Anex

MSI MEG Ai1000P PCIE5

Lab ID#: MS10002036
Receipt Date: Jun 22, 2022
Test Date: Jul 5, 2022

Report: 22PS2036A
Report Date: Jul 5, 2022

DUT INFORMATION

Brand	MSI
Manufacturer (OEM)	CWT
Series	MEG PCIE5
Model Number	MEG Ai1000P PCIE5
Serial Number	
DUT Notes	

DUT SPECIFICATIONS

Rated Voltage (Vrms)	100-240
Rated Current (Arms)	13
Rated Frequency (Hz)	50-60
Rated Power (W)	1000
Type	ATX12V
Cooling	120mm Hydraulic Bearing Fan (PLA12025S12H)
Semi-Passive Operation	✓
Cable Design	Fully Modular

TEST EQUIPMENT

Electronic Loads	Chroma 63601-5 x4 Chroma 63600-2 x2 63640-80-80 x20 63610-80-20 x2
AC Sources	Chroma 6530, Keysight AC6804B
Power Analyzers	N4L PPA1530 x2
Sound Analyzer	Bruel & Kjaer 2270 G4
Microphone	Bruel & Kjaer Type 4955-A
Data Loggers	Picoscope TC-08 x2, Labjack U3-HV x2
Tachometer	UNI-T UT372 x2
Digital Multimeter	Keysight U1273AX, Fluke 289, Keithley 2015 - THD
UPS	CyberPower OLS3000E 3kVA x2
Transformer	3kVA x2

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Anex

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RESULTS

Temperature Range (°C /°F)	30-32 / 86-89.6
ErP Lot 3/6 Ready	✓
(EU) No 617/2013 Compliance	✓
ALPM (Alternative Low Power Mode) compatible	✓
PCIe 5.0 Ready	✓

115V

Average Efficiency	90.178%
Efficiency With 10W (≤500W) or 2% (>500W)	73.952
Average Efficiency 5VSB	76.196%
Standby Power Consumption (W)	0.0234000
Average PF	0.995
Avg Noise Output	34.53 dB(A)
Efficiency Rating (ETA)	PLATINUM
Noise Rating (LAMBDA)	Standard++

230V

Average Efficiency	91.630%
Average Efficiency 5VSB	77.582%
Standby Power Consumption (W)	0.0922000
Average PF	0.947
Avg Noise Output	34.40 dB(A)
Efficiency Rating (ETA)	PLATINUM
Noise Rating (LAMBDA)	Standard++

POWER SPECIFICATIONS

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	22	22	83.33	3	0.3
	Watts	120		1000	15	3.6
Total Max. Power (W)		1000				

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

Hold-Up Time (ms)	18
AC Loss to PWR_OK Hold Up Time (ms)	17.5
PWR_OK Inactive to DC Loss Delay (ms)	0.5

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CABLES AND CONNECTORS

Modular Cables

Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors
ATX connector 20+4 pin (600mm)	1	1	16-18AWG	No
8 pin EPS12V (710mm)	2	2	18AWG	No
12+4 pin PCIe (610mm)	1	1	18-24AWG	No
2 x 6+2 pin PCIe (610mm)	1	2	18AWG	No
6+2 pin PCIe (600mm)	4	4	16AWG	No
6+2 pin PCIe (600mm+150mm)	2	4	16-18AWG	No
SATA (500mm+150mm+150mm+150mm)	3	12	18AWG	No
4 pin Molex (500mm+150mm+150mm+150mm) / FDD (+150mm)	1	4 / 1	18-20AWG	No
USB Cable Mini B	1	1	24-28AWG	No

