EFFICIENCY AND NOISE REPORT IN ACCORDANCE WITH
CYBENETICS ETA AND CYBENETICS LAMBDA PROCEDURE

# Cooler Master MWE 450

Lab ID#: CM19450034
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 | 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 |

## TEST EQUIPMENT

| | | |
|---|---|---|
| Electronic Loads | Chroma 6314A x2<br>63123A x6<br>63102A<br>63101A | Chroma 63601-5 x4<br>Chroma 63600-2 x2<br>63640-80-80 x20<br>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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## RESULTS

| | |
|---|---|
| Temperature Range (°C /°F) | 30-32 / 86-89.6 (+-2°C / +- 3.6°F) |
| ErP Lot 3/6 Ready | ✓ |
| (EU) No 617/2013 Compliance | ✓ |

## 230V

| | |
|---|---|
| Average Efficiency | 86.182% |
| Average Efficiency 5VSB | 77.124% |
| Standby Power Consumption (W) | 0.1818430 |
| Average PF | 0.913 |
| Avg Noise Output | 32.25 dB(A) |
| Efficiency Rating (ETA) | BRONZE |
| Noise Rating (LAMBDA) | Standard++ |

## 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 | | | | |







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## 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<br>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)<br>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)<br>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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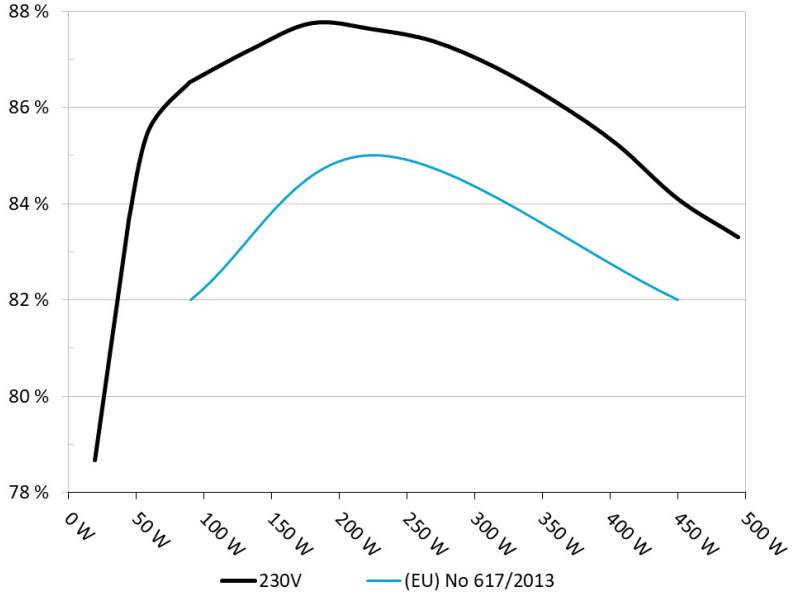
## EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE

**Efficiency: Cooler Master MWE 450**
Ambient: 32°C - 40°C (89.6°F - 104°F)

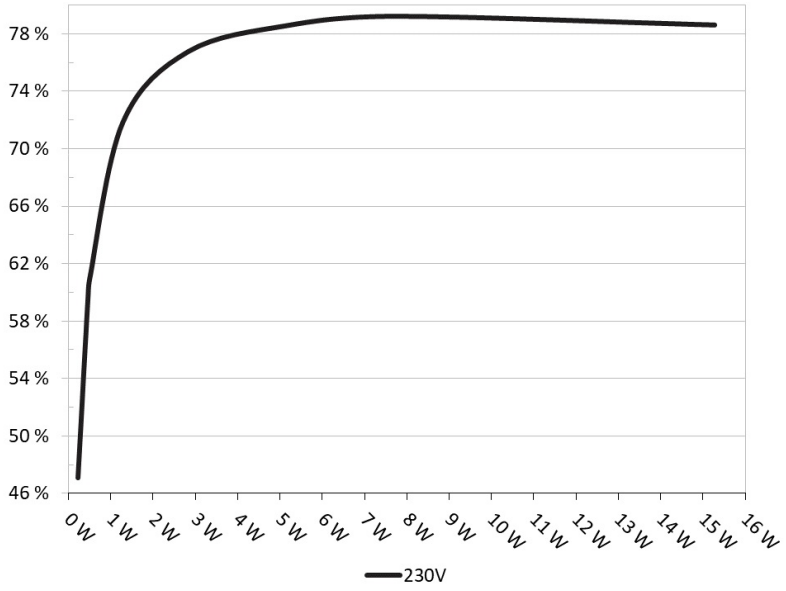



### INFO

*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

**5VSB Efficiency: Cooler Master MWE 450**
Ambient: 28°C - 32°C (82.4°F - 89.6°F)




### INFO

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







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## 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 |

