FSP Technology Hydro PTM X PRO 1200W

Serial Number S3101000008

Lab ID FS12002317

Certification ID 252317

Test Result Report ID: 23PS2317A

Certificate Issue Date: Jan 5, 2024

Scheme: ETA-EMI PSU

115V



230V



Scheme: LAMBDA PSU

115V



230V





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	FSP Technology
Model	Hydro PTM X PRO 1200W
OEM/ODM	FSP
Serial Number	S3101000008
Product Specifications	
Manufacturer-Provided Information	
Rated Voltage (Vrms)	100-240

Rated Current (Arms)	14-9
Rated Frequency (Hz)	50-60
Rated Power (W)	1200
Operating Temperature (Continuous Full Load) (°C)	
Type	ATX12V
Cable Design	Fully Modular
Warranty	-
Cybenetics Measurements	
Dimensions (W x H x D)	
Weight	
Cooling	120mm Fluid Dynamic Bearing Fan (MGA12012XF-O25)
Semi-Passive Operation	✓ (selectable)
Cybenetics Testing Information	
Lab ID	FS12002317
Date of receipt	Dec 11, 2023
Testing Date	Jan 3, 2024
Report Issued Date	Jan 5, 2024
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	16AWG	No
12+4 pin PCIe (700mm) (600W)	1	1	16-28AWG	No

SATA (500mm+150mm+150mm+150mm)	2	8	18AWG	No
SATA (500mm+150mm) / 4-pin Molex (+150mm) / FDD (+150mm)	1	2 / 1 / 1	18-22AWG	No
SATA (500mm+150mm) / 4-pin Molex (+150mm+100mm)	1	2 / 2	18AWG	No
AC Power Cord (1350mm) - C13 coupler	1	1	18AWG	-

Power Specifications

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	20	20	100	3	0.3
	Watts	120		1200	15	3.6
Total Max. Power (W)		1200				

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)	89.859%
Average Noise Output (>1450 Load Combinations)	35.73dBA
Average PF (>1450 Load Combinations)	0.992
Efficiency With 10W (≤500W) or 2% (>500W) Load	69.527%
Standby Power Consumption	0.0630W
Non-Accredited	

12V Ripple (Full Load)	29.30mV
5V Ripple (Full Load)	11.41mV
3.3V Ripple (Full Load)	13.45mV
5VSB Ripple (Full Load)	14.67mV
12V Load Regulation	0.85%
5V Load Regulation	1.21%
3.3V Load Regulation	1.42%
5VSB Load Regulation	5.17%
Inrush Current	50.010A

230V

Accredited	
Average Efficiency (>1450 load combinations)	92.042%
Average Noise Output (>1450 Load Combinations)	35.53dBA
Average PF (>1450 Load Combinations)	0.960
Efficiency With 10W (≤500W) or 2% (>500W) Load	69.771%
Standby Power Consumption	0.1788W
Non-Accredited	
12V Ripple (Full Load)	27.24mV
5V Ripple (Full Load)	11.63mV
3.3V Ripple (Full Load)	12.67mV
5VSB Ripple (Full Load)	14.58mV
12V Load Regulation	0.72%
5V Load Regulation	1.11%
3.3V Load Regulation	1.39%
5VSB Load Regulation	7.31%
Inrush Current	77.220A
12V Transient Response (200%)	11.40V
5V Transient Response (200%)	4.912V
3.3V Transient Response (200%)	3.179V
5VSB Transient Response (200%)	4.858V
Hold-Up Time & PWR_OK Signal	23.90ms

AC Loss to PWR_OK Hold Up Time		19.00ms
PWR_OK Inactive to DC Loss Delay		4.90ms
PSU Timings: T1 (20% / 100%)	64.0ms	65.0ms
PSU Timings: T3 (20% / 100%)	123.0ms	127.0ms
OPP (26.70°C / 40.02°C)	131.26%	120.67%

Hold-Up Time & PWR_OK Signal

Hold-Up Time (ms)	23.9
AC Loss to PWR_OK Hold Up Time (ms)	19
PWR_OK Inactive to DC Loss Delay (ms)	4.9

Stromverbrauch im Ruhezustand

Tables

115V

Detailed Results						
	Average	Min	Limit Min	Max	Limit Max	Result
Mains Voltage RMS:	114.93 V	114.84 V	113.85 V	115.01 V	116.15 V	PASS
Mains Frequency:	60.00 Hz	59.99 Hz	59.40 Hz	60.02 Hz	60.60 Hz	PASS
Mains Voltage CF:	1.420	1.418	1.340	1.422	1.490	PASS
Mains Voltage THD:	0.26 %	0.20 %	N/A	0.37 %	2.00 %	PASS
Real Power:	0.063 W	0.011 W	N/A	0.078 W	N/A	N/A
Apparent Power:	10.457 W	10.434 W	N/A	10.477 W	N/A	N/A
Power Factor:	0.006	N/A	N/A	N/A	N/A	N/A

