Anex

FSP Technology Inc. HPT750M Hydro

Lab ID#: 168
Receipt Date: -
Test Date: -

Report:

Report Date: Aug 30, 2018

DUT INFORMATION

Brand	FSP Technology Inc.
Manufacturer (OEM)	FSP
Series	Hydro PTM
Model Number	HPT750M Hydro
Serial Number	S7200000012
DUT Notes	

DUT SPECIFICATIONS

Rated Voltage (Vrms)	100-240
Rated Current (Arms)	10-5
Rated Frequency (Hz)	50-60
Rated Power (W)	750
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	62.5	2.5	0.3
	Watts	120		750	12.5	3.6
Total Max. Power (W)		750				

CABLES AND CONNECTORS

Modular Cables

Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors
ATX connector 20+4 pin (600mm)	1	1	18-22AWG	No
4+4 pin EPS12V (700mm)	2	2	18AWG	No
6+2 pin PCIe (500mm+150mm)	3	6	18AWG	No
SATA (500mm+155mm+155mm+155mm)	2	8	18AWG	No
SATA (500mm+155mm)+4 pin Molex (+155mm+100mm)	2	4 / 4	18AWG	No
SATA (500mm+155mm)+4 pin Molex (+155mm)+ FDD (+155mm)	1	2 / 1 / 1	18-22AWG	No
AC Power Cord (1360mm) - C13 coupler	1	1	18AWG	-

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General Data	
Manufacturer (OEM)	FSP
Platform Model	PTM
Primary Side	
Transient Filter	4x Y caps, 1x X caps, 2x CM chokes, 1x MOV
Inrush Protection	NTC Thermistor & relay
Bridge Rectifier(s)	1x GBJ2506 (600V, 25A @ 100°C)
APFC MOSFETS	3x TK20A60W (600V, 20A @ 150°C, 0.13Ohm)
APFC Boost Diode	1x CREE C3D06060A (600V, 6A @ 154°C)
Hold-up Cap(s)	2x RubyconMXH (420V, 330uF each or 660uF combined, 2000h @ 105°C)
Main Switchers	2x STFI26NM60N (600V, 12.6A @ 100°C, 0.165Ohm)
Driver IC	1x Silicon Labs Si8233BD
APFC Controller	Infineon ICE2PCS02 Supporting IC: Fairchild KA393
Resonant Controller	Champion CM6901T2X
Topology	Primary side: Half-Bridge & LLC Resonant Controller Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	
+12V MOSFETS	4x Toshiba TPHR85 04PL(SOP Advance Series, 40V, 150A @ 25C, 0.85 mOhm)
5V & 3.3V	DC-DC Converters: 6x Infineon BSC0901NS (30V, 94A @ 100°C, 1.9mOhm) PWM Controller: APW7159C
Filtering Capacitors	Electrolytics: 6x KZE, 7x RubyconZLH Polymers: Teapo (Taiwan)
Supervisor IC	SITI PS223 (OCP, OTP, OVP, UVP, SCP, PG)
Fan Model	Protechnic Electric MGA13512XF-A25 (135mm, 12V, 0.38A, FDB)
5VSB Circuit	
Rectifier	Inte ational Rectifier IRFR1018E (60V, 56A @ 100°C, 8.4 mOhm)
Standby PWM Controller	Power Integrations SC1225K

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RESULTS	
Temperature Range (°C /°F)	30-32 / 86-89.6
Average Efficiency	89.740
Efficiency With 10W (≤500W) or 2% (>500W) Load -115V	0.000
Average Efficiency 5VSB	84.565
Standby Power Consumption (W) -115V	0.0474149
Standby Power Consumption (W) -230V	0.1076250
Average PF	0.997
ErP Lot 3/6 Ready	✓
(EU) No 617/2013 Compliance	✓
Avg Noise Output	27.77
Efficiency Rating (ETA)	PLATINUM
Noise Rating (LAMBDA)	A-