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General Data	-
Manufacturer (OEM)	CWT
Platform	CTT
PCB Type	Double Sided
Primary Side	-
Transient Filter	6x Y caps, 2x X caps, 2x CM chokes, 1x MOV
Inrush Protection	NTC Thermistor SCK-0510 (5 Ohm) & Relay
Bridge Rectifier(s)	2x GBJ2506 (600V, 25A @ 100°C)
APFC MOSFETs	2x Infineon IPA60R099P6 (600V, 24A @ 100°C, Rds(on): 0.099Ohm) & 1x SYNC Power SPN5003 (to reduce no load consumption)
APFC Boost Diode	2x Infineon IDH08G65C6 (650V, 8A @ 145°C)
Bulk Cap(s)	1x Nippon Chemi-Con (400V, 680uF, 2,000h @ 105°C, KMW) & 1x Rubycon (400V, 680uF, 2,000h @ 105°C, KMW)
Main Switchers	4x Alpha & Omega AOT29S50 (500V, 18A @ 100°C, Rds(on): 0.15Ohm)
IC Drivers	2x Novosense NSi6602 & 1x Infineon 2EDN752x
Digital APFC Controller	Texas Instruments UCD3138A
Digital Resonant Controller	Texas Instruments UCD3138A
Topology	Primary side: Semi-Digital, Interleaved PFC, Full-Bridge & LLC converter Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	-
+12V MOSFETs	6x Infineon BSC014N06NS (60V, 152A @ 100°C, Rds(on): 1.45mOhm)
5V & 3.3V	DC-DC Converters: 6x PWM Controller(s): no info
Filtering Capacitors	Electrolytic: 6x Nippon Chemi-Con (105°C, W), 4x Nippon Chemi-Con (4-10,000h @ 105°C, KY), 1x Nippon Chemi-Con (2-5,000h @ 105°C, KZE), 3x Rubycon (4-10,000h @ 105°C, YXJ), 1x Elite (2-5,000h @ 105°C, ED) Polymer: 12x Nippon Chemi-Con, 14x FPCAP, 5x NIC
Supervisor IC	Weltrend WT7502R (OVP, UVP, SCP, PG)
MCU & Fan Controller	Microchip PIC32MM0064GPM036
Fan Model	MSI (Powerlogic) PLA12025S12H-4 (120mm, 12V, 0.36A, Hydro-Dynamic Bearing Fan)
5VSB Circuit	-
Rectifier	1x PS1045L SBR (45V, 10A)
Standby PWM Controller	On Bright OB2365T

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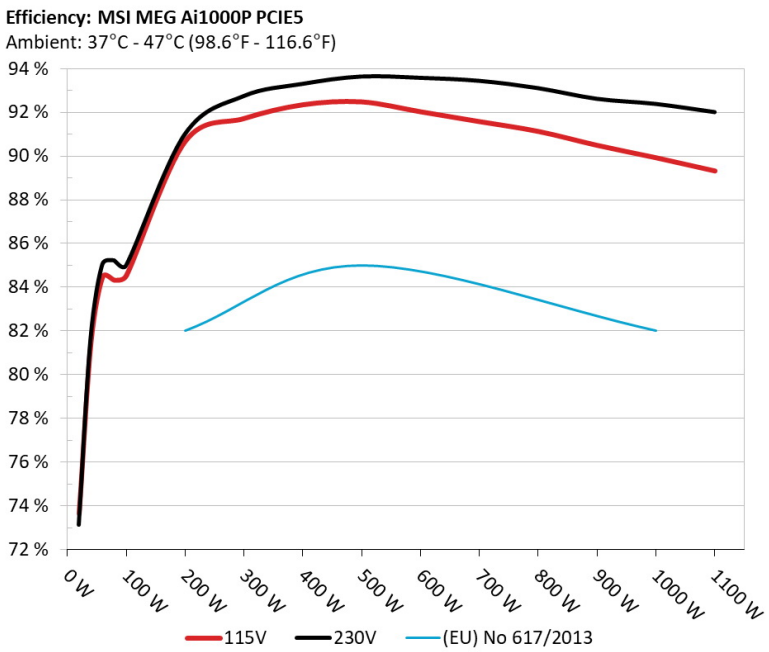
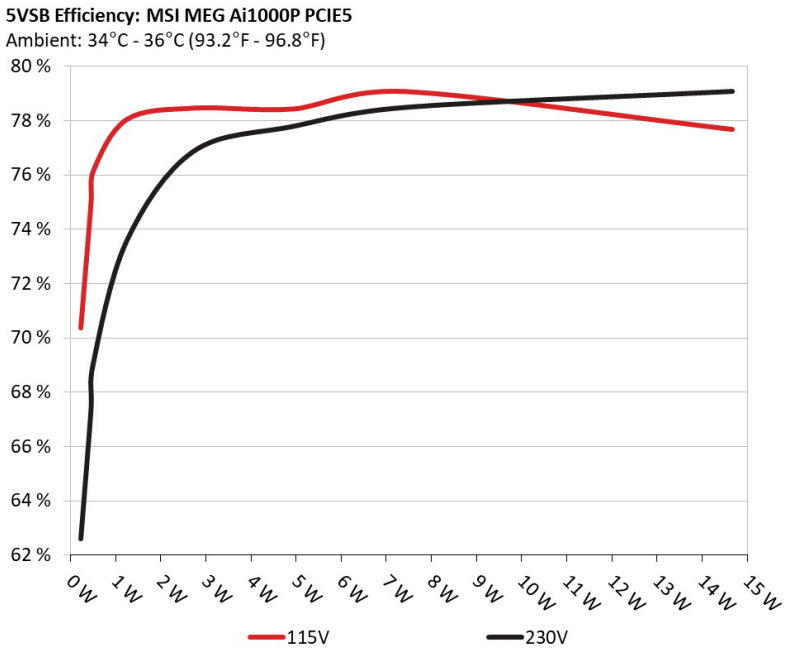
EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE