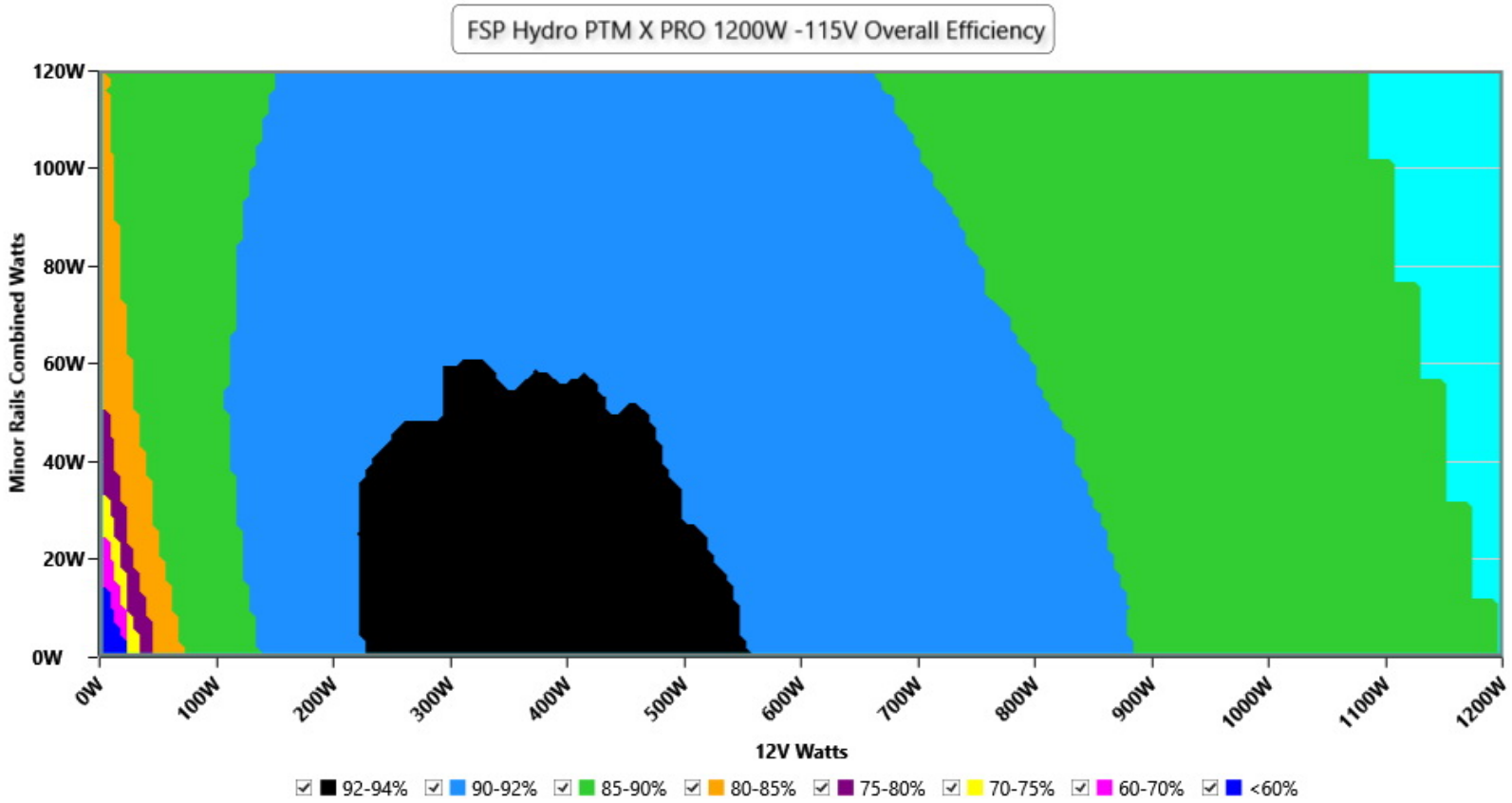
230V

Detailed Results						
	Average	Min	Limit Min	Max	Limit Max	Result

Mains Voltage RMS:	229.89 V	229.79 V	227.70 V	229.97 V	232.30 V	PASS
Mains Frequency:	50.00 Hz	49.99 Hz	49.50 Hz	50.01 Hz	50.50 Hz	PASS
Mains Voltage CF:	1.417	1.416	1.340	1.419	1.490	PASS
Mains Voltage THD:	0.18 %	0.15 %	N/A	0.24 %	2.00 %	PASS
Real Power:	0.179 W	0.141 W	N/A	0.223 W	N/A	N/A
Apparent Power:	35.292 W	35.252 W	N/A	35.334 W	N/A	N/A
Power Factor:	0.005	N/A	N/A	N/A	N/A	N/A

