Anex

Cooler Master MWE 500

Lab ID#: CM19500033
Receipt Date: Jul 5, 2019
Test Date: May 15, 2019

Report:
Report Date: Nov 6, 2019

DUT INFORMATION

Brand	Cooler Master
Manufacturer (OEM)	Gospower
Series	MWE White
Model Number	
Serial Number	MPE5001ACABW1191400004
DUT Notes	

DUT SPECIFICATIONS

Rated Voltage (Vrms)	200-240
Rated Current (Arms)	5
Rated Frequency (Hz)	50-60
Rated Power (W)	500
Type	ATX12V
Cooling	120mm Rifle Bearing Fan (DF1202512SELN)
Semi-Passive Operation	✓
Cable Design	Fixed cables

POWER SPECIFICATIONS

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	16	16	41	3	0.3
	Watts	110		492	15	3.6
Total Max. Power (W)		500				

CABLES AND CONNECTORS

Captive Cables

Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors
ATX connector 20+4 pin (510mm)	1	1	18-20AWG	No
4+4 pin EPS12V (530mm)	1	1	18AWG	No
6+2 pin PCIe (490mm+100mm)	1	2	16-18AWG	No
SATA (420mm+150mm+150mm)	2	6	18-20AWG	No
4-pin Molex (420mm+150mm+150mm)	1	3	18-20AWG	No
AC Power Cord (1400mm) - C13 coupler	1	1	18AWG	-

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General Data	
Manufacturer (OEM)	Gospower
PCB Type	Single Sided
Primary Side	
Transient Filter	3x Y caps, 2x X caps, 2x CM chokes
Inrush Protection	NTC Thermistor
Bridge Rectifier(s)	1x Diode Incorporated GBU608 (800V, 6A @ 100°C)
APFC MOSFETS	1x JILIN SINO-MICROELECTRONICS JCS13N50FC (500V, 8A @ 100°C, 0.49Ohm)
APFC Boost Diode	1x JILIN SINO-MICROELECTRONICS 10F60UHF (600V, 10A @ 100°C)
Hold-up Cap(s)	1x Elite (420V, 330uF, 2000h @ 85°C, GM)
Main Switchers	2x JILIN SINO-MICROELECTRONICS JCS13N50FC (500V, 8A @ 100°C, 0.49Ohm)
APFC Controller	Champion CM6500UNX
Resonant Controllers	Champion CU6901V
Topology	Primary side: Half-Bridge & LLC converter Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	
+12V MOSFETS	2x Nce Power NCE4080 (40V, 56A @ 100°C, 6.5mOhm)
5V & 3.3V	DC-DC Converters: 4x IPS FTD05N03NA (30V, 75A @ 100°C, 6mOhm) PWM Controllers: ANPEC APW7159C
Filtering Capacitors	Electrolytics: 4x Elite (2-5,000h @ 105°C, ED), 4x Elite (2,000h @ 105°C, EL), 2x CapXon (2-5,000h @ 105°C, KF), 1x CapXon (3-10,000h @ 105°C, GH) Polymers: CapXon
Supervisor IC	IN1S313I-SAG
Fan Model	Thermal Control DF1202512SELN (120mm, 12V, 0.25A, Rifle Bearing Fan)
5VSB Circuit	
Rectifier	-
Standby PWM Controller	On-Bright OB2365SP

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RESULTS

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

230V

Average Efficiency	86.127%
Average Efficiency 5VSB	77.130%
Standby Power Consumption (W)	0.1894080
Average PF	0.909
Avg Noise Output	31.55 dB(A)
Efficiency Rating (ETA)	
Noise Rating (LAMBDA)	S++

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)	21
AC Loss to PWR_OK Hold Up Time (ms)	19.4
PWR_OK Inactive to DC Loss Delay (ms)	1.6

