Evaluation Report

Cooler Master MWE 450

DUT INFORMATION

Brand	Cooler Master
Manufacturer (OEM)	Gospower
Series	MWE White
Model Number	MWE 450
Serial Number	MPE4501ACABW1191400003
DUT Notes	

DUT SPECIFICATIONS

Rated Voltage (Vrms)	200-240
Rated Current (Arms)	4
Rated Frequency (Hz)	50-60
Rated Power (W)	450
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	15	15	37	3	0.3
	Watts	100		444	15	3.6
Total Max. Power (W)		450				

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, 220uF, 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: 8x 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

Test Date	05-15-2019
Certification Date	06-11-2019
Lab ID #	696
Temperature Range (°C /°F)	30-32 / 86-89.6
Average Efficiency	86.182
Efficiency With 10W (≤500W) or 2% (>500W) Load -115V	0.000
Average Efficiency 5VSB	77.124
Standby Power Consumption (W) -115V	0.0000000
Standby Power Consumption (W) -230V	0.1818430
Average PF	0.913
ErP Lot 3/6 Ready	✓
(EU) No 617/2013 Compliance	✓
Avg Noise Output	32.25
Efficiency Rating (ETA)	ETA-S
Noise Rating (LAMBDA)	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	

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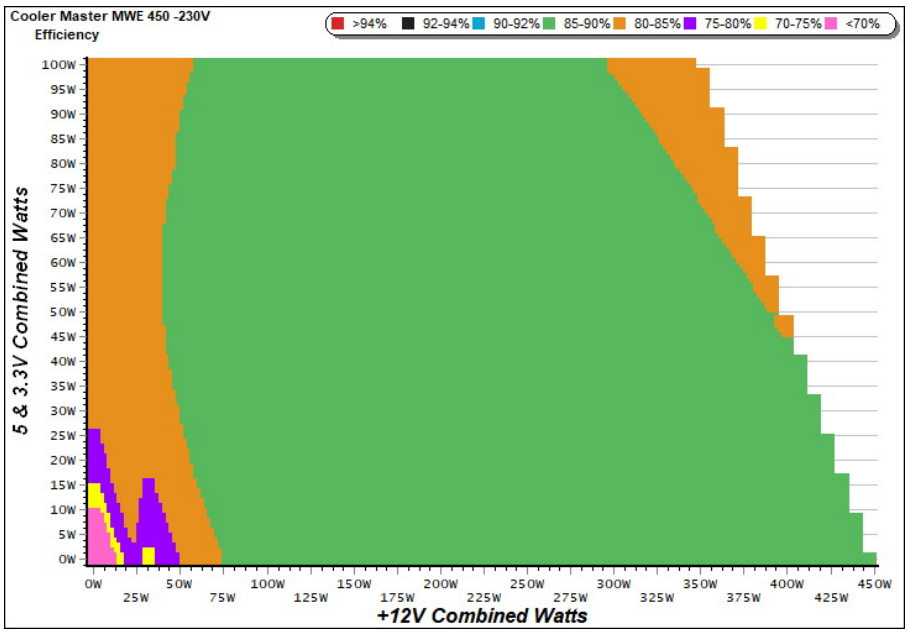
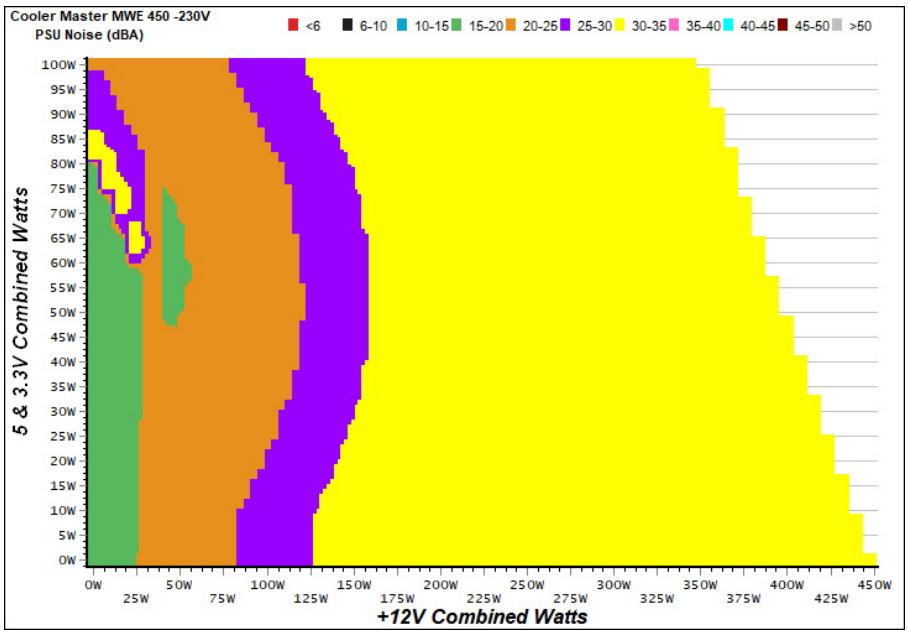
EFFICIENCY GRAPH