Efficiency Graph

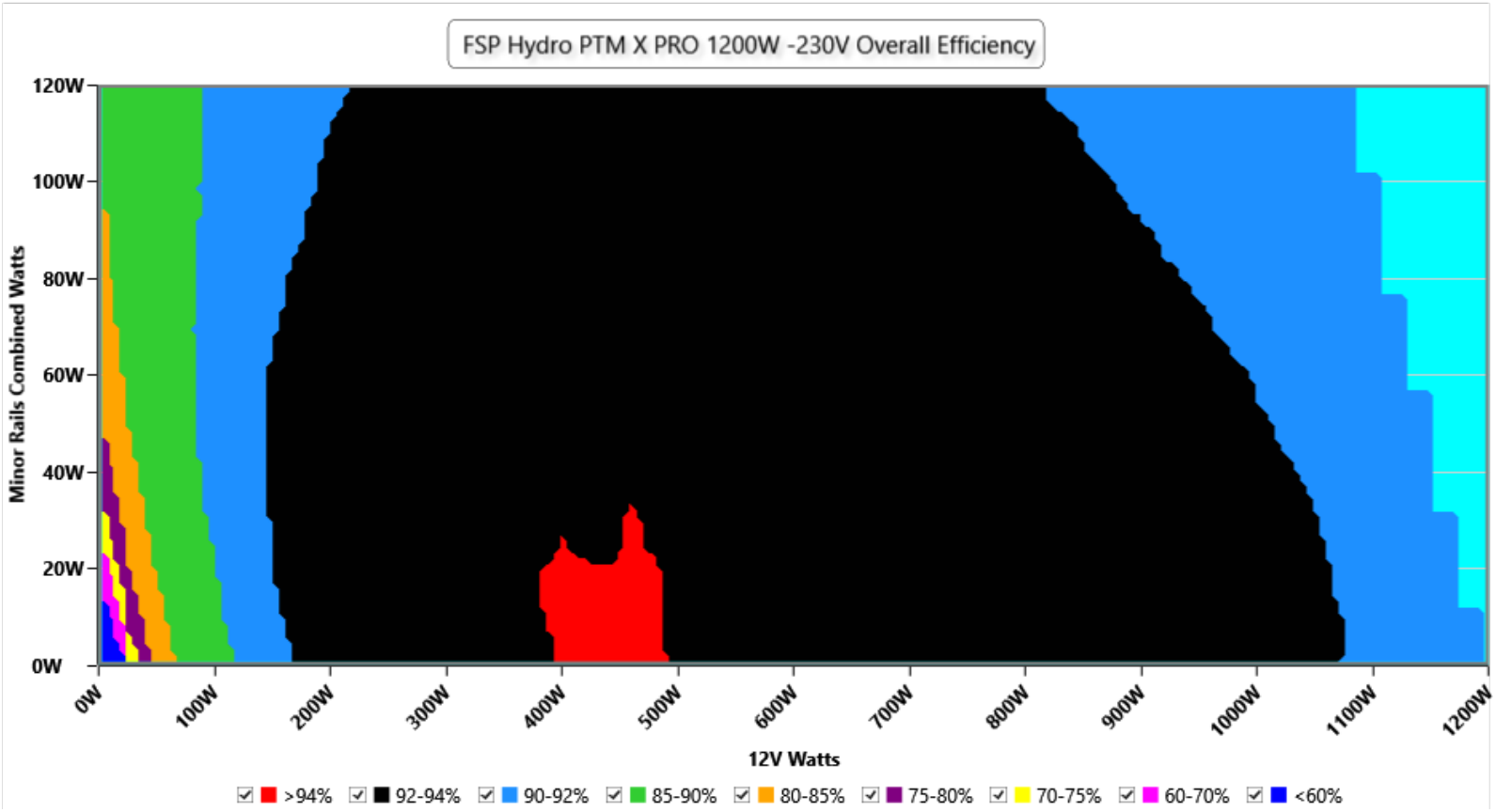
115V



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



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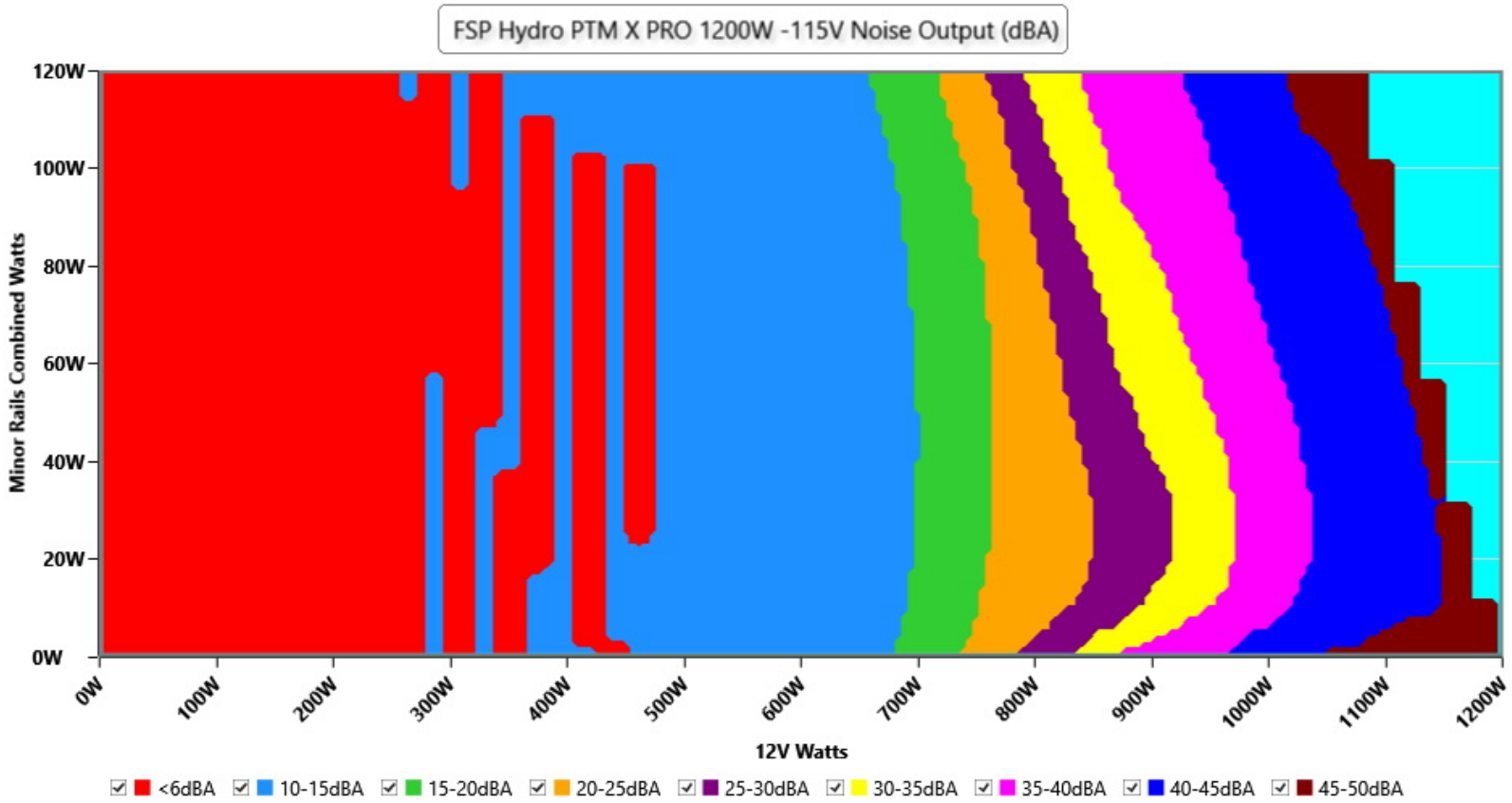
Noise Graph