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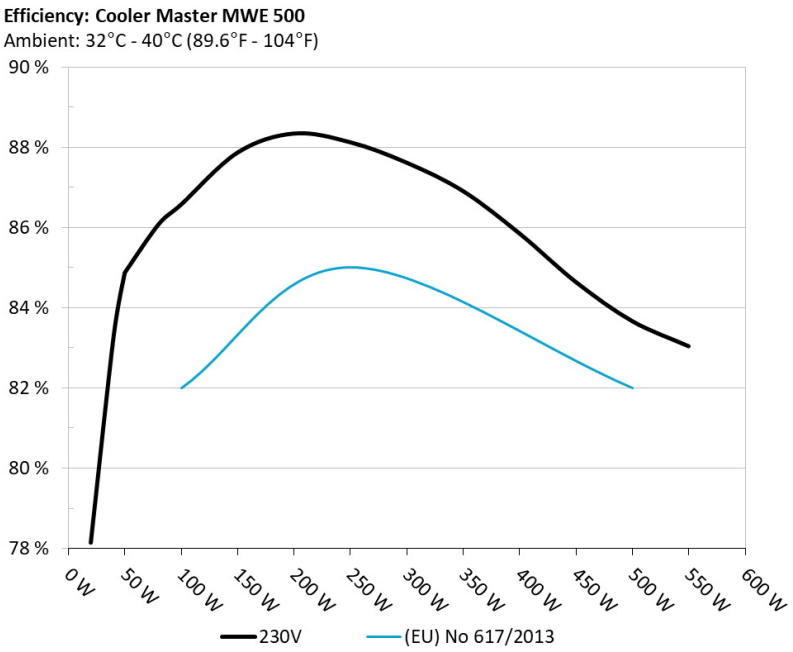
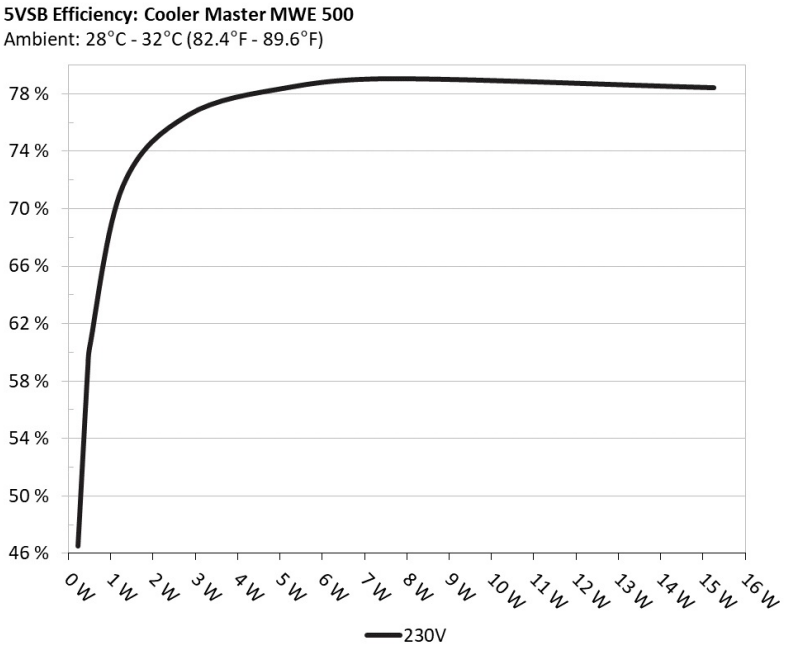
EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE



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)

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.234	46.521%	0.010
	5.177V	0.503		230.25V
2	0.090A	0.466	58.987%	0.015
	5.176V	0.790		230.25V
3	0.550A	2.840	76.550%	0.068
	5.162V	3.710		230.31V
4	1.000A	5.149	78.443%	0.115
	5.148V	6.564		230.31V
5	1.500A	7.701	79.082%	0.161
	5.133V	9.738		230.31V
6	3.000A	15.262	78.452%	0.261
	5.087V	19.454		230.29V

