

Anex

FSP Technology Inc. HPT850M Hydro (#2)

Lab ID#: 435

Receipt Date: Jul 14, 2018

Test Date: Jul 18, 2018

Report:

Report Date: Jul 20, 2018

DUT INFORMATION

Brand	FSP Technology Inc.
Manufacturer (OEM)	FSP
Series	Hydro PTM
Model Number	
Serial Number	
DUT Notes	

DUT SPECIFICATIONS

Rated Voltage (Vrms)	100-240
Rated Current (Arms)	10-5
Rated Frequency (Hz)	50-60
Rated Power (W)	850
Type	ATX12V
Cooling	135mm Fluid Dynamic Bearing Fan (MGA13512XF-A25)
Semi-Passive Operation	✓
Cable Design	Fully Modular

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				

CABLES AND CONNECTORS

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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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	SMTI 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

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RESULTS

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

115V

Average Efficiency	90.632%
Efficiency With 10W (≤500W) or 2% (>500W)	69.084
Average Efficiency 5VSB	85.770%
Standby Power Consumption (W)	0.0585192
Average PF	0.995
Avg Noise Output	26.98 dB(A)
Efficiency Rating (ETA)	PLATINUM
Noise Rating (LAMBDA)	A-

TEST EQUIPMENT

Electronic Loads	Chroma 6314A x2 63123A x6 63102A 63101A	Chroma 63601-5 x4 Chroma 63600-2 x2 63640-80-80 x20 63610-80-20 x2
AC Sources	Chroma 6530, Chroma 61604, Keysight AC6804B	
Power Analyzers	N4L PPA1530 x2, N4L PPA5530	
Oscilloscopes	Picoscope 4444 & 3424, Keysight DSOX3024A, Rigol DS2072A	
Voltmeter	Keithley 2015 THD 6.5 Digit	
Sound Analyzer	Bruel & Kjaer 2250-L G4	
Microphone	Bruel & Kjaer Type 4955-A, Bruel & Kjaer Type 4189	
Data Loggers	Picoscope TC-08 x2, Labjack U3-HV x2	

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

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

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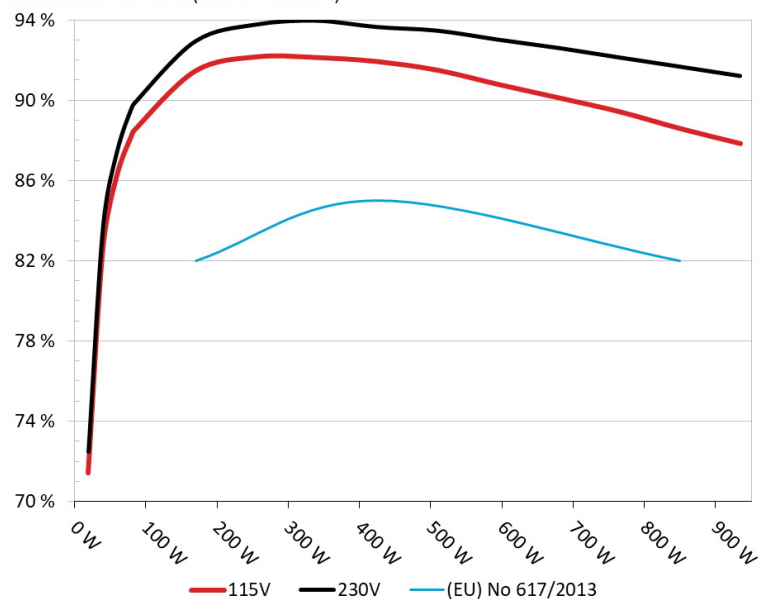
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EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE