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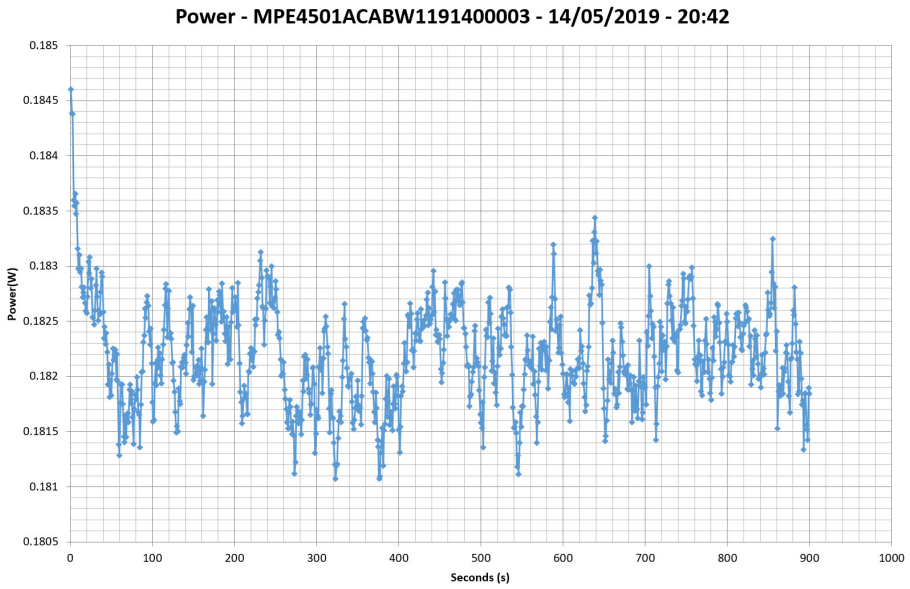
5VSB EFFICIENCY -115V (ERP LOT 3/6 & CEC)

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.233	47.071%	0.010
	5.183V	0.495		230.29V
2	0.090A	0.467	59.490%	0.015
	5.181V	0.785		230.29V
3	0.550A	2.843	76.796%	0.070
	5.168V	3.702		230.29V
4	1.000A	5.155	78.594%	0.118
	5.154V	6.559		230.29V
5	1.500A	7.710	79.248%	0.165
	5.139V	9.729		230.29V
6	3.000A	15.279	78.644%	0.266
	5.093V	19.428		230.28V