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230V

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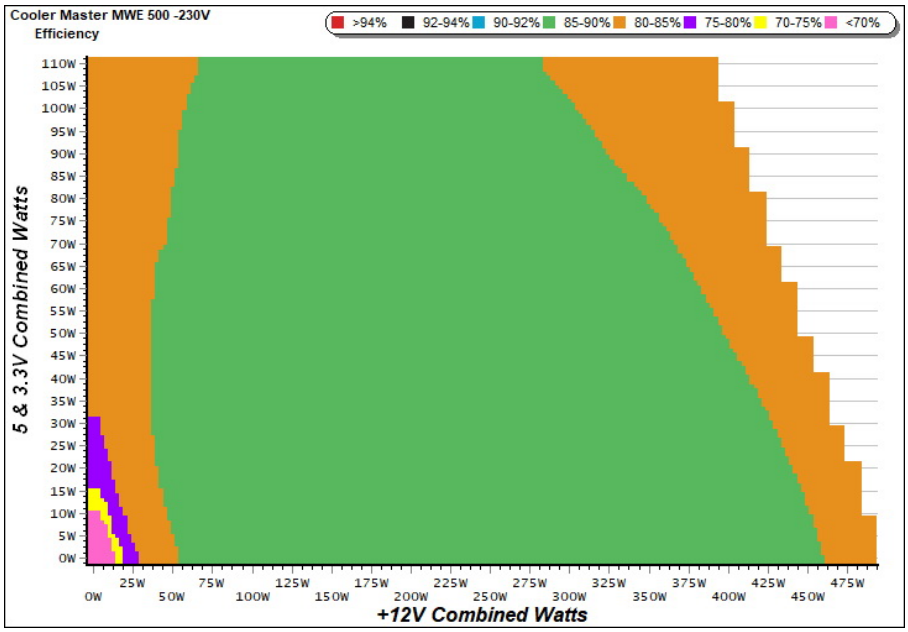
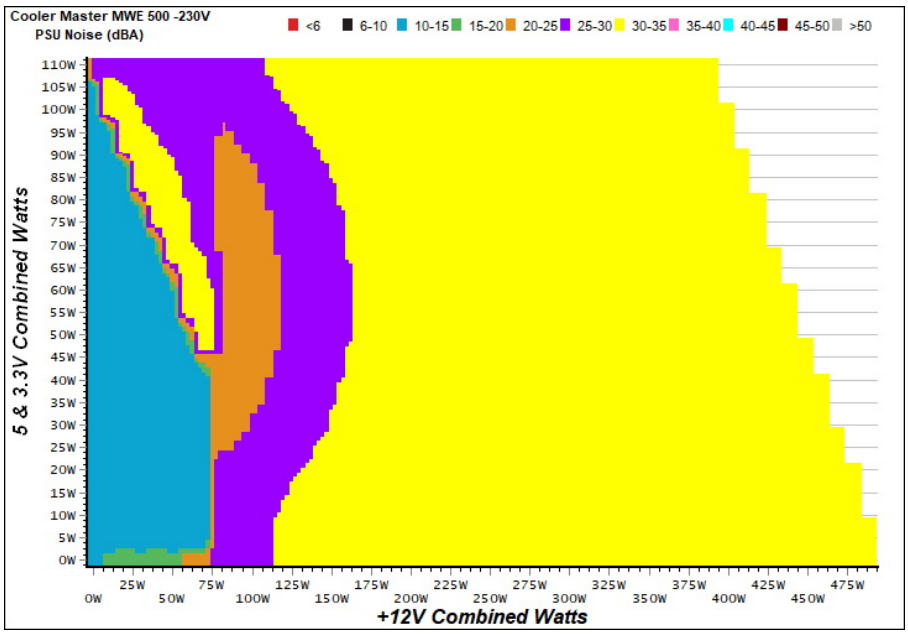
EFFICIENCY GRAPH 230V