TEST EQUIPMENT		
Electronic Loads	Chroma 6314A x2 63123A x6 63102A 63101A	Chroma 63601-5 x2 Chroma 63600-2 63640-80-80 x10 63610-80-20
AC Sources	Chroma 6530, Chroma 61604	
Power Analyzers	N4L PPA1530, 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	

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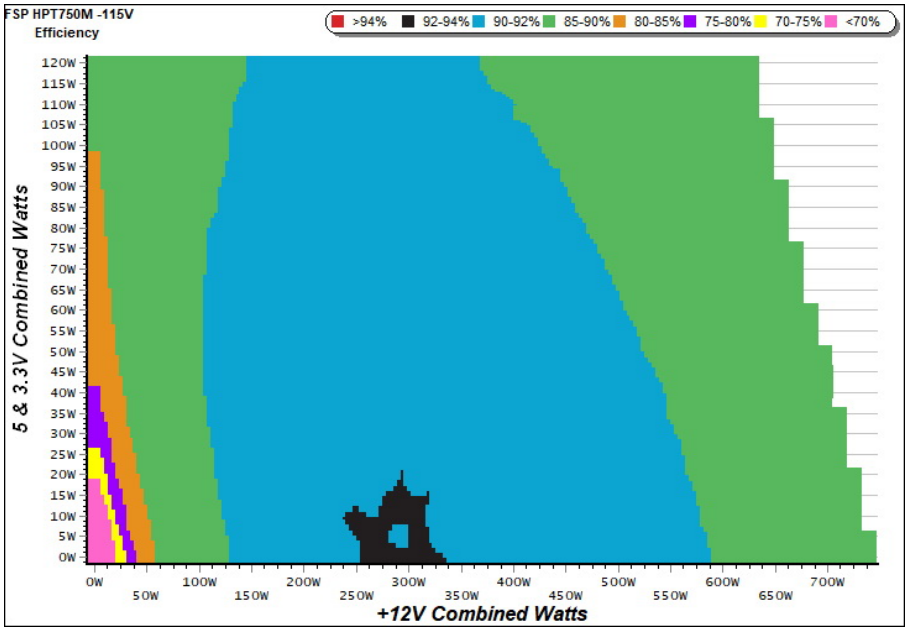
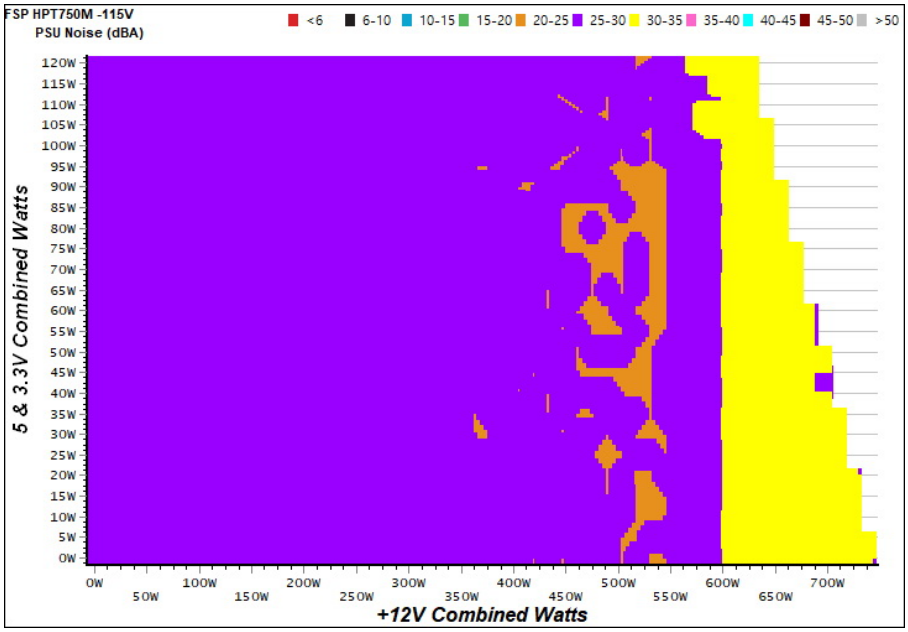
EFFICIENCY GRAPH