# 230V







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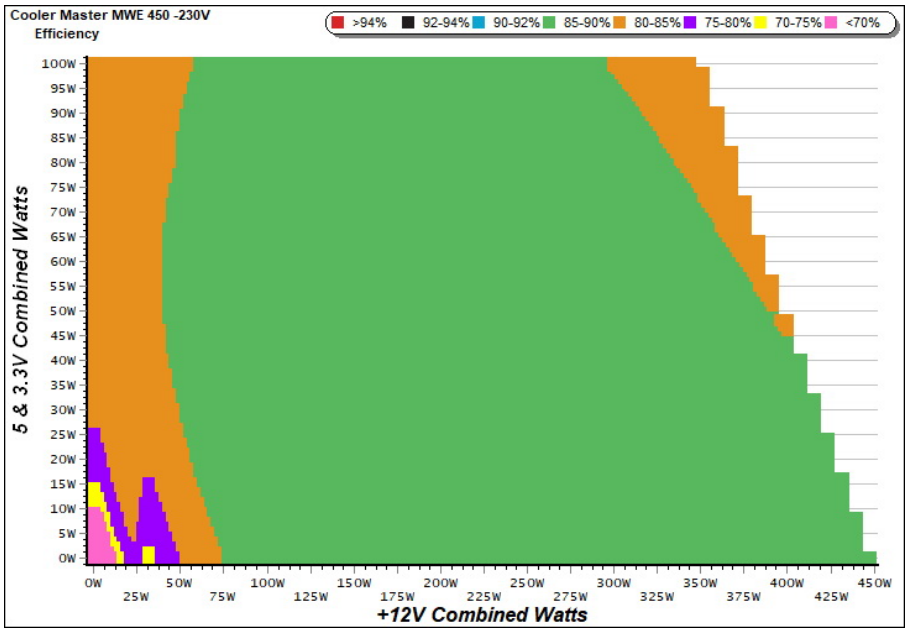
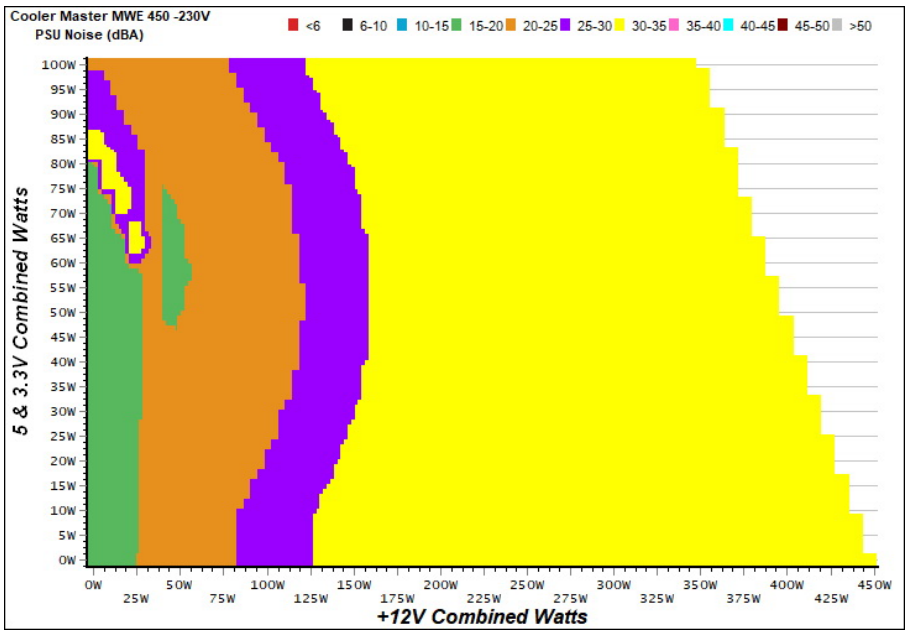
## EFFICIENCY GRAPH 230V




### 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 (+-2 °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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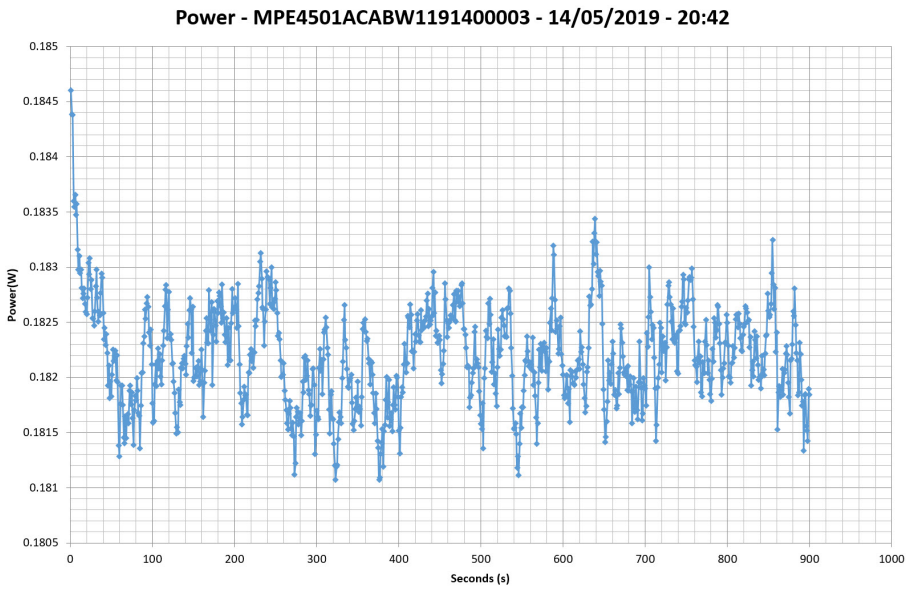
## VAMPIRE POWER -230V




### 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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## COMMISSION REGULATION (EU) NO 617/2013 TESTING 230V

| Test # | 12V | 5V | 3.3V | 5VSB | DC/AC (Watts) | Efficiency | Fan Speed (RPM) | PSU Noise (dB[A]) | Temps (In/Out) | PF/AC Volts |
|---|---|---|---|---|---|---|---|---|---|---|
| 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 |
| 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 |
| 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 |







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## Cooler Master MWE 450

*Top side*


*Power specifications label*

**Aristeidis Bitziopoulos**
Lab Director

## CERTIFICATIONS 230V

CYBENETICS BRONZE 230v

CYBENETICS STANDARD++ 230v





Cybenetics offers the ETA and Lambda voluntary certification programs, through which the efficient and silent power supplies are promoted

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