FSP Technology Hydro PTM Pro 1650W (ATXv3.1)

S3481000010

Lab ID FS16502554

Certification ID 252554

Test Result Report ID: 24PS2554A

Certificate Issue Date: Aug 30, 2024

230V

Scheme: ETA-EMI PSU

230V

Scheme: LAMBDA PSU

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 Pro 1650W (ATXv3.1)
OEM/ODM	FSP
Serial Number	S3481000010
Product Specifications	
Manufacturer-Provided Information	
□□□□ (Vrms)	200-240
□□□□ (Arms)	10

□□□□ (Hz)	50-60
□□□□ (W)	1650
Operating Temperature (Continuous Full Load) (°C)	
□□	ATX12V
□□□□	Fully Modular
Warranty	-
Cybenetics Measurements	
Dimensions (W x H x D)	
Weight	
□□	135mm Fluid Dynamic Bearing Fan (MGA13512XF-A25)
□□□□□	✓ (selectable)
Cybenetics Testing Information	
Lab ID	FS16502554
Date of receipt	Aug 20, 2024
Testing Date	Aug 29, 2024
Report Issued Date	Aug 30, 2024
Engineer Name	-
Authorized By the Laboratory Technical Manager	Aristeidis Bitziopoulos
Signature	

□□□□□ (Non-accredited measurements)

□□□□□				
□□	□□□□	□□□□□□	**Gauge**	In Cable Capacitors
ATX □□ 20+4 pin (600mm)	1	1	16-22AWG	□
4+4 pin EPS 12V □□ (700mm)	2	2	16AWG	□
6+2pin PCIe□□ (650mm+150mm)	1	2	16-18AWG	□
6+2pin PCIe□□ (650mm)	2	2	16AWG	□
12+4 pin PCIe (700mm) (600W)	2	2	16-28AWG	□
SATA□□ (500mm+155mm+155mm+155mm)	2	8	18AWG	□
SATA□□ (500mm+150mm) / 4-pin Molex (+150mm+100mm)	2	4 / 4	18AWG	□

Protection Features(Manufacturer)

Over Power Protection	✓
Over Current (+12V) Protection	✓
Over Temperature Protection	✓
Short Circuit Protection	✓
Surge Protection	✓
Inrush Current Protection	✓
Fan Failure Protection	✗

□□□□

□		3.3V	5V	12V	5VSB	-12V
□□□□	□□	20	20	137.5	3	0.3
	□	120		1650	15	3.6
□□□□□ (W)		1650				

Test Results

Temperature & Compliance Info

□□□□ (°C /°F)	28-32 / 82.4-89.6
□□ ErP Lot3/6□□	✓
□□ (EU) No 617/2013□□	✓
ALPM (Alternative Low Power Mode) compatible	✓
ATX v3.1 PSU Power Excursion	✓

Performance Summary 230V

Accredited	
□□□□ (>1450 load combinations)	92.367%
Average Noise Output (>1450 Load Combinations)	29.85dBA
PF□□□ (>1450 Load Combinations)	0.980

Efficiency With 10W (≤500W) or 2% (>500W) Load		-
□□□□□□		0.1349W
Non-Accredited		
12V Ripple (Full Load)		29.01mV
5V Ripple (Full Load)		29.38mV
3.3V Ripple (Full Load)		27.29mV
5VSB Ripple (Full Load)		24.35mV
12V Load Regulation		0.63%
5V Load Regulation		0.51%
3.3V Load Regulation		0.65%
5VSB Load Regulation		2.76%
Inrush Current		45.930A
12V Transient Response (200%)		11.05V
5V Transient Response (200%)		4.966V
3.3V Transient Response (200%)		3.165V
5VSB Transient Response (200%)		4.827V
□□□□ & PG□□		21.20ms
AC Loss to PWR_OK Hold Up Time		19.00ms
PWR_OK Inactive to DC Loss Delay		2.20ms
PSU Timings: T1 (20% / 100%)	52.0ms	44.0ms
PSU Timings: T3 (20% / 100%)	123.0ms	122.0ms
12V OCP (29.7°C / 43.9°C)	164.60A (119.71%), 12.012V	160.00A (116.36%), 12.053V
5V OCP (29.7°C / 43.9°C)	24.7A (123.50%), 5.048V	23A (115.00%), 5.053V
3.3V OCP (29.7°C / 43.9°C)	25A (125.00%), 3.316V	23.2A (116.00%), 3.321V
5VSB OCP (29.7°C / 43.9°C)	4.4A (146.67%), 4.99V	4.4A (146.67%), 4.989V
OPP (29.63°C / 43.11°C)	124.41%	120.17%