Efficiency: FSP HPT850M

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



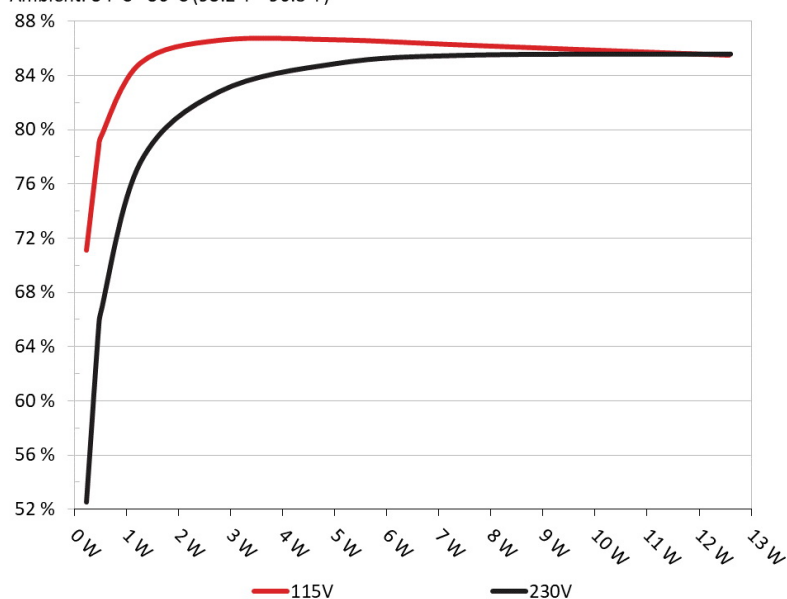
INFO

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

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

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

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.229	52.523%	0.015
	5.080V	0.436		230.94V
2	0.090A	0.458	65.149%	0.024
	5.078V	0.703		230.94V
3	0.550A	2.787	82.799%	0.109
	5.067V	3.366		230.94V
4	1.000A	5.071	84.884%	0.177
	5.070V	5.974		230.93V
5	1.500A	7.599	85.478%	0.235
	5.065V	8.890		230.93V
6	2.500A	12.607	85.564%	0.312
	5.042V	14.734		230.93V

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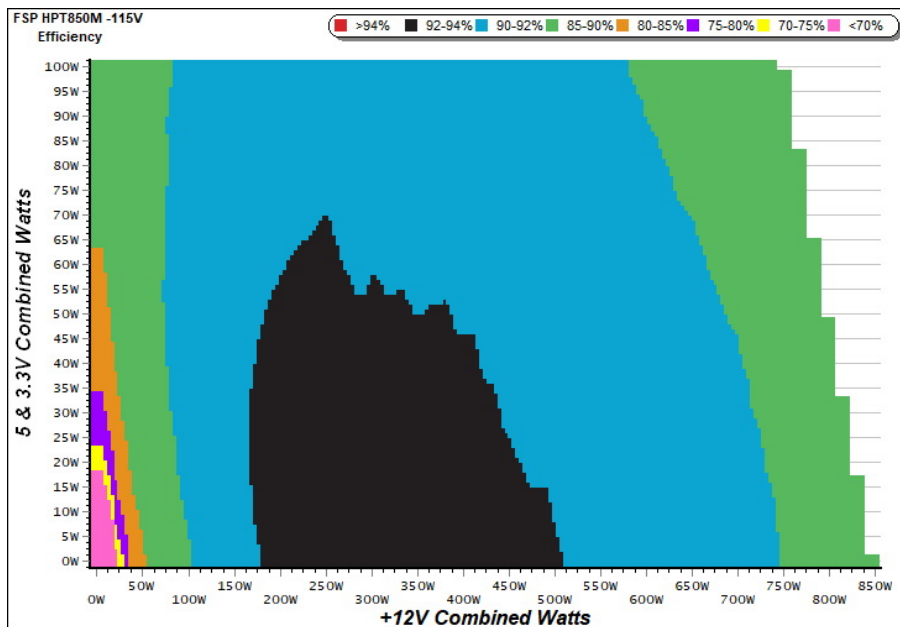
115V