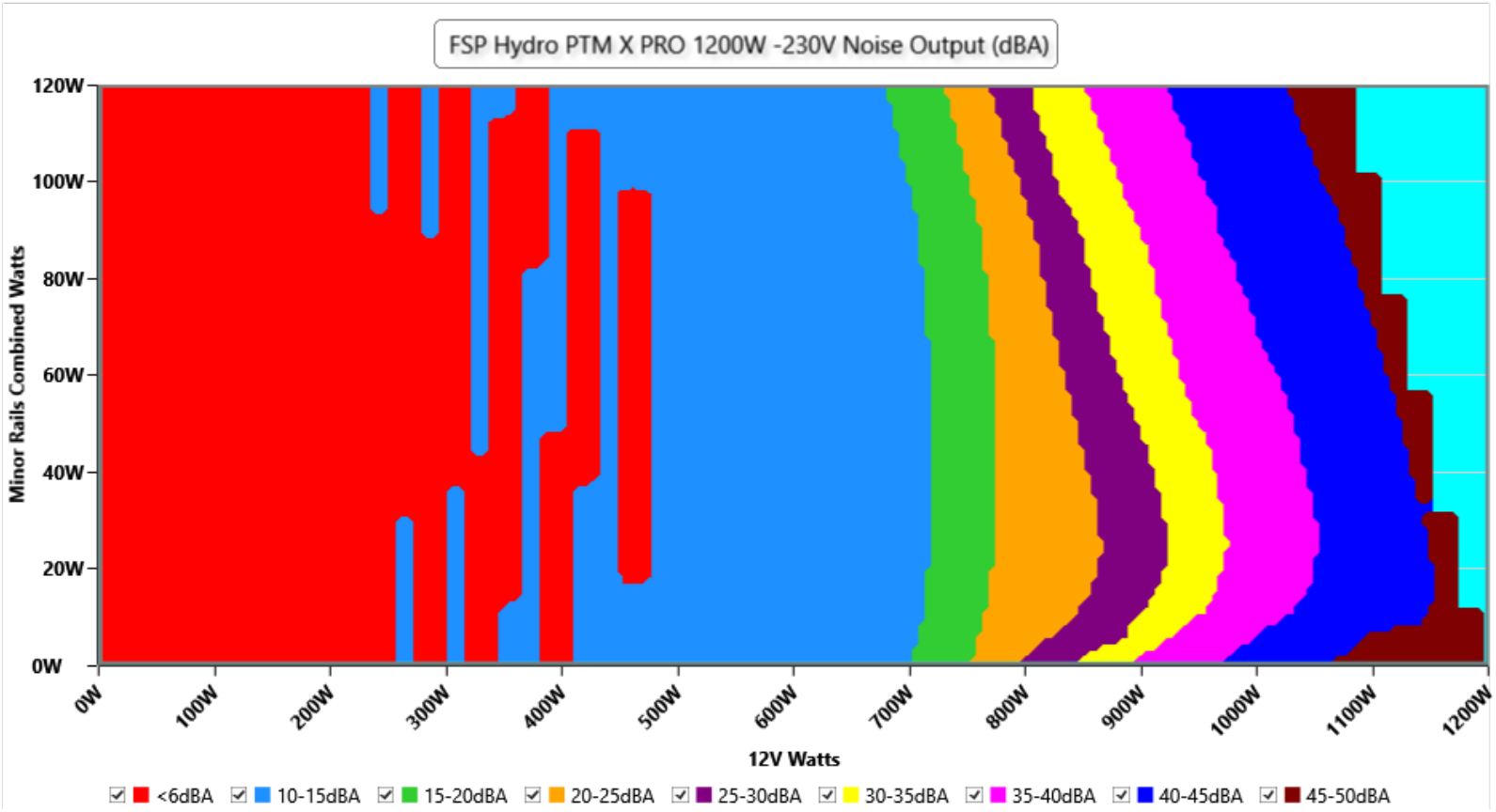
115V



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%	0 RPM · <6.0 dB(A) · 44.6 °C	0 RPM · <6.0 dB(A) · 44.6 °C	fan off in both
20%	0 RPM · <6.0 dB(A) · 45.3 °C	0 RPM · <6.0 dB(A) · 45.3 °C	fan off in both
50%	767 RPM · 13.1 dB(A) · 42.4 °C	767 RPM · 13.1 dB(A) · 42.4 °C	**+0.0 dB(A)**
100%	2632 RPM · 50.2 dB(A) · 45.8 °C	2632 RPM · 50.2 dB(A) · 45.8 °C	**+0.0 dB(A)**

230V

Load	Normal ambient fan · noise · intake	High ambient fan · noise · intake	Noise change
10%	0 RPM · <6.0 dB(A) · 44.5 °C	0 RPM · <6.0 dB(A) · 44.5 °C	fan off in both
20%	0 RPM · <6.0 dB(A) · 45.5 °C	0 RPM · <6.0 dB(A) · 45.5 °C	fan off in both
50%	766 RPM · 13.0 dB(A) · 42.4 °C	766 RPM · 13.0 dB(A) · 42.4 °C	**+0.0 dB(A)**
100%	2628 RPM · 50.2 dB(A) · 45.2 °C	2628 RPM · 50.2 dB(A) · 45.2 °C	**+0.0 dB(A)**