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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.223W	70.376%	0.024
	4.966V	0.317W		115.16V
2	0.09A	0.447W	74.905%	0.045
	4.965V	0.597W		115.16V
3	0.55A	2.724W	78.452%	0.221
	4.953V	3.472W		115.16V
4	1A	4.942W	78.421%	0.324
	4.942V	6.302W		115.16V
5	1.5A	7.394W	79.061%	0.381
	4.929V	9.352W		115.15V
6	2.999A	14.671W	77.669%	0.467
	4.892V	18.889W		115.15V

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.223W	62.607%	0.008
	4.965V	0.357W		230.32V
2	0.09A	0.447W	67.324%	0.015
	4.964V	0.665W		230.33V
3	0.55A	2.724W	76.881%	0.076
	4.953V	3.544W		230.33V
4	1A	4.941W	77.8%	0.131
	4.942V	6.351W		230.33V
5	1.5A	7.393W	78.493%	0.182
	4.929V	9.42W		230.33V
6	2.999A	14.67W	79.086%	0.289
	4.891V	18.549W		230.33V

Anex

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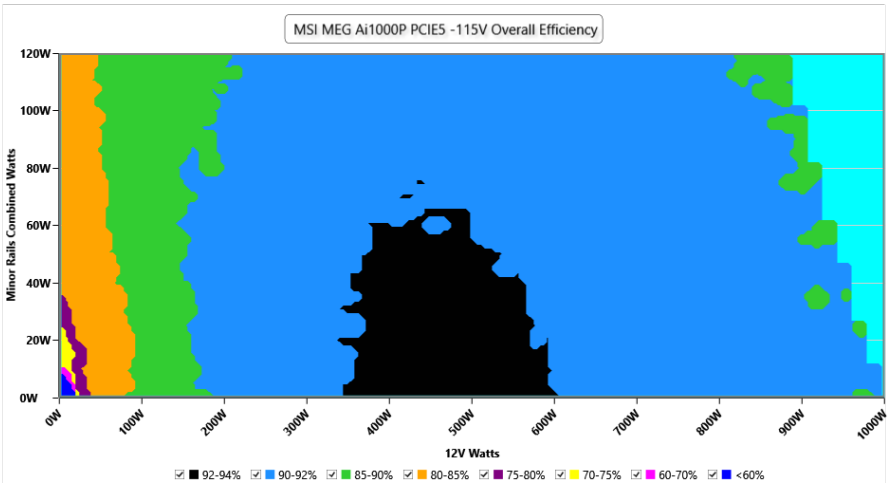
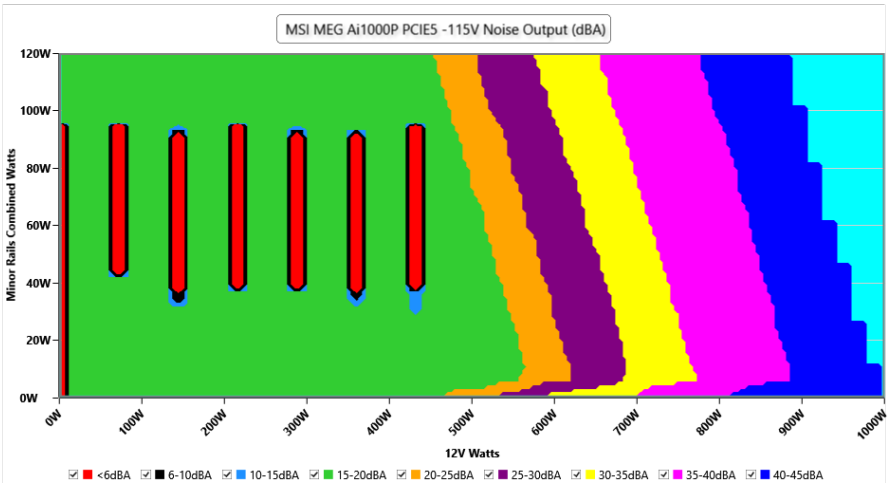
EFFICIENCY GRAPH 115V