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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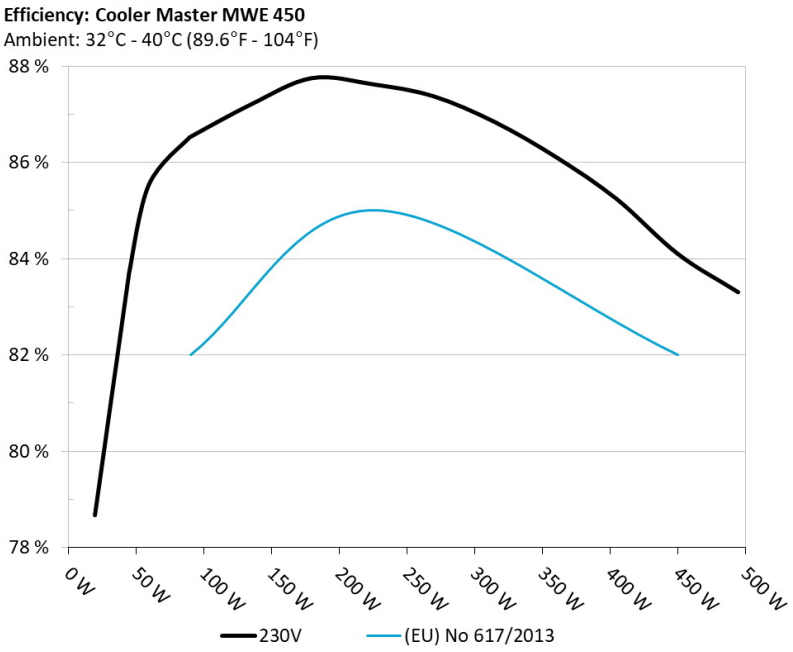
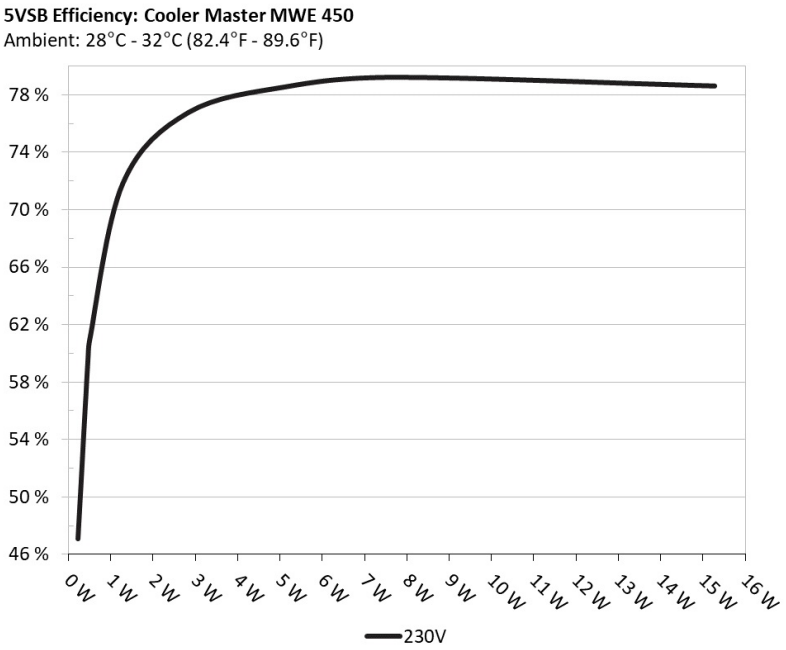
EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE