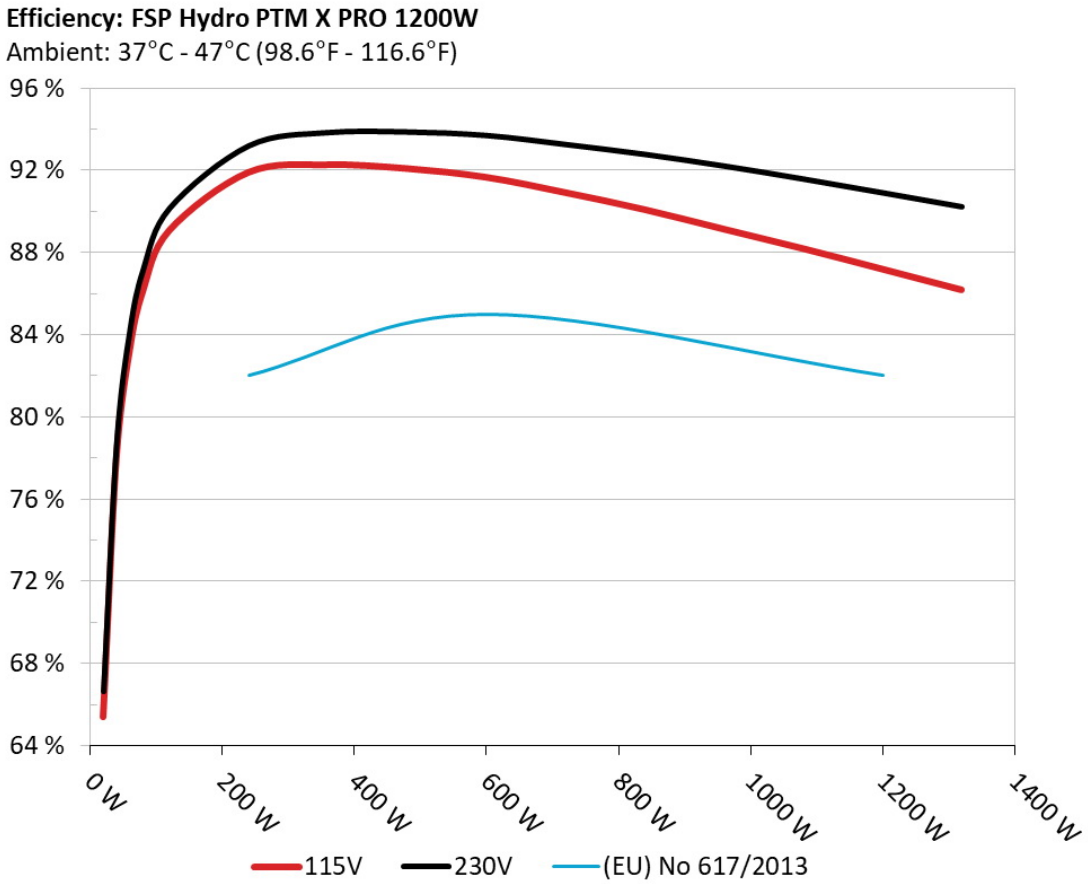
INFO

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

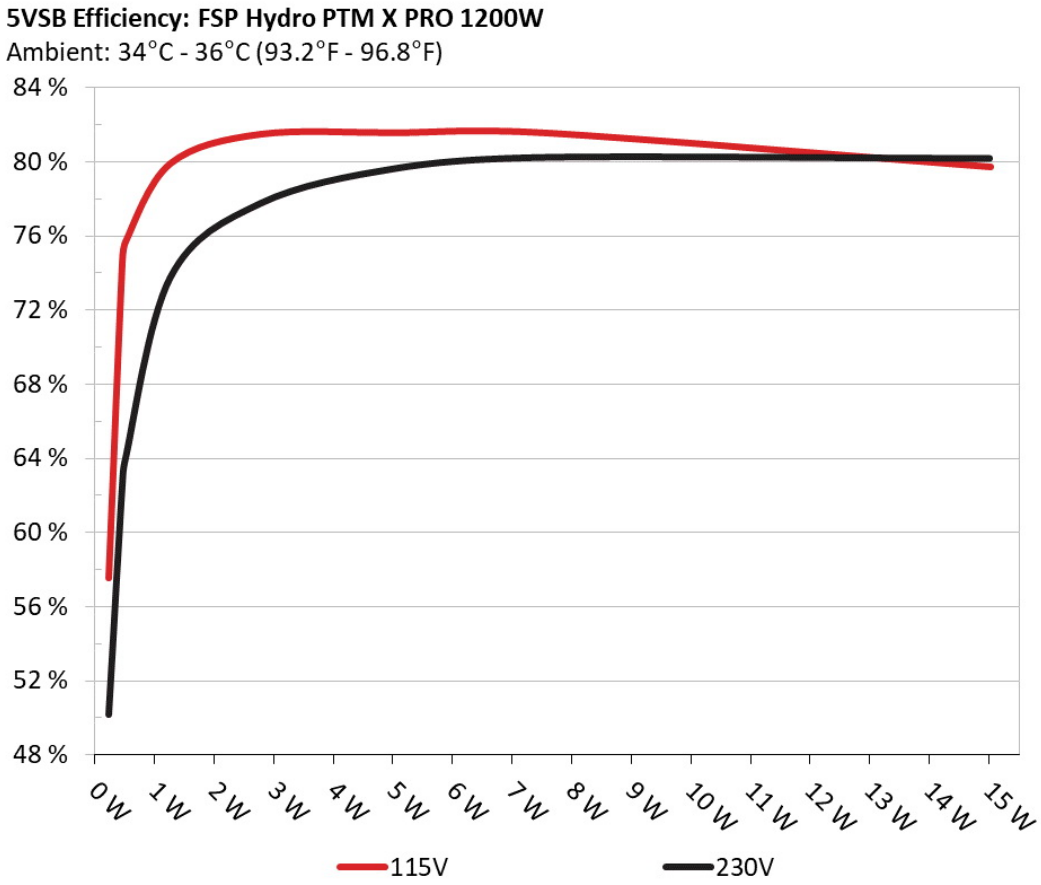
Efficiency under high ambient temperature



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	0.228W	58.061%	0.025
	5.06V	0.26W		114.91V
2	0.09A	0.455W	75.136%	0.057
	5.059V	0.605W		114.91V
3	0.55A	2.778W	81.995%	0.257
	5.051V	3.388W		114.92V
4	1A	5.043W	82.073%	0.36
	5.043V	6.145W		114.91V
5	1.5A	7.551W	82.065%	0.408
	5.034V	9.201W		114.91V
6	3A	15.017W	80.236%	0.491
	5.006V	18.716W		114.9V

230V

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.228W	50.698%	0.013
	5.06V	0.452W		229.88V
2	0.09A	0.455W	63.056%	0.02
	5.059V	0.724W		229.88V
3	0.55A	2.778W	78.265%	0.097
	5.051V	3.551W		229.89V
4	1A	5.042W	80.145%	0.161
	5.043V	6.293W		229.88V
5	1.5A	7.55W	80.743%	0.204
	5.033V	9.351W		229.88V
6	3A	15.016W	80.687%	0.316
	5.006V	18.613W		229.88V

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%	8.140A	1.988A	1.962A	1.006A	119.992	89.087%	0	<6.0	44.59°C	0.979
	12.087V	5.031V	3.364V	4.971V	134.691				40.37°C	114.87V
20%	17.310A	2.984A	2.945A	1.211A	239.95	91.921%	0	<6.0	45.25°C	0.995
	12.076V	5.027V	3.362V	4.956V	261.04				40.64°C	114.83V
30%	26.773A	3.484A	3.44A	1.418A	359.159	92.291%	0	<6.0	46.33°C	0.994