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

Anex

MSI MEG Ai1000P PCIE5

VAMPIRE POWER -115V

Detailed Results

	Average	Min	Limit Min	Max	Limit Max	Result
Mains Voltage RMS:	115.17 V	115.13 V	113.85 V	115.20 V	116.15 V	PASS
Mains Frequency:	60.00 Hz	59.99 Hz	59.40 Hz	60.01 Hz	60.60 Hz	PASS
Mains Voltage CF:	1.416	1.415	1.340	1.418	1.490	PASS
Mains Voltage THD:	0.13 %	0.10 %	N/A	0.18 %	2.00 %	PASS
Real Power:	0.023 W	0.019 W	N/A	0.027 W	N/A	N/A
Apparent Power:	13.261 W	13.081 W	N/A	13.446 W	N/A	N/A
Power Factor:	0.002	N/A	N/A	N/A	N/A	N/A

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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MSI MEG Ai1000P PCIE5

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
10%	6.502A	1.979A	1.996A	0.992A	99.986	84.516%	0	<6.0	45.18°C	0.984
	12.055V	5.054V	3.307V	5.039V	118.361				40.76°C	115.14V
20%	14.043A	2.97A	2.995A	1.192A	199.928	90.655%	0	<6.0	45.87°C	0.994
	12.036V	5.051V	3.305V	5.035V	220.48				41.1°C	115.12V
30%	21.983A	3.466A	3.496A	1.391A	299.967	91.709%	0	<6.0	46.63°C	0.996
	12.006V	5.049V	3.303V	5.03V	327.089				41.35°C	115.08V
40%	29.846A	3.963A	3.997A	1.592A	399.502	92.337%	0	<6.0	47.45°C	0.997
	12.005V	5.047V	3.302V	5.026V	432.665				41.78°C	115.05V
50%	37.382A	4.956A	4.999A	1.792A	499.223	92.471%	0	<6.0	48.63°C	0.998
	12.003V	5.045V	3.301V	5.022V	539.886				42.57°C	115.02V
60%	45.026A	5.955A	6.008A	1.994A	599.777	92.018%	1059	23.3	42.82°C	0.998
	11.992V	5.039V	3.296V	5.014V	651.799				49.38°C	114.98V
70%	52.714A	6.95A	7.013A	2.194A	699.492	91.569%	1363	31.5	43.06°C	0.998
	11.959V	5.037V	3.294V	5.011V	763.926				50.13°C	114.94V
80%	60.365A	7.947A	8.017A	2.295A	799.501	91.122%	1627	36.6	44.71°C	0.999
	11.954V	5.035V	3.292V	5.008V	877.421				53°C	114.9V
90%	68.503A	8.445A	8.507A	2.397A	899.268	90.485%	1884	41.5	44.88°C	0.999
	11.924V	5.032V	3.29V	5.004V	993.902				54.14°C	114.87V
100%	76.328A	8.947A	9.029A	3.004A	999.304	89.916%	2118	43.5	45.55°C	0.999
	11.918V	5.029V	3.288V	4.991V	1111.452				55.65°C	114.82V
110%	84.079A	9.947A	10.132A	3.005A	1099.92	89.31%	2324	47.0	46.7°C	0.998
	11.913V	5.026V	3.286V	4.99V	1231.574				57.63°C	114.78V
CL1	0.116A	14.301A	14.455A	0A	121.287	82.214%	987	20.4	42.17°C	0.989
	12.039V	5.049V	3.299V	5.076V	147.557				48.67°C	115.14V
CL2	0.114A	21.787A	0A	0A	111.385	80.638%	1412	32.1	43°C	0.988
	12.050V	5.049V	3.302V	5.091V	138.101				50.36°C	115.14V
CL3	0.115A	0A	22.003A	0A	73.974	76.446%	1484	34.8	44.33°C	0.978
	12.030V	5.055V	3.299V	5.054V	96.777				52.4°C	115.15V
CL4	83.819A	0A	0A	0A	999.951	90.403%	2086	43.5	45.73°C	0.999
	11.930V	5.038V	3.295V	5.037V	1106.109				55.63°C	114.83V