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



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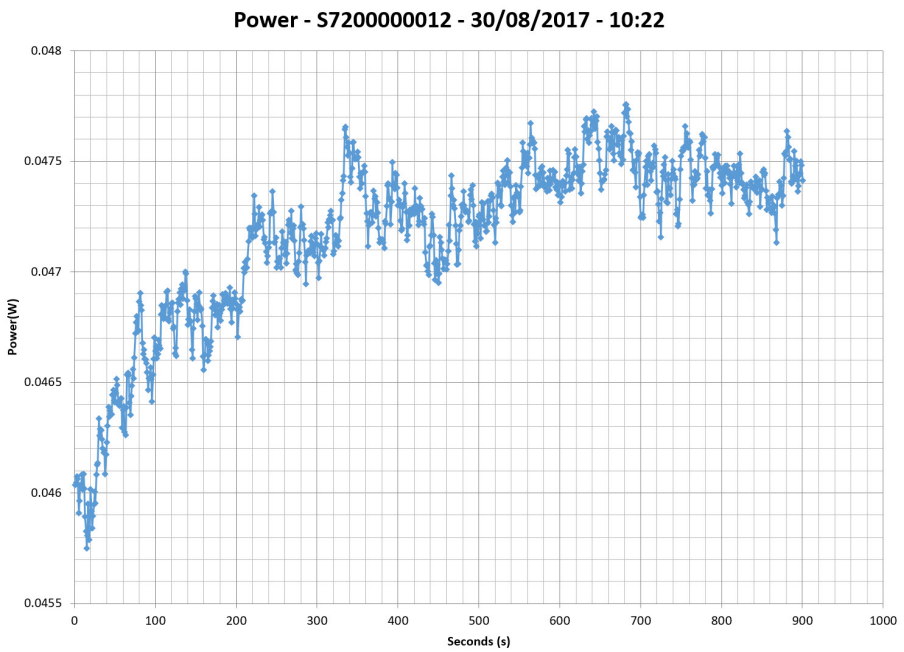
5VSB EFFICIENCY -115V (ERP LOT 3/6 & CEC)

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.041A	0.210	72.664%	0.047
	5.067V	0.289		115.16V
2	0.087A	0.440	79.855%	0.087
	5.066V	0.551		115.16V
3	0.542A	2.733	85.273%	0.314
	5.044V	3.205		115.15V
4	1.002A	5.037	85.041%	0.390
	5.029V	5.923		115.15V
5	1.501A	7.507	84.787%	0.428
	5.000V	8.854		115.15V
6	2.501A	12.386	83.893%	0.468
	4.952V	14.764		115.15V

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.041A	0.210	58.989%	0.018
	5.066V	0.356		230.39V
2	0.087A	0.440	70.175%	0.030
	5.065V	0.627		230.39V
3	0.542A	2.732	81.504%	0.146
	5.044V	3.352		230.38V
4	1.002A	5.039	84.547%	0.223
	5.029V	5.960		230.38V
5	1.502A	7.508	84.702%	0.279
	5.000V	8.864		230.39V
6	2.500A	12.387	84.248%	0.343
	4.954V	14.703		230.39V