	12.068V	5.024V	3.358V	4.938V	389.16				41.3°C	114.79V
40%	36.353A	3.988A	3.938A	1.628A	479.529	92.11%	765	13.0	41.94°C	0.995
	12.057V	5.016V	3.352V	4.916V	520.606				47.53°C	114.74V
50%	45.563A	4.992A	4.931A	1.839A	599.301	91.688%	767	13.1	42.41°C	0.996
	12.045V	5.008V	3.347V	4.896V	653.631				48.49°C	114.7V
60%	54.834A	5.998A	5.926A	2A	719.596	90.938%	887	18.5	42.81°C	0.996
	12.037V	5.002V	3.342V	4.881V	791.308				49.33°C	114.66V
70%	64.054A	7.007A	6.925A	2.264A	839.55	90.112%	1252	29.7	43.39°C	0.996
	12.028V	4.996V	3.336V	4.858V	931.673				50.47°C	114.61V
80%	73.375A	8.018A	7.927A	2.374A	959.534	89.158%	1837	41.1	43.61°C	0.995
	12.016V	4.988V	3.331V	4.845V	1076.226				51.68°C	114.56V
90%	83.050A	8.53A	8.42A	2.484A	1079.353	88.213%	2477	48.3	44.48°C	0.994
	12.003V	4.982V	3.326V	4.831V	1223.583				53.53°C	114.51V
100%	92.533A	9.042A	8.945A	3.14A	1199.38	87.211%	2632	50.2	45.76°C	0.994
	11.992V	4.976V	3.321V	4.778V	1375.27				55.81°C	114.46V
110%	101.881A	10.056A	10.043A	3.145A	1320.02	86.197%	2636	50.3	46.79°C	0.993
	11.991V	4.971V	3.316V	4.77V	1531.461				57.72°C	114.48V
CL1	0.116A	14.418A	14.214A	0A	121.301	84.006%	763	12.9	40.66°C	0.981
	12.105V	5.007V	3.356V	5.077V	144.396				46.17°C	114.85V