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MSI MEG Ai1000P PCIE5

20-80W 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	1.231A	0.494A	0.499A	0.198A	19.991	73.642%	0	<6.0	39.67°C	0.808
	12.054V	5.056V	3.309V	5.053V	27.151				36.56°C	115.17V
40W	2.712A	0.692A	0.698A	0.297A	39.992	81.471%	0	<6.0	41.34°C	0.926
	12.050V	5.055V	3.308V	5.051V	49.102				37.99°C	115.17V
60W	4.195A	0.89A	0.898A	0.396A	59.992	84.475%	0	<6.0	42.49°C	0.962
	12.044V	5.055V	3.308V	5.049V	70.982				38.76°C	115.15V
80W	5.676A	1.088A	1.097A	0.495A	79.937	84.316%	0	<6.0	43.45°C	0.977
	12.035V	5.055V	3.308V	5.047V	94.802				39.48°C	115.15V

RIPPLE MEASUREMENTS 115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	56.83mV	7.42mV	7.64mV	9.81mV	Pass
20% Load	15.93mV	13.67mV	6.52mV	20.44mV	Pass
30% Load	13.82mV	13.77mV	6.47mV	20.14mV	Pass
40% Load	17.50mV	16.16mV	7.08mV	22.47mV	Pass
50% Load	21.14mV	14.74mV	6.88mV	24.44mV	Pass
60% Load	17.85mV	17.43mV	7.18mV	25.86mV	Pass
70% Load	17.85mV	6.71mV	12.69mV	9.97mV	Pass
80% Load	18.56mV	6.45mV	9.35mV	10.43mV	Pass
90% Load	18.46mV	16.11mV	10.97mV	23.48mV	Pass
100% Load	32.08mV	7.85mV	10.54mV	11.83mV	Pass
110% Load	36.05mV	7.77mV	10.64mV	11.60mV	Pass
Crossload1	12.77mV	6.31mV	9.44mV	10.04mV	Pass
Crossload2	8.45mV	12.09mV	6.47mV	23.43mV	Pass
Crossload3	24.61mV	14.89mV	10.16mV	25.20mV	Pass
Crossload4	32.42mV	7.93mV	8.76mV	12.63mV	Pass

Anex

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230V

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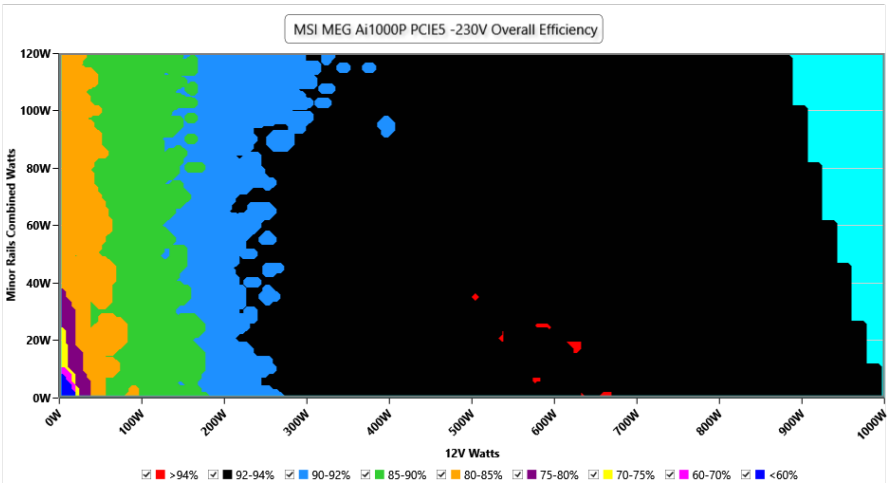
EFFICIENCY GRAPH 230V