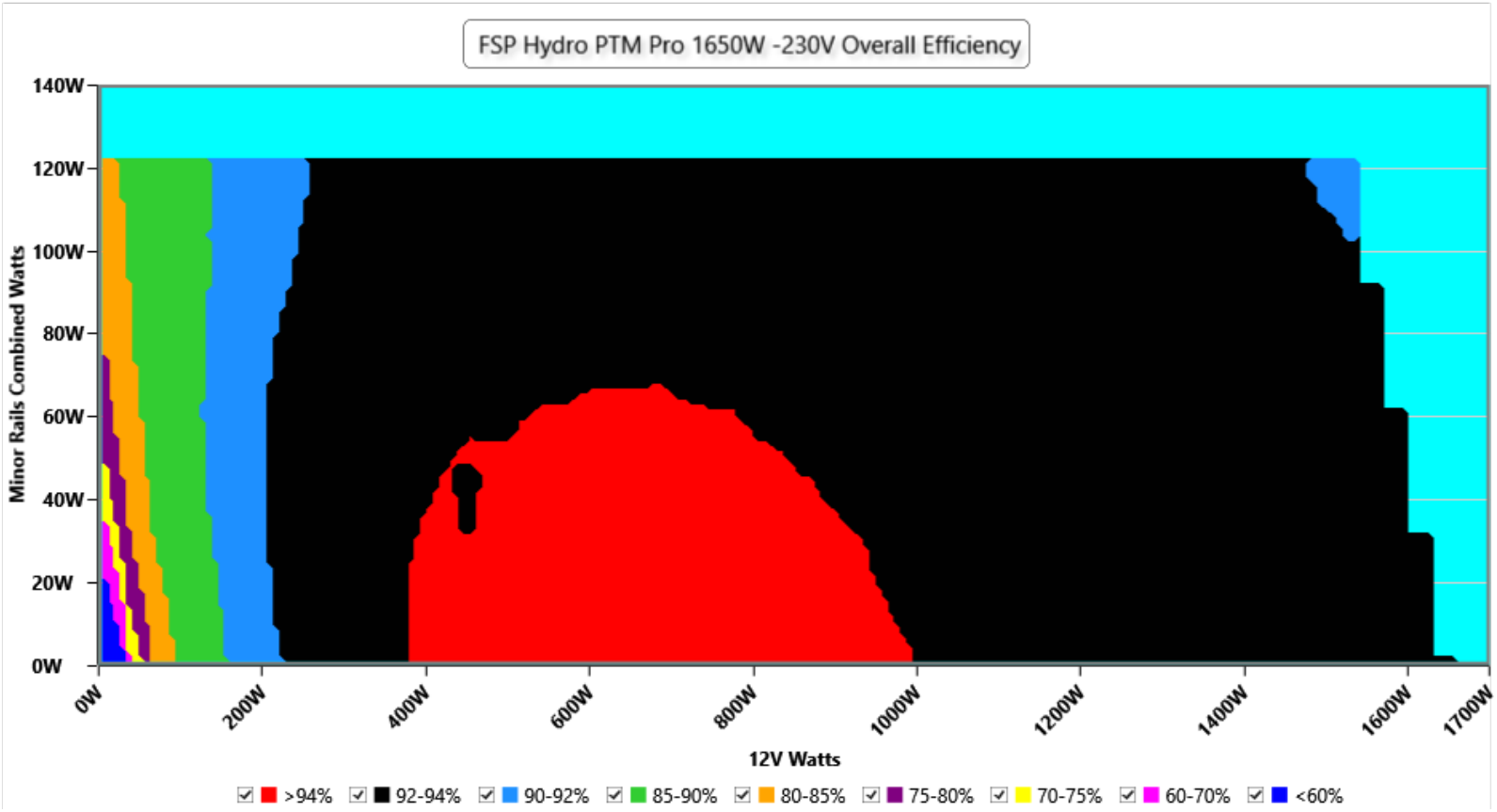
□□□□ & PG□□

Hold-Up Time (ms)	21.2
AC Loss to PWR_OK Hold Up Time (ms)	19
PWR_OK Inactive to DC Loss Delay (ms)	2.2