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	19.957A	0A	0A	101.348	82.531%	754	12.5	41.3°C	0.974
	12.100V	5.009V	3.355V	5.098V	122.801				48.31°C	114.86V
CL3	0.114A	0A	19.605A	0A	67.4	77.668%	0	<6.0	50.34°C	0.958
	12.099V	5.03V	3.367V	5.039V	86.778				41.25°C	114.86V
CL4	100.011A	0A	0A	0A	1199.988	87.588%	2632	50.2	45.55°C	0.994
	11.999V	4.994V	3.327V	4.972V	1370.051				56.51°C	114.53V

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%	8.146A	1.988A	1.962A	1.008A	119.986	90.164%	0	<6.0	44.46°C	0.858
	12.078V	5.029V	3.363V	4.959V	133.075				40.2°C	229.87V
20%	17.320A	2.984A	2.945A	1.214A	239.941	93.206%	0	<6.0	45.46°C	0.942
	12.069V	5.026V	3.361V	4.943V	257.431				40.95°C	229.85V
30%	26.785A	3.484A	3.44A	1.422A	359.129	93.848%	0	<6.0	46.32°C	0.966
	12.062V	5.022V	3.357V	4.922V	382.672				41.22°C	229.83V
40%	36.358A	3.987A	3.938A	1.633A	479.513	93.881%	762	12.9	41.56°C	0.977
	12.055V	5.017V	3.352V	4.899V	510.768				47.24°C	229.81V
50%	45.564A	4.992A	4.931A	1.846A	599.283	93.712%	766	13.0	42.37°C	0.983
	12.044V	5.009V	3.347V	4.875V	639.498				48.43°C	229.79V
60%	54.835A	5.997A	5.926A	2A	719.529	93.27%	881	18.2	42.97°C	0.985
	12.036V	5.003V	3.342V	4.856V	771.443				49.48°C	229.77V
70%	64.054A	7.007A	6.925A	2.28A	839.54	92.789%	1243	29.4	43.28°C	0.987
	12.027V	4.996V	3.336V	4.824V	904.789				50.31°C	229.74V
80%	73.374A	8.018A	7.928A	2.393A	959.532	92.224%	1812	40.7	43.62°C	0.986
	12.016V	4.988V	3.33V	4.807V	1040.441				51.78°C	229.72V
90%	83.050A	8.53A	8.422A	2.509A	1079.36	91.59%	2479	48.3	44.87°C	0.984
	12.003V	4.982V	3.325V	4.783V	1178.467				53.92°C	229.7V

Test	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
100%	92.537A	9.043A	8.948A	3.207A	1199.386	90.922%	2628	50.2	45.16°C	0.983
	11.992V	4.976V	3.32V	4.677V	1319.148				55.17°C	229.68V
110%	101.945A	10.059A	10.048A	3.214A	1319.987	90.236%	2636	50.3	46.57°C	0.981
	11.984V	4.97V	3.314V	4.667V	1462.814				57.48°C	229.66V
CL1	0.116A	14.42A	14.22A	0A	121.303	84.931%	761	12.8	41.13°C	0.871
	12.103V	5.006V	3.355V	5.08V	142.825				46.58°C	229.86V
CL2	0.115A	19.952A	0A	0A	101.346	83.582%	0	<6.0	47.15°C	0.84
	12.098V	5.01V	3.355V	5.103V	121.256				40.06°C	229.87V
CL3	0.114A	0A	19.611A	0A	67.395	78.304%	756	12.6	41.64°C	0.756
	12.099V	5.032V	3.366V	5.04V	86.066				50.65°C	229.87V
CL4	100.028A	0A	0A	0A	1199.93	91.414%	2628	50.2	45.35°C	0.983
	11.996V	4.996V	3.328V	4.973V	1312.633				56.29°C	229.68V