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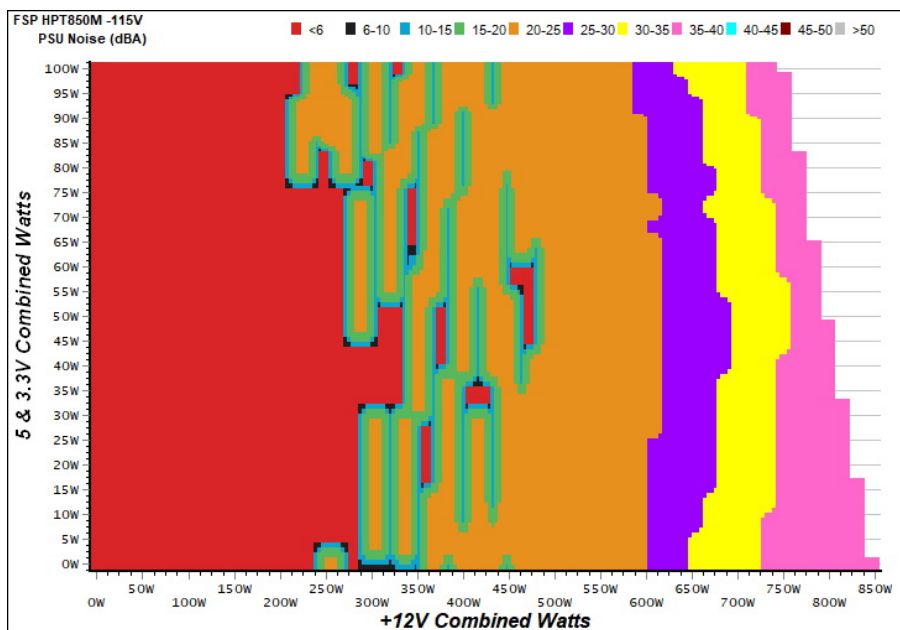
EFFICIENCY GRAPH 115V



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

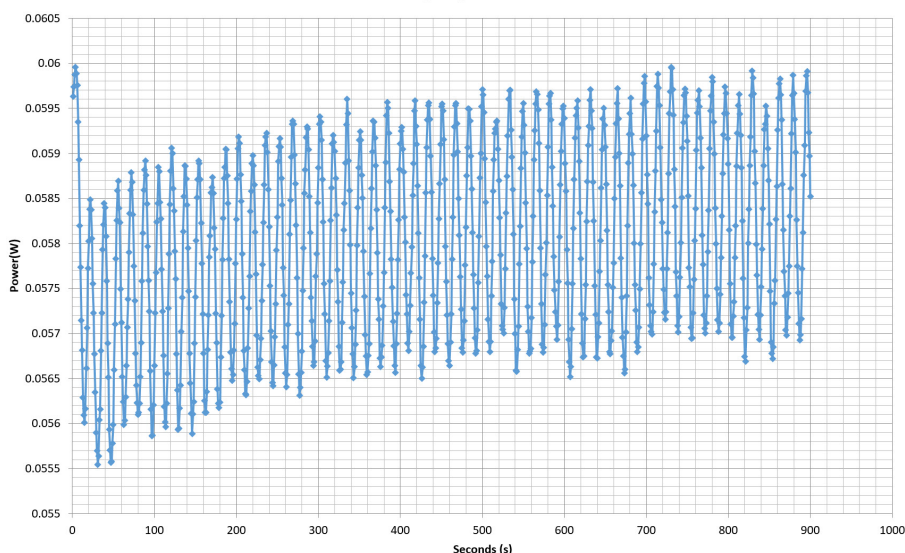
The PSU's noise in its entire operational range and under 30-32 °C ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails

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VAMPIRE POWER -115V

Power - 18/07/2018 - 09:08



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

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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	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

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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	1.197A	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

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
50% Load	18.0 mV	5.5 mV	5.7 mV	11.1 mV	Pass
60% Load	19.0 mV	5.6 mV	5.9 mV	15.8 mV	Pass
70% Load	19.0 mV	5.9 mV	6.2 mV	17.3 mV	Pass
80% Load	19.3 mV	6.4 mV	7.4 mV	15.8 mV	Pass
90% Load	20.5 mV	6.4 mV	7.8 mV	15.9 mV	Pass
100% Load	21.4 mV	6.7 mV	8.2 mV	14.7 mV	Pass
110% Load	22.7 mV	6.7 mV	7.7 mV	15.2 mV	Pass
Crossload 1	18.0 mV	6.6 mV	7.6 mV	3.9 mV	Pass
Crossload 2	21.8 mV	4.7 mV	4.8 mV	10.4 mV	Pass

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Top side

 FSP					
AC Input 交流輸入 / 交流輸入 / 정격입력		100-240V ~ 10-5A 50-60Hz			
DC Output 直流輸出 / 直流輸出		+3.3V	+5V	+12V	-12V +5Vsb
Max Output Current 最大電流 / 最大電流 / 정격출력		20A	20A	70.83A	0.3A 2.5A
Max Combined Power 最大功率 / 最大功率		100W		850W	3.6W 12.5W
Total Power 額定功率 / 額定功率		850W			



Power specifications label

CERTIFICATIONS 115V



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