Tables 230V

Detailed Results						
	Average	Min	Limit Min	Max	Limit Max	Result
Mains Voltage RMS:	229.87 V	229.79 V	227.70 V	229.93 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:	1.419	1.417	1.340	1.420	1.490	PASS
Mains Voltage THD:	0.13 %	0.10 %	N/A	0.19 %	2.00 %	PASS
Real Power:	0.135 W	0.106 W	N/A	0.175 W	N/A	N/A
Apparent Power:	33.845 W	33.802 W	N/A	33.876 W	N/A	N/A
Power Factor:	0.004	N/A	N/A	N/A	N/A	N/A

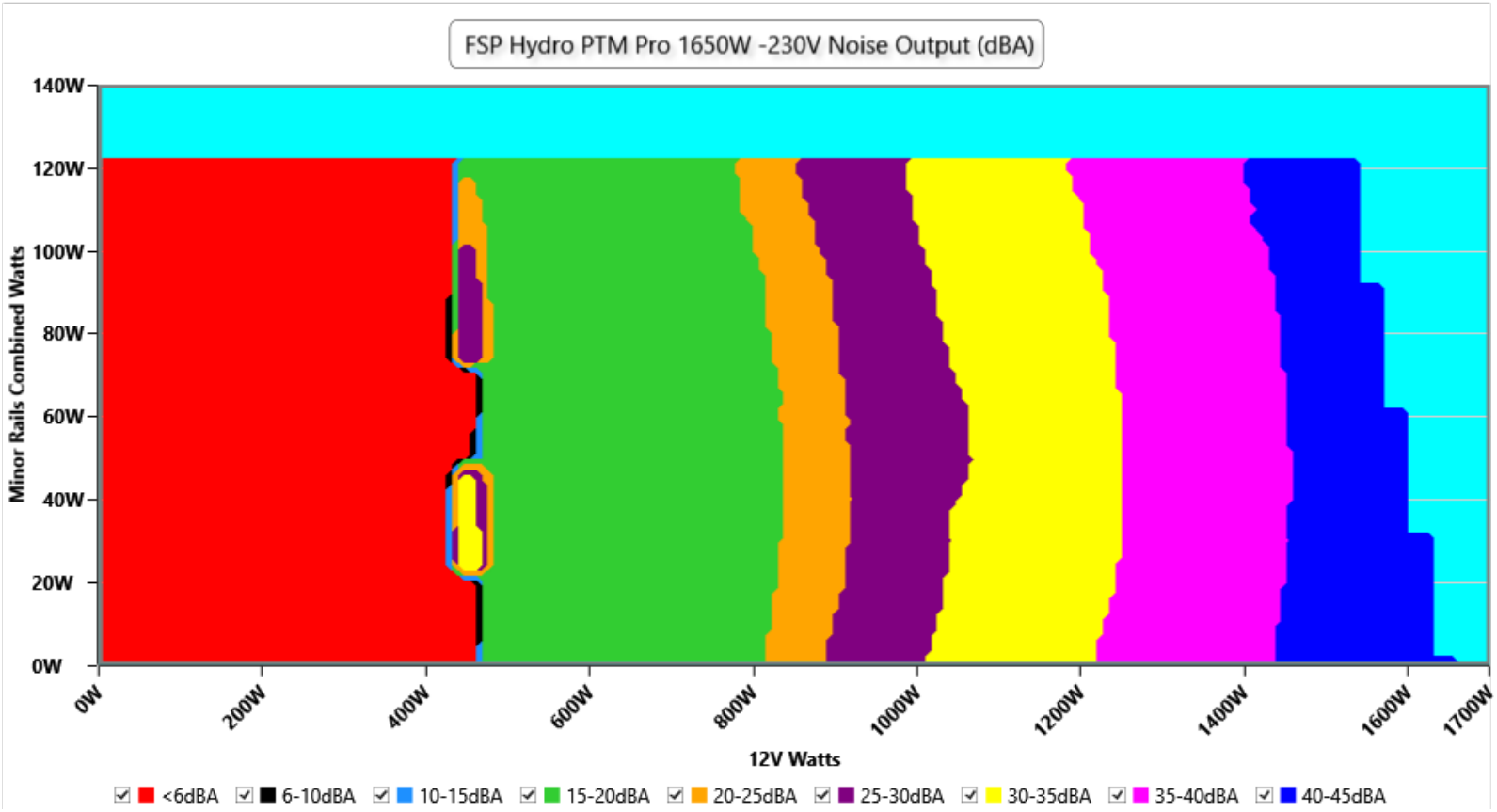
230V



□□

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



□□