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	1.228A	0.496A	0.49A	0.199A	20	65.386%	0	<6.0	40.01°C	0.817
	12.094V	5.036V	3.368V	5.025V	30.586				36.89°C	114.9V
40W	2.704A	0.695A	0.686A	0.299A	39.999	78.008%	0	<6.0	40.89°C	0.913
	12.093V	5.035V	3.367V	5.018V	51.276				37.56°C	114.89V
60W	4.179A	0.894A	0.882A	0.399A	59.998	83.248%	0	<6.0	42.49°C	0.946
	12.091V	5.034V	3.367V	5.011V	72.072				38.67°C	114.89V
80W	5.650A	1.093A	1.078A	0.5A	79.944	86.117%	0	<6.0	43.05°C	0.962
	12.090V	5.034V	3.366V	5.004V	92.832				39.08°C	114.88V

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	1.229A	0.497A	0.49A	0.199A	19.99	66.638%	0	<6.0	39.93°C	0.441
	12.075V	5.031V	3.366V	5.019V	30				36.85°C	229.89V
40W	2.706A	0.696A	0.686A	0.299A	39.991	78.8%	0	<6.0	41.22°C	0.591
	12.076V	5.031V	3.365V	5.011V	50.752				37.95°C	229.88V
60W	4.184A	0.894A	0.882A	0.4A	59.991	84.223%	0	<6.0	42.45°C	0.696
	12.077V	5.031V	3.365V	5.004V	71.231				38.97°C	229.88V
80W	5.656A	1.093A	1.079A	0.5A	79.934	87.165%	0	<6.0	43.18°C	0.772
	12.078V	5.031V	3.364V	4.997V	91.702				39.29°C	229.88V

The results above are not used in the certification process

Ripple Measurements

115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	9.98mV	8.58mV	8.13mV	9.67mV	Pass
20% Load	11.26mV	8.58mV	8.19mV	10.03mV	Pass
30% Load	12.33mV	8.89mV	8.75mV	10.39mV	Pass
40% Load	13.56mV	9.45mV	8.85mV	10.69mV	Pass
50% Load	14.21mV	9.40mV	9.26mV	10.74mV	Pass
60% Load	15.23mV	10.47mV	9.87mV	11.20mV	Pass
70% Load	16.20mV	9.76mV	10.28mV	12.28mV	Pass
80% Load	16.82mV	10.52mV	11.72mV	13.40mV	Pass
90% Load	18.86mV	10.53mV	11.20mV	12.23mV	Pass
100% Load	29.30mV	11.41mV	13.45mV	14.67mV	Pass
110% Load	28.92mV	11.76mV	14.19mV	15.99mV	Pass
Crossload1	13.33mV	9.97mV	10.91mV	10.60mV	Pass
Crossload2	10.85mV	12.16mV	9.00mV	10.03mV	Pass

Test	12V	5V	3.3V	5VSB	Pass/Fail
Crossload3	9.57mV	8.89mV	11.51mV	10.39mV	Pass
Crossload4	28.23mV	11.98mV	11.50mV	14.21mV	Pass

The results above are not used in the certification process

230V

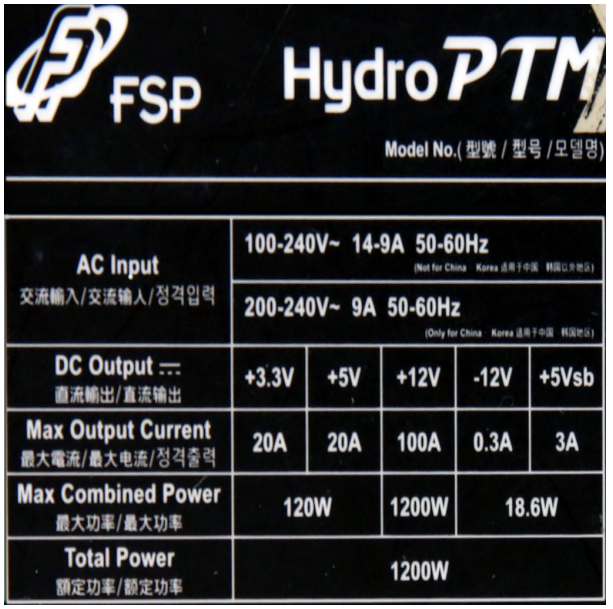
Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	9.52mV	8.43mV	8.34mV	10.08mV	Pass
20% Load	10.75mV	9.14mV	9.16mV	11.15mV	Pass
30% Load	10.95mV	8.74mV	8.64mV	10.79mV	Pass
40% Load	11.02mV	9.66mV	8.85mV	11.46mV	Pass
50% Load	12.43mV	9.50mV	9.46mV	10.90mV	Pass
60% Load	14.82mV	9.81mV	9.82mV	11.61mV	Pass
70% Load	16.92mV	9.45mV	10.44mV	12.38mV	Pass
80% Load	16.82mV	10.47mV	12.12mV	12.89mV	Pass
90% Load	17.63mV	10.52mV	11.46mV	12.79mV	Pass
100% Load	27.24mV	11.63mV	12.67mV	14.58mV	Pass
110% Load	27.99mV	11.85mV	13.57mV	15.83mV	Pass
Crossload1	13.50mV	10.63mV	11.37mV	11.53mV	Pass
Crossload2	10.74mV	13.38mV	9.16mV	10.28mV	Pass
Crossload3	9.77mV	9.40mV	12.07mV	11.26mV	Pass
Crossload4	26.31mV	11.96mV	11.33mV	14.55mV	Pass

The results above are not used in the certification process

FSP Technology Hydro PTM X PRO 1200W



Top side



Power specifications label

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