A	1.982A	1.973A	0.789A	79.858	88.190%	0	<6.0	0.978
	12.062V	5.046V	3.342V	5.073V	90.552				115.27V

The results above are not used in the certification process

Ripple Measurements 115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	18.9 mV	7.0 mV	7.0 mV	8.2 mV	Pass
20% Load	16.2 mV	4.0 mV	4.1 mV	8.7 mV	Pass
30% Load	16.8 mV	4.1 mV	4.4 mV	8.9 mV	Pass
40% Load	16.7 mV	4.3 mV	4.7 mV	9.9 mV	Pass