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)

230V

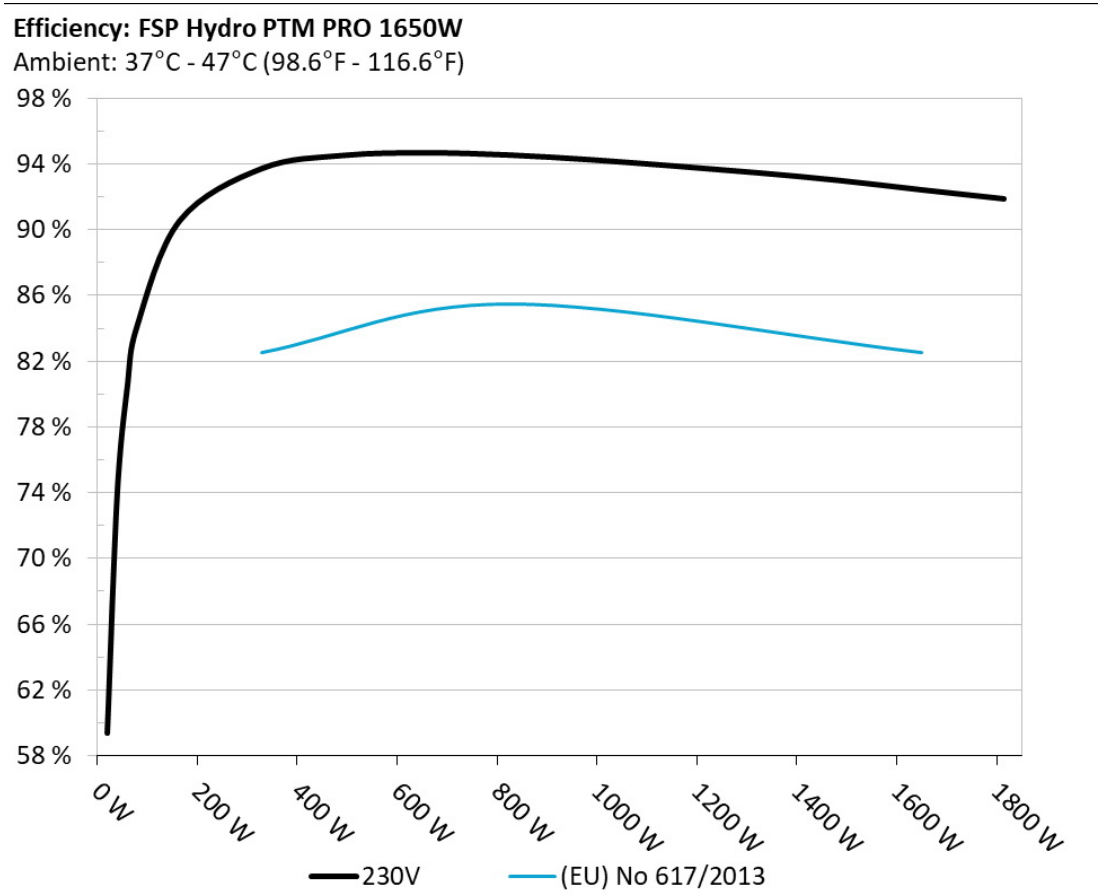
Load	Normal ambient fan · noise · intake	High ambient fan · noise · intake	Noise change
10%	0 RPM · <6.0 dB(A) · 32.5 °C	0 RPM · <6.0 dB(A) · 43.8 °C	fan off in both
20%	0 RPM · <6.0 dB(A) · 32.4 °C	0 RPM · <6.0 dB(A) · 42.8 °C	fan off in both
50%	608 RPM · 16.4 dB(A) · 31.5 °C	816 RPM · 25.6 dB(A) · 42.4 °C	**+9.2 dB(A)**
100%	1430 RPM · 41.4 dB(A) · 30.4 °C	1783 RPM · 47.0 dB(A) · 45.7 °C	**+5.6 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.