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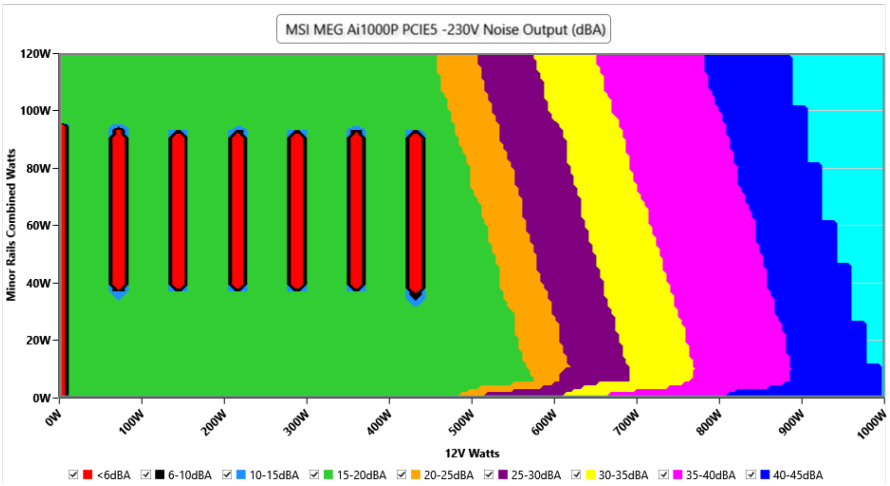
NOISE GRAPH 230V



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MSI MEG Ai1000P PCIE5

VAMPIRE POWER -230V

Detailed Results

	Average	Min	Limit Min	Max	Limit Max	Result
Mains Voltage RMS:	230.34 V	230.21 V	227.70 V	230.37 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:	1.416	1.415	1.340	1.417	1.490	PASS
Mains Voltage THD:	0.13 %	0.10 %	N/A	0.22 %	2.00 %	PASS
Real Power:	0.092 W	0.084 W	N/A	0.107 W	N/A	N/A
Apparent Power:	44.477 W	44.076 W	N/A	44.855 W	N/A	N/A
Power Factor:	0.002	N/A	N/A	N/A	N/A	N/A

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 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%	6.500A	1.979A	1.995A	0.992A	99.984	84.983%	0	<6.0	44.53°C	0.877
	12.059V	5.054V	3.307V	5.04V	117.703				40.17°C	230.33V
20%	14.068A	2.969A	2.995A	1.191A	199.923	90.986%	0	<6.0	45.65°C	0.92
	12.015V	5.052V	3.305V	5.036V	219.749				40.83°C	230.33V
30%	21.991A	3.466A	3.496A	1.391A	299.958	92.738%	0	<6.0	46.78°C	0.944
	12.001V	5.05V	3.304V	5.031V	323.451				41.5°C	230.31V
40%	29.891A	3.962A	3.997A	1.592A	399.491	93.294%	0	<6.0	47.89°C	0.956
	11.986V	5.048V	3.302V	5.026V	428.247				42.11°C	230.3V
50%	37.461A	4.955A	4.998A	1.792A	499.218	93.632%	0	<6.0	48.39°C	0.96
	11.978V	5.046V	3.301V	5.023V	533.17				42.16°C	230.28V
60%	45.040A	5.952A	6.005A	1.994A	599.767	93.573%	1088	24.6	42.84°C	0.962
	11.989V	5.041V	3.297V	5.016V	640.923				49.56°C	230.26V
70%	52.625A	6.949A	7.013A	2.194A	699.504	93.436%	1350	31.5	43.49°C	0.968
	11.979V	5.037V	3.294V	5.011V	748.976				50.59°C	230.25V
80%	60.361A	7.948A	8.018A	2.296A	799.507	93.104%	1628	36.6	44.03°C	0.977
	11.955V	5.034V	3.292V	5.008V	858.736				52.11°C	230.23V
90%	68.495A	8.446A	8.508A	2.397A	899.292	92.615%	1884	41.5	44.9°C	0.985
	11.925V	5.032V	3.29V	5.004V	971.022				54.05°C	230.21V
100%	76.276A	8.948A	9.03A	3.005A	999.305	92.382%	2119	43.5	45.82°C	0.984
	11.926V	5.029V	3.288V	4.991V	1081.697				55.99°C	230.19V
110%	84.026A	9.947A	10.132A	3.005A	1099.925	92.006%	2324	47.0	46.51°C	0.984
	11.920V	5.026V	3.286V	4.99V	1195.555				57.41°C	230.18V
CL1	0.116A	14.302A	14.457A	0A	121.286	82.861%	987	20.4	42.48°C	0.875
	12.039V	5.048V	3.299V	5.076V	146.378				48.06°C	230.33V
CL2	0.114A	21.788A	0A	0A	111.384	81.369%	1393	32.1	43.26°C	0.903
	12.051V	5.049V	3.302V	5.091V	136.95				50.42°C	230.33V
CL3	0.115A	0A	22.004A	0A	73.974	77.18%	1483	34.8	44.63°C	0.831
	12.031V	5.054V	3.299V	5.053V	95.833				52.73°C	230.33V
CL4	83.768A	0A	0A	0A	999.931	92.829%	2087	43.5	45.62°C	0.984
	11.937V	5.038V	3.294V	5.037V	1077.152				55.55°C	230.2V