VAMPIRE POWER -115V



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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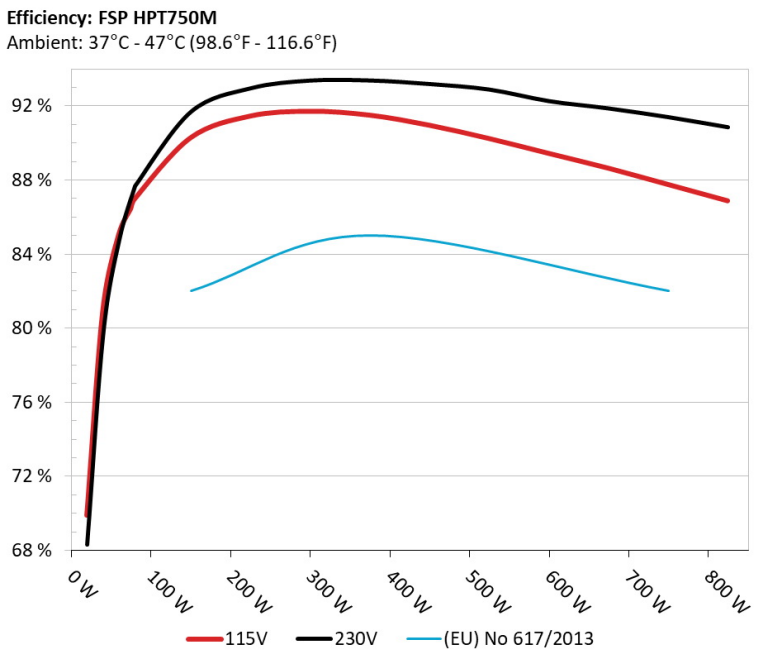
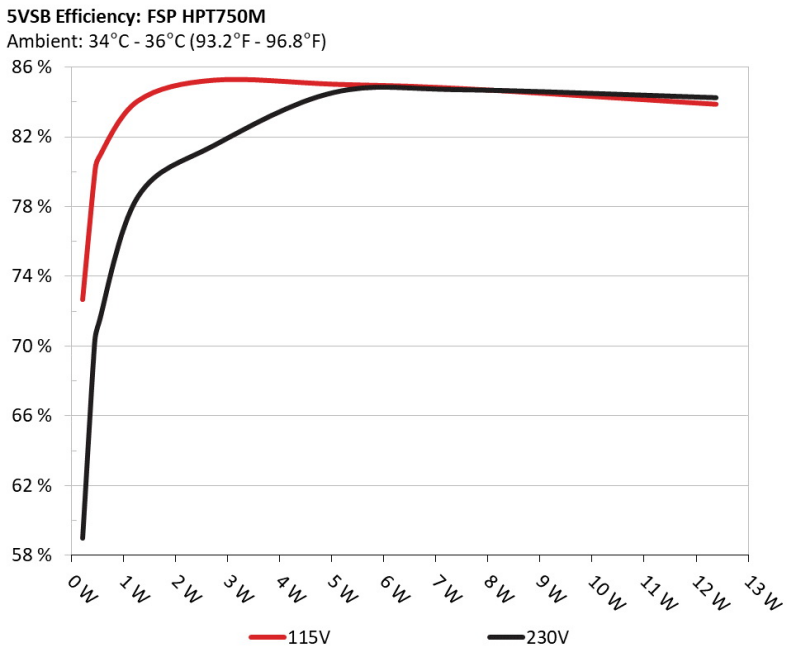
EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE