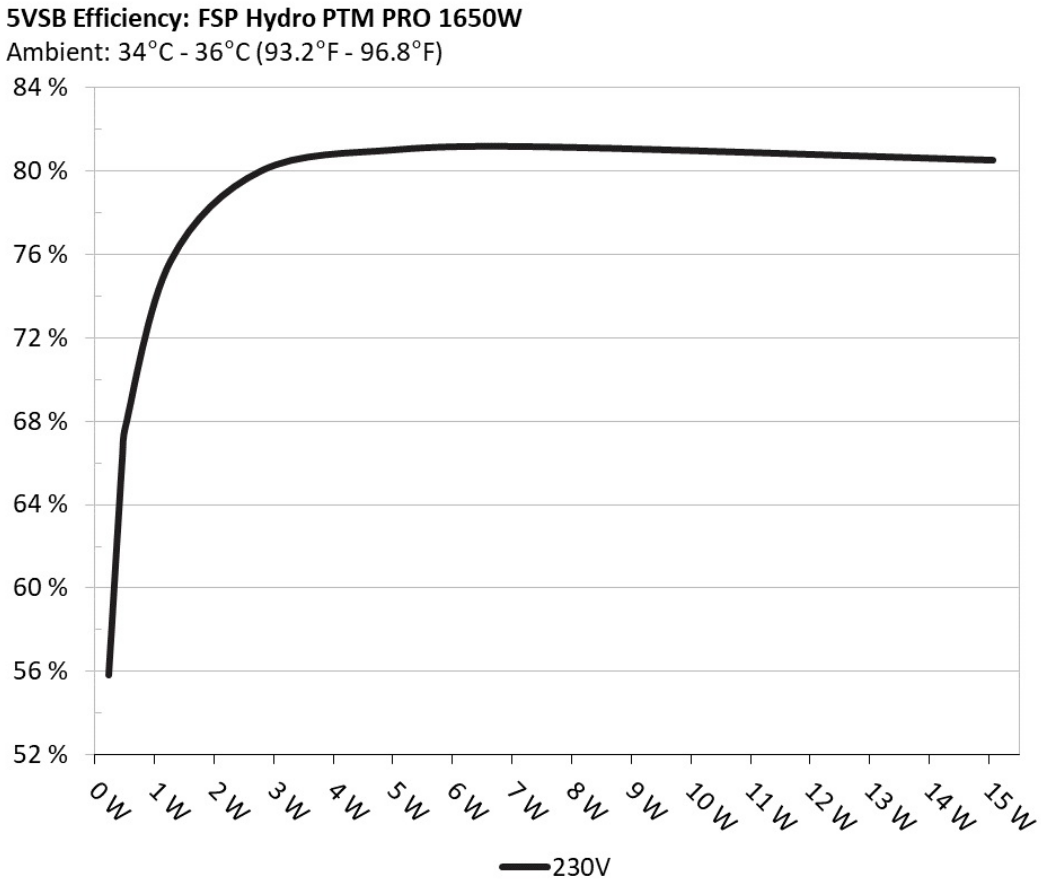
Informational. Not part of the ETA or LAMBDA rating.