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 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

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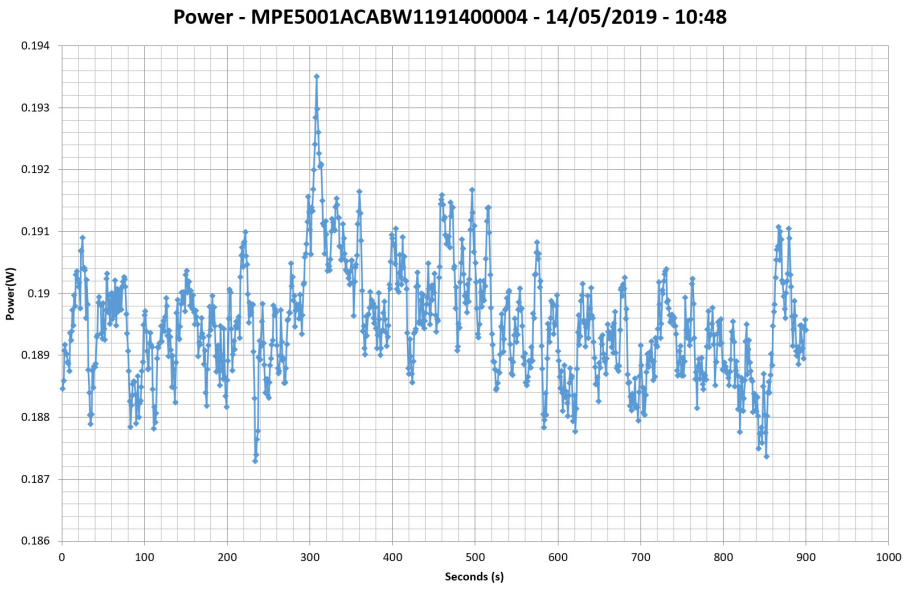
VAMPIRE POWER -230V



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
1	2.306A	2.010A	1.945A	0.974A	49.644	83.549%	0	<6.0	40.85°C	0.616
	12.163V	4.976V	3.389V	5.137V	59.419				34.06°C	230.25V
2	5.683A	3.024A	2.929A	1.172A	99.749	86.578%	0	<6.0	41.58°C	0.802
	12.115V	4.961V	3.378V	5.121V	115.213				34.47°C	230.25V
3	9.391A	3.539A	3.414A	1.371A	149.640	87.871%	1315	31.8	35.05°C	0.863
	12.101V	4.946V	3.367V	5.107V	170.295				42.94°C	230.25V
4	13.115A	4.055A	3.932A	1.571A	199.631	88.347%	1431	32.8	35.59°C	0.917
	12.080V	4.932V	3.357V	5.094V	225.962				43.81°C	230.25V
5	16.519A	5.086A	4.929A	1.773A	249.756	88.128%	1450	33.0	36.05°C	0.938
	12.062V	4.917V	3.346V	5.078V	283.401				44.86°C	230.25V
6	19.927A	6.119A	5.937A	1.976A	299.830	87.617%	1450	33.0	36.96°C	0.949
	12.045V	4.903V	3.336V	5.062V	342.206				46.26°C	230.24V
7	23.348A	7.161A	6.946A	2.181A	349.940	86.906%	1450	33.0	37.21°C	0.956
	12.028V	4.889V	3.325V	5.046V	402.663				47.49°C	230.24V
8	26.777A	8.208A	7.963A	2.387A	400.045	85.845%	1454	33.0	37.65°C	0.962
	12.012V	4.874V	3.314V	5.029V	466.007				48.57°C	230.24V
9	30.619A	8.741A	8.470A	2.391A	449.757	84.641%	1454	33.0	38.31°C	0.968
	11.994V	4.864V	3.305V	5.020V	531.373				49.62°C	230.24V
10	34.233A	9.275A	9.010A	3.006A	499.741	83.664%	1451	33.0	39.37°C	0.972
	11.978V	4.852V	3.296V	4.990V	597.320				50.92°C	230.24V
11	38.452A	9.290A	9.030A	3.011A	549.718	83.040%	1455	33.0	40.28°C	0.974
	11.963V	4.845V	3.289V	4.984V	661.991				52.36°C	230.24V
CL1	0.133A	13.002A	12.998A	0.000A	108.525	81.791%	1444	32.9	36.15°C	0.832
	12.103V	4.882V	3.342V	5.133V	132.685				44.76°C	230.24V
CL2	41.001A	0.999A	0.999A	0.000A	499.637	84.382%	1452	33.0	39.18°C	0.972
	11.985V	4.920V	3.329V	5.103V	592.110				50.86°C	230.23V