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MSI MEG Ai1000P PCIE5

20-80W LOAD TESTS 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	1.231A	0.494A	0.499A	0.198A	19.989	73.139%	0	<6.0	40.01°C	0.435
	12.054V	5.057V	3.309V	5.054V	27.308				36.82°C	230.34V
40W	2.712A	0.692A	0.698A	0.297A	39.991	81.666%	0	<6.0	40.78°C	0.613
	12.049V	5.056V	3.309V	5.051V	48.983				37.47°C	230.34V
60W	4.194A	0.89A	0.898A	0.396A	59.991	85.05%	0	<6.0	41.95°C	0.721
	12.045V	5.056V	3.308V	5.049V	70.543				38.42°C	230.34V
80W	5.675A	1.088A	1.097A	0.495A	79.933	85.226%	0	<6.0	43.19°C	0.825
	12.035V	5.055V	3.308V	5.047V	93.805				39.38°C	230.33V

RIPPLE MEASUREMENTS 230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	63.31mV	10.82mV	6.62mV	20.04mV	Pass
20% Load	9.82mV	5.79mV	6.42mV	9.31mV	Pass
30% Load	15.27mV	11.03mV	6.57mV	19.43mV	Pass
40% Load	16.38mV	11.89mV	6.67mV	20.39mV	Pass
50% Load	21.14mV	12.60mV	11.22mV	21.25mV	Pass
60% Load	24.18mV	5.99mV	7.23mV	9.62mV	Pass
70% Load	25.39mV	5.95mV	7.58mV	10.17mV	Pass
80% Load	24.38mV	6.35mV	9.10mV	10.07mV	Pass
90% Load	23.57mV	14.69mV	12.23mV	22.62mV	Pass
100% Load	37.77mV	7.77mV	10.70mV	11.56mV	Pass
110% Load	42.09mV	8.28mV	10.84mV	12.28mV	Pass
Crossload1	14.38mV	6.30mV	9.94mV	9.71mV	Pass
Crossload2	9.67mV	13.01mV	6.02mV	22.62mV	Pass
Crossload3	24.10mV	13.92mV	10.16mV	22.92mV	Pass
Crossload4	37.56mV	7.87mV	8.57mV	11.13mV	Pass

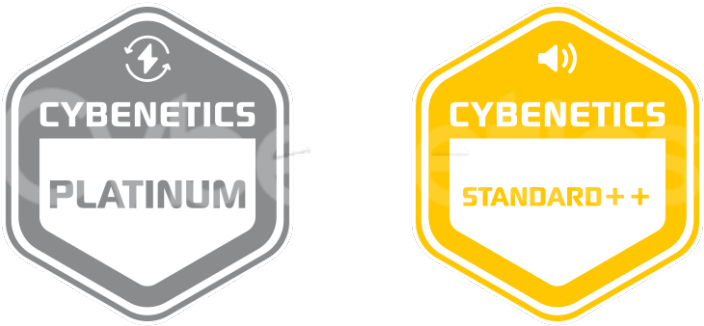
Anex

MSI MEG Ai1000P PCIE5

Top side

Power specifications label

CERTIFICATIONS 115V



CERTIFICATIONS 230V