Indicative Performance



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□□□□



□□

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

□□□□ □□ 5Vsb □□ (ErP Lot3/6 & CEC) 230V

□□ #	5VSB	DC/AC (□)	□□	PF/AC □□
1	**0.045A**	0.228W	55.305%	0.012
	5.071V	0.413W		229.83V

2	**0.09A**	0.456W	65.762%	0.02
	5.07V	0.694W		229.84V
3	**0.55A**	2.785W	79.529%	0.099
	5.063V	3.502W		229.83V
4	**1A**	5.056W	80.547%	0.165
	5.055V	6.277W		229.84V
5	**1.5A**	7.572W	80.681%	0.208
	5.047V	9.386W		229.83V
6	**3.001A**	15.07W	80.042%	0.321
	5.023V	18.827W		229.83V

Protection Features

OCP (Normal @ 29.7°C)	12V: 164.60A (119.71%), 12.012V 5V: 24.7A (123.50%), 5.048V 3.3V: 25A (125.00%), 3.316V 5VSB: 4.4A (146.67%), 4.99V
OCP (Hot @ 43.9°C)	12V: 160.00A (116.36%), 12.053V 5V: 23A (115.00%), 5.053V 3.3V: 23.2A (116.00%), 3.321V 5VSB: 4.4A (146.67%), 4.989V
OPP (Normal @ 29.6°C)	2052.78W (124.41%)
OPP (Hot @ 43.1°C)	1982.75W (120.17%)
OTP	✓ (170°C @ Secondary Side)
SCP	12V to Earth: ✓ 5V to Earth: ✓ 3.3V to Earth: ✓ 5VSB to Earth: ✓ -12V to Earth: ✓
PWR_OK	Proper Operation
NLO	✓
Fan Failure Protection	✗
SIP	Surge: MOV Inrush: NTC & Bypass Relay

Supplementary Tests (For Reference)

10-110%□□□□ 230V

□□	12V	5V	3.3V	5VSB	DC/AC (□)	□□	□□□□ (RPM)	□□□□□□□ (dB[A])	□□ (□□ /□□)	PF/AC □□
10%	**11.803A**	**1.968A**	**1.943A**	**0.991A**	164.957	90.06%	0	<6.0	43.79°C	0.936
	12.146V	5.08V	3.397V	5.048V	183.177				40.46°C	229.81V
20%	**24.638A**	**2.954A**	**2.916A**	**1.191A**	329.956	93.243%	0	<6.0	42.77°C	0.98
	12.138V	5.077V	3.395V	5.036V	353.868				40.89°C	229.78V
30%	**37.793A**	**3.448A**	**3.405A**	**1.393A**	494.387	94.035%	643	18.7	41.06°C	0.99
	12.127V	5.075V	3.392V	5.024V	525.695				43.39°C	229.76V
40%	**51.036A**	**3.943A**	**3.893A**	**1.596A**	659.637	94.188%	679	20.5	41.65°C	0.993
	12.117V	5.073V	3.391V	5.012V	700.346				43.39°C	229.73V
50%	**63.957A**	**4.931A**	**4.87A**	**1.8A**	824.923	94.052%	816	25.6	42.36°C	0.994
	12.108V	5.07V	3.388V	5V	877.093				44°C	229.71V
60%	**76.827A**	**5.921A**	**5.848A**	**2A**	989.46	93.765%	1006	32	42.83°C	0.994
	12.101V	5.067V	3.386V	4.988V	1055.253				44.59°C	229.68V
70%	**89.776A**	**6.912A**	**6.828A**	**2.211A**	1154.86	93.385%	1214	37	43.05°C	0.994
	12.093V	5.065V	3.384V	4.975V	1236.857				45.54°C	229.67V
80%	**102.755A**	**7.903A**	**7.808A**	**2.317A**	1319.65	92.98%	1399	40.7	43.95°C	0.995
	12.085V	5.062V	3.381V	4.964V	1419.288				45.78°C	229.62V
90%	**116.126A**	**8.4A**	**8.286A**	**2.424A**	1485.073	92.507%	1614	44.5	44.2°C	0.995
	12.078V	5.059V	3.379V	4.953V	1605.369				47.36°C	229.59V
100%	**129.242A**	**8.898A**	**8.794A**	**3.042A**	1649.864	91.936%	1783	47	45.67°C	0.994
	12.072V	5.057V	3.377V	4.933V	1794.559				48.39°C	229.57V
110%	**142.262A**	**9.893A**	**9.867A**	**3.047A**	1814.458	91.388%	1945	48.9	46.78°C	0.994
	12.063V	5.054V	3.375V	4.923V	1985.446				49.41°C	229.53V
CL1	**0.116A**	**14.269A**	**14.108A**	**0A**	121.316	82.944%	0	<6.0	43.06°C	0.901
	12.160V	5.06V	3.381V	5.063V	146.263				43.6°C	229.81V
CL2	**0.115A**	**19.761A**	**0A**	**0.001A**	101.359	80.736%	0	<6.0	41.88°C	0.867
	12.163V	5.058V	3.392V	5.066V	125.543				41.09°C	229.82V

