# Enermax MaxTytan 1250W

Serial Number

Lab ID 216

Certification ID 25216

Test Result Report ID:

Certificate Issue Date: Nov 14, 2018

115V

Scheme: ETA-EMI PSU

115V

Scheme: LAMBDA PSU

Aristeidis Bitziopoulos, Certification Body General Manager

# General Information

## Test Equipment

| | |
|---|---|
| Electronic Loads | Chroma 63601-5 x2<br>Chroma 63600-2<br>Chroma 63640-80-80 x10<br>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 | Enermax |
| Model | MaxTytan 1250W |
| OEM/ODM | Channel Well Technology |
| Serial Number | |
| Product Specifications | |
| Manufacturer-Provided Information | |
| Rated Voltage (Vrms) | 100-240 |
| Rated Current (Arms) | 15-7 |

| | |
|---|---|
| Rated Frequency (Hz) | 47-63 |
| Rated Power (W) | 1250 |
| Operating Temperature (Continuous Full Load) (°C) | |
| Type | ATX12V |
| Cable Design | Fully Modular |
| Warranty | - |
| Cybenetics Measurements | |
| Dimensions (W x H x D) | |
| Weight | |
| Cooling | 140mm Magnetic Cyclone Bearing Fan<br>(ED142512M-PA) |
| Semi-Passive Operation | ✓ |
| Cybenetics Testing Information | |
| Lab ID | 216 |
| Date of receipt | Nov 1, 2018 |
| Testing Date | Nov 11, 2018 |
| Report Issued Date | Nov 14, 2018 |
| Engineer Name | - |
| Authorized By the Laboratory Technical Manager | Aristeidis Bitziopoulos |
| Signature |  |

## Cables and Connectors
## (Non-accredited measurements)

| Modular Cables | | | | |
|---|---|---|---|---|
| Description | Cable Count | Connector Count (Total) | Gauge | In Cable Capacitors |
| ATX connector 20+4 pin (600mm) | 1 | 1 | 16-20AWG | No |
| 4+4 pin EPS12V (700mm) | 1 | 1 | 16AWG | No |
| 8 pin EPS12V (700mm) | 1 | 1 | 16AWG | No |
| 6+2 pin PCIe (600mm) | 8 | 8 | 16-18AWG | No |
| SATA (500mm+150mm+150mm+150mm) | 4 | 16 | 18AWG | No |

| | | | | |
|---|---|---|---|---|
| 4 pin Molex (500mm+140mm+140mm+140mm) | 2 | 8 | 18AWG | No |
| FDD Adapter (+100mm) | 1 | 1 | 20AWG | No |
| Coolergenie - Power Supply Cable (+600mm) | 1 | 1 | 22-24AWG | No |
| Coolergenie - 4 pin Fan Cable (+500mm) | 1 | 1 | 26AWG | No |
| Coolergenie - 4 pin Fan Extension Cable (+500mm) | 1 | 1 | 26AWG | No |
| AC Power Cord (1400mm) - C13 coupler | 1 | 1 | 18AWG | - |

## Power Specifications

| Rail | | 3.3V | 5V | 12V | 5VSB | -12V |
|---|---|---|---|---|---|---|
| Max. Power | Amps | 20 | 20 | 104 | 3 | 0.3 |
| | Watts | 100 | | 1248 | 15 | 3.6 |
| Total Max. Power (W) | | 1250 | | | | |

## Parts Description

| General Data | |
|---|---|
| Manufacturer (OEM) | Channel Well Technology |
| Platform Model | CST |
| Primary Side | |
| Transient Filter | 6x Y caps, 2x X caps, 2x CM chokes, 1x MOV |
| Inrush Protection | NTC Thermistor & Bypass Relay |
| Bridge Rectifier(s) | 2x Vishay LVB1560 (600V, 15A @ 125°C) |
| APFC MOSFETS | 2x Toshiba TK25N60X (600V, 25A @ 150°C, 0.105 Ohm) |
| APFC Boost Diode | 2x SCS110AG (600V, 10A & 117°C) |
| Hold-up Cap(s) | 1x Chemi-Con (420V, 560uF, 2000h @ 105°C, KMR)<br>1x Nichicon (400V, 680uF, 2000h @ 105°C, GG) |
| Main Switchers | 4x Alpha & Omega AOTF29S50 (600V, 18A @ 100°C, 0.15 Ohm) |
| FET Drivers | 2x Silicon Labs Si8230BD |
| Primary MCU | Texas Instruments UCD3138 (31.25MHz, 32-bit ARM7TDMI-S Processor, 32KB Flash, 3x Feedback loop control, 14bit DAC, up to 2MHz switching freq) |
| Secondary MCU | Microchip PIC32MX230F064D (40 MHz, 64KB Flash, 13x analog chanels, 10bit ADC, USB interface) |
| Topology | Primary side: Full-Bridge & LLC Resonant Converter<br>Secondary side: Synchronous Rectification & DC-DC converters |
| Secondary Side | |

| | |
|---|---|
| +12V MOSFETS | 12x Alpha & Omega AON6240 (40V, 67A @ 100°C, 1.6 mOhm) |
| 5V & 3.3V | DC-DC Converters:<br>6x Sinopower SM3117NSUC (30V, 85A @ 100°C, 7.2 mOhm @ Vgs=10V)<br>PWM Controller: 1x Anpec APW7159C |
| Filtering Capacitors | Electrolytics: Nippon Chemi-Con (105°C, KY, KZE)<br>Polymers: Apaq, Nippon Chemi-Con |
| Supervisor IC | Infinno ST9S313-DAG(OVP, UVP) & LM358 |
| Fan Model | Enermax ED142512M-PA (139mm, 12V, 0.30A, 1560 RPM, twister bearing) |
| 5VSB Circuit | |
| Rectifier | 1x M03N65D FET |
| Standby PWM Controller | On Bright OB5269CP & SPN5003 (N-Channel Enhancement Mode FET) |