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	1.911A	2.004A	1.954A	0.973A	44.801	83.441%	0	<6.0	42.23°C	0.617
	12.146V	4.985V	3.376V	5.142V	53.692				35.25°C	230.28V
2	4.800A	3.019A	2.942A	1.170A	89.290	85.287%	1114	24.6	35.91°C	0.811
	12.165V	4.969V	3.364V	5.128V	104.693				43.53°C	230.28V
3	8.109A	3.529A	3.427A	1.369A	134.419	87.196%	1257	28.8	36.46°C	0.883
	12.137V	4.958V	3.356V	5.115V	154.158				44.34°C	230.29V
4	11.422A	4.043A	3.943A	1.569A	179.663	87.747%	1401	31.9	36.88°C	0.919
	12.122V	4.947V	3.348V	5.101V	204.750				45.15°C	230.30V
5	14.412A	5.067A	4.942A	1.770A	224.975	87.618%	1539	33.8	37.27°C	0.939
	12.106V	4.934V	3.339V	5.086V	256.768				46.23°C	230.31V
6	17.342A	6.096A	5.946A	1.973A	269.503	87.372%	1535	33.8	37.75°C	0.951
	12.092V	4.921V	3.330V	5.071V	308.455				47.58°C	230.32V
7	20.346A	7.133A	6.954A	2.177A	314.827	86.835%	1534	33.8	38.10°C	0.959
	12.077V	4.908V	3.321V	5.055V	362.559				48.49°C	230.32V
8	23.362A	8.175A	7.969A	2.382A	360.159	86.107%	1536	33.8	38.75°C	0.965
	12.060V	4.894V	3.313V	5.039V	418.271				49.63°C	230.33V
9	26.778A	8.701A	8.469A	2.387A	405.074	85.233%	1533	33.7	39.38°C	0.969
	12.046V	4.885V	3.306V	5.029V	475.257				50.86°C	230.33V
10	29.940A	9.234A	9.006A	3.000A	449.891	84.100%	1530	33.7	39.74°C	0.973
	12.030V	4.874V	3.298V	5.001V	534.947				51.56°C	230.37V
11	33.703A	9.245A	9.021A	3.005A	494.684	83.302%	1533	33.7	40.27°C	0.976
	12.016V	4.868V	3.292V	4.994V	593.844				52.63°C	230.34V
CL1	0.143A	12.001A	12.001A	0.000A	100.697	81.507%	1529	33.7	37.12°C	0.847
	12.144V	4.909V	3.337V	5.137V	123.544				46.04°C	230.40V
CL2	37.017A	1.003A	0.999A	1.000A	458.816	84.806%	1535	33.8	39.56°C	0.973
	12.034V	4.932V	3.325V	5.085V	541.019				51.37°C	230.34V

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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	1.188A	0.500A	0.472A	0.193A	19.508	78.671%	0	<6.0	0.368
	12.131V	5.000V	3.384V	5.173V	24.797				230.30V
2	2.441A	1.002A	0.974A	0.387A	39.941	83.716%	0	<6.0	0.577
	12.146V	4.993V	3.379V	5.163V	47.710				230.33V
3	3.625A	1.504A	1.450A	0.582A	59.396	85.537%	0	<6.0	0.698
	12.139V	4.987V	3.375V	5.153V	69.439				230.34V
4	4.884A	2.008A	1.956A	0.778A	79.812	86.516%	0	<6.0	0.778
	12.125V	4.980V	3.371V	5.143V	92.251				230.28V

RIPPLE MEASUREMENTS

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	65.9 mV	23.0 mV	15.6 mV	14.0 mV	Pass
20% Load	53.0 mV	20.3 mV	17.3 mV	13.2 mV	Pass
30% Load	46.3 mV	21.0 mV	17.1 mV	13.1 mV	Pass
40% Load	45.1 mV	20.9 mV	17.2 mV	13.2 mV	Pass
50% Load	44.1 mV	20.9 mV	18.9 mV	13.9 mV	Pass
60% Load	48.8 mV	21.3 mV	20.4 mV	14.9 mV	Pass
70% Load	45.8 mV	23.8 mV	21.4 mV	14.9 mV	Pass
80% Load	42.5 mV	22.1 mV	25.0 mV	16.7 mV	Pass
90% Load	42.4 mV	22.0 mV	25.2 mV	17.2 mV	Pass
100% Load	51.4 mV	24.0 mV	27.4 mV	20.9 mV	Pass
110% Load	52.9 mV	24.7 mV	28.4 mV	21.3 mV	Pass
Crossload 1	52.1 mV	22.7 mV	30.8 mV	14.4 mV	Pass
Crossload 2	49.1 mV	21.7 mV	18.1 mV	17.0 mV	Pass

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

Hold-Up Time (ms)	11.0
AC Loss to PWR_OK Hold Up Time (ms)	13.2
PWR_OK Inactive to DC Loss Delay (ms)	-2.2

Top side

Power specifications label

CERTIFICATIONS

ETA S 230V

LAMBDA S++ 230V

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