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20-80W LOAD TESTS 230V

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	PF/AC Volts
1	1.189A	0.501A	0.471A	0.194A	19.552	78.139%	0	<6.0	0.346
	12.152V	4.991V	3.398V	5.168V	25.022				230.25V
2	2.440A	1.001A	0.972A	0.388A	39.980	83.330%	0	<6.0	0.548
	12.168V	4.984V	3.394V	5.159V	47.978				230.26V
3	3.626A	1.507A	1.443A	0.583A	59.429	84.874%	0	<6.0	0.669
	12.144V	4.978V	3.389V	5.149V	70.020				230.26V
4	4.886A	2.010A	1.949A	0.778A	79.861	86.088%	0	<6.0	0.745
	12.131V	4.972V	3.385V	5.139V	92.767				230.26V

RIPPLE MEASUREMENTS 230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	66.2 mV	17.9 mV	12.8 mV	20.0 mV	Pass
20% Load	80.5 mV	18.9 mV	15.2 mV	19.6 mV	Pass
30% Load	32.2 mV	18.2 mV	15.0 mV	16.2 mV	Pass
40% Load	33.1 mV	18.8 mV	15.7 mV	18.2 mV	Pass
50% Load	32.6 mV	19.3 mV	18.0 mV	19.3 mV	Pass
60% Load	32.7 mV	19.9 mV	18.6 mV	21.4 mV	Pass
70% Load	32.2 mV	20.9 mV	20.0 mV	22.0 mV	Pass
80% Load	32.3 mV	20.2 mV	21.8 mV	24.2 mV	Pass
90% Load	32.9 mV	21.0 mV	21.8 mV	25.3 mV	Pass
100% Load	47.7 mV	23.2 mV	24.3 mV	27.9 mV	Pass
110% Load	47.7 mV	24.0 mV	23.9 mV	29.1 mV	Pass
Crossload 1	37.1 mV	23.6 mV	20.8 mV	16.0 mV	Pass
Crossload 2	45.5 mV	22.0 mV	20.4 mV	25.0 mV	Pass

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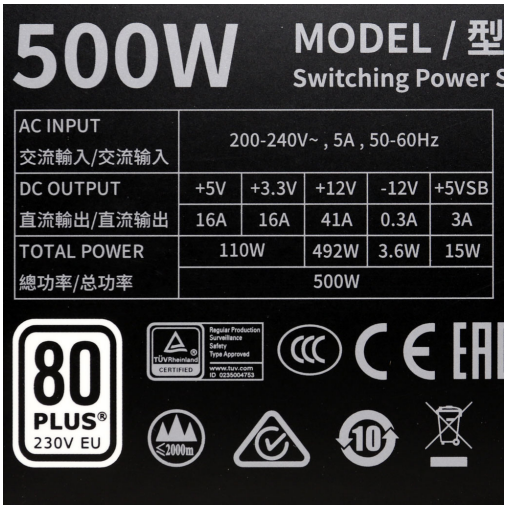
Top side



Power specifications label

CERTIFICATIONS 230V