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

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10-110% LOAD TESTS

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
1	4.427A	1.985A	1.962A	0.996A	74.771	86.472%	865	25.2	38.38°C	0.989
	12.012V	5.044V	3.360V	5.010V	86.468				40.67°C	115.19V
2	9.910A	2.977A	2.954A	1.200A	149.753	90.290%	865	25.2	38.64°C	0.996
	11.997V	5.033V	3.349V	4.989V	165.858				41.64°C	115.19V
3	15.754A	3.488A	3.470A	1.405A	224.841	91.467%	865	25.2	38.93°C	0.998
	11.981V	5.023V	3.339V	4.973V	245.817				42.64°C	115.20V
4	21.607A	3.990A	3.960A	1.610A	299.695	91.728%	865	25.2	39.19°C	0.998
	11.965V	5.013V	3.330V	4.956V	326.720				44.00°C	115.22V
5	27.129A	4.991A	4.970A	1.820A	374.614	91.518%	865	25.2	39.70°C	0.999
	11.949V	5.003V	3.318V	4.939V	409.334				45.51°C	115.20V
6	32.660A	6.016A	5.984A	2.030A	449.558	90.973%	865	25.2	40.44°C	0.999
	11.934V	4.990V	3.308V	4.916V	494.164				48.32°C	115.21V
7	38.212A	7.025A	7.006A	2.246A	524.473	90.256%	910	27.1	41.38°C	0.999
	11.918V	4.979V	3.296V	4.895V	581.096				51.03°C	115.44V
8	43.780A	8.058A	8.032A	2.457A	599.473	89.453%	1235	34.9	42.54°C	0.999
	11.902V	4.968V	3.285V	4.878V	670.155				53.40°C	115.21V
9	49.799A	8.574A	8.577A	2.462A	674.494	88.651%	1330	36.9	44.02°C	0.999
	11.886V	4.958V	3.275V	4.868V	760.842				57.17°C	115.20V
10	55.788A	9.096A	9.091A	2.574A	749.326	87.774%	1610	41.7	45.83°C	0.998
	11.869V	4.948V	3.265V	4.852V	853.697				60.96°C	115.21V
11	62.187A	9.113A	9.118A	2.578A	824.225	86.890%	1800	44.7	47.22°C	0.998
	11.852V	4.939V	3.256V	4.844V	948.579				63.55°C	115.19V
CL1	0.098A	14.026A	14.005A	0.004A	117.934	85.301%	995	29.2	44.15°C	0.994
	11.999V	5.007V	3.321V	5.019V	138.256				54.79°C	115.21V
CL2	62.448A	1.003A	1.001A	1.001A	754.548	88.064%	1350	37.1	45.29°C	0.998
	11.871V	4.969V	3.291V	4.944V	856.816				61.11°C	115.21V

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20-80W LOAD TESTS

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	PF/AC Volts
1	1.212A	0.492A	0.469A	0.195A	19.626	69.906%	865	25.2	0.921
	12.024V	5.054V	3.370V	5.051V	28.075				115.19V
2	2.453A	0.986A	0.979A	0.396A	39.754	80.980%	865	25.2	0.963
	12.019V	5.050V	3.367V	5.038V	49.091				115.19V
3	3.695A	1.477A	1.482A	0.596A	59.832	85.083%	865	25.2	0.982
	12.015V	5.047V	3.363V	5.031V	70.322				115.19V
4	4.928A	1.985A	1.963A	0.796A	79.793	86.996%	865	25.2	0.989
	12.011V	5.043V	3.360V	5.021V	91.720				115.18V

RIPPLE MEASUREMENTS

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	19.1 mV	6.0 mV	6.6 mV	11.4 mV	Pass
20% Load	19.1 mV	6.3 mV	6.7 mV	15.9 mV	Pass
30% Load	18.5 mV	6.2 mV	6.9 mV	17.8 mV	Pass
40% Load	19.2 mV	6.5 mV	7.6 mV	19.8 mV	Pass
50% Load	20.2 mV	7.6 mV	7.0 mV	18.0 mV	Pass
60% Load	21.7 mV	7.6 mV	7.7 mV	20.2 mV	Pass
70% Load	22.8 mV	7.6 mV	7.1 mV	15.5 mV	Pass
80% Load	21.5 mV	9.4 mV	10.3 mV	21.3 mV	Pass
90% Load	22.2 mV	9.8 mV	10.5 mV	21.0 mV	Pass
100% Load	24.1 mV	12.6 mV	10.9 mV	24.5 mV	Pass
110% Load	68.9 mV	78.3 mV	78.9 mV	77.8 mV	Fail
Crossload 1	20.5 mV	8.7 mV	8.6 mV	8.0 mV	Pass
Crossload 2	23.3 mV	12.0 mV	10.0 mV	14.9 mV	Pass

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HOLD-UP TIME & POWER OK SIGNAL (230V)	
Hold-Up Time (ms)	22.7
AC Loss to PWR_OK Hold Up Time (ms)	18.6
PWR_OK Inactive to DC Loss Delay (ms)	4.1

Top side

Power specifications label

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