CL3	**0.114A**	**0A**	**19.528A**	**0A**	67.388	74.242%	0	<6.0	42.36°C	0.807
	12.163V	5.077V	3.38V	5.067V	90.776				44.09°C	229.83V
CL4	**136.589A**	**0A**	**0A**	**0.001A**	1649.579	92.295%	1816	47.4	44.42°C	0.994
	12.077V	5.075V	3.39V	4.988V	1787.297				48.64°C	229.56V

The results above are not used in the certification process

20-80□□□□ 230V

□□	12V	5V	3.3V	5VSB	DC/AC (□)	□□	□□□□ (RPM)	□□□□□□ (dB[A])	□□ (□□ /□□)	PF/AC □□
20W	**1.222A**	**0.492A**	**0.485A**	**0.197A**	20	58.873%	0	<6.0	38.46°C	0.512
	12.147V	5.083V	3.399V	5.069V	33.96				36.77°C	229.84V
40W	**2.692A**	**0.689A**	**0.68A**	**0.296A**	40	73.483%	0	<6.0	42.29°C	0.673
	12.147V	5.082V	3.399V	5.066V	54.431				37.65°C	229.83V
60W	**4.160A**	**0.885A**	**0.874A**	**0.395A**	59.999	79.929%	0	<6.0	40.69°C	0.753
	12.147V	5.081V	3.398V	5.063V	75.065				38.58°C	229.82V
80W	**5.624A**	**1.082A**	**1.068A**	**0.494A**	79.94	83.669%	0	<6.0	44.77°C	0.815
	12.147V	5.081V	3.398V	5.061V	95.547				39.95°C	229.82V

The results above are not used in the certification process

□□□□ 230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	16.01mV	15.09mV	14.57mV	10.36mV	Pass
20% Load	18.21mV	16.37mV	15.90mV	12.41mV	Pass
30% Load	13.96mV	14.98mV	13.29mV	12.47mV	Pass
40% Load	16.06mV	16.73mV	16.11mV	14.42mV	Pass
50% Load	18.10mV	19.60mV	17.08mV	15.45mV	Pass
60% Load	16.83mV	18.53mV	16.47mV	16.01mV	Pass
70% Load	15.70mV	18.02mV	15.49mV	15.45mV	Pass
80% Load	19.13mV	24.07mV	21.96mV	18.63mV	Pass
90% Load	21.63mV	24.94mV	23.91mV	19.45mV	Pass
100% Load	29.01mV	29.38mV	27.29mV	24.35mV	Pass





Test	12V	5V	3.3V	5VSB	Pass/Fail
110% Load	29.55mV	28.73mV	25.82mV	25.94mV	Pass
Crossload1	17.54mV	17.14mV	19.14mV	20.68mV	Pass
Crossload2	18.10mV	20.53mV	16.78mV	23.45mV	Pass
Crossload3	15.70mV	15.04mV	18.26mV	22.37mV	Pass
Crossload4	29.10mV	26.59mV	21.93mV	26.42mV	Pass

The results above are not used in the certification process

FSP Technology Hydro PTM Pro 1650W (ATXv3.1)

Top side

Power specifications label

本测试报告中包含的所有数据和图表均可在以下条件下由任何人使用：使用过程需提及测试结果由 Cybenetics提供。
在任何情况下都应提供原始测试结果文档的网站链接

Cybenetics 提供自愿性认证计划：电源方面有 ETA (效率)、 LAMBDA (噪声) 与 SAFE (安全与正确运行)；散热产品方面有 DELTA (机箱隔音) 与 PHI (风扇风量与静压)