# Test Results

## Temperature & Compliance Info

| | |
|---|---|
| Temperature Range (°C /°F) | 28-32 / 82.4-89.6 |
| ErP Lot 3/6 Ready | ✓ |
| (EU) No 617/2013 Compliance | ✓ |

## Performance Summary 115V

| | |
|---|---|
| Accredited | |
| Average Efficiency (>1450 load combinations) | 91.244% |
| Average Noise Output (>1450 Load Combinations) | 23.12dBA |
| Average PF (>1450 Load Combinations) | 0.995 |
| Efficiency With 10W (≤500W) or 2% (>500W) Load | - |
| Standby Power Consumption | 0.0496W |
| Non-Accredited | |
| 12V Ripple (Full Load) | 30.33mV |
| 5V Ripple (Full Load) | 17.47mV |
| 3.3V Ripple (Full Load) | 14.66mV |
| 5VSB Ripple (Full Load) | 21.37mV |
| 12V Load Regulation | 0.48% |

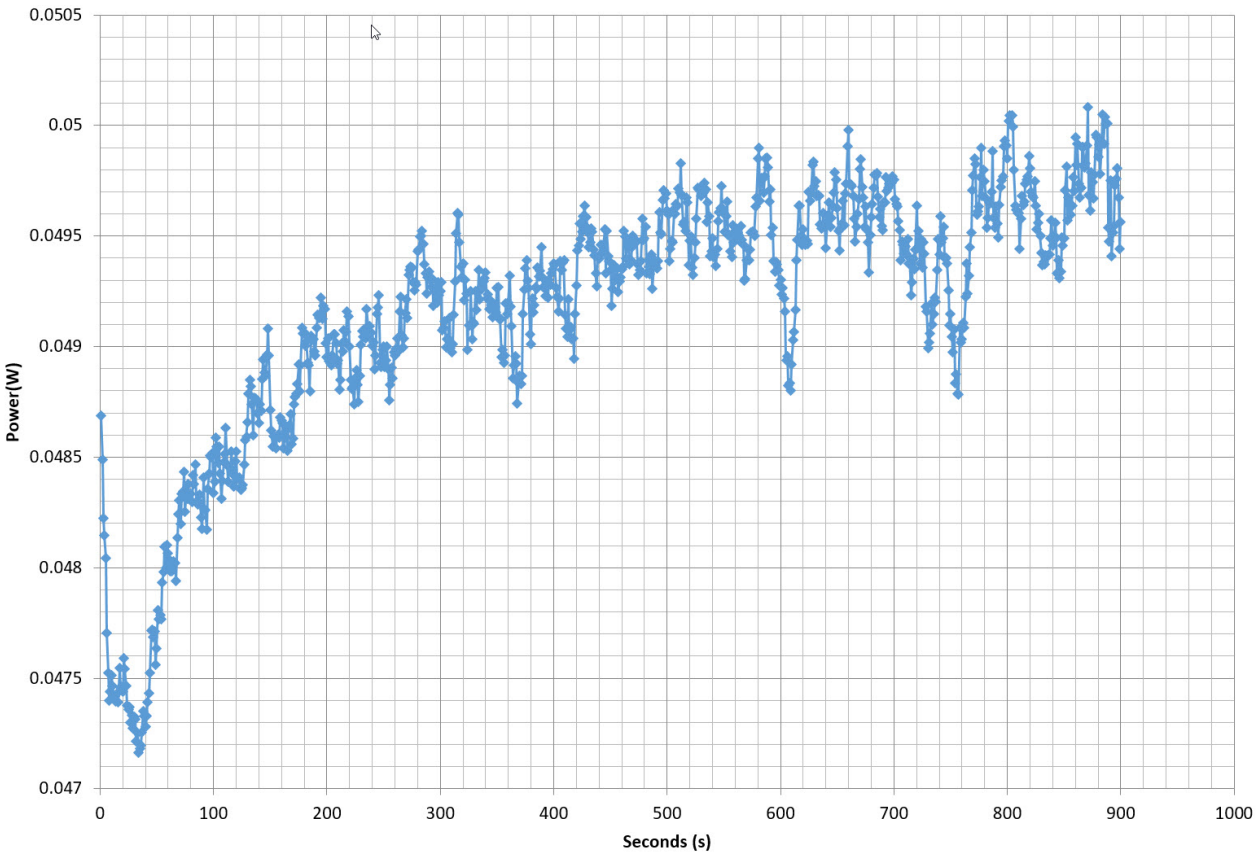
| | |
|---|---|
| 5V Load Regulation | 0.53% |
| 3.3V Load Regulation | 0.91% |
| 5VSB Load Regulation | 1.40% |
| Inrush Current | 30.234A |

## Hold-Up Time & PWR_OK Signal

| | |
|---|---|
| Hold-Up Time (ms) | 20.4 |
| AC Loss to PWR_OK Hold Up Time (ms) | 16.3 |
| PWR_OK Inactive to DC Loss Delay (ms) | 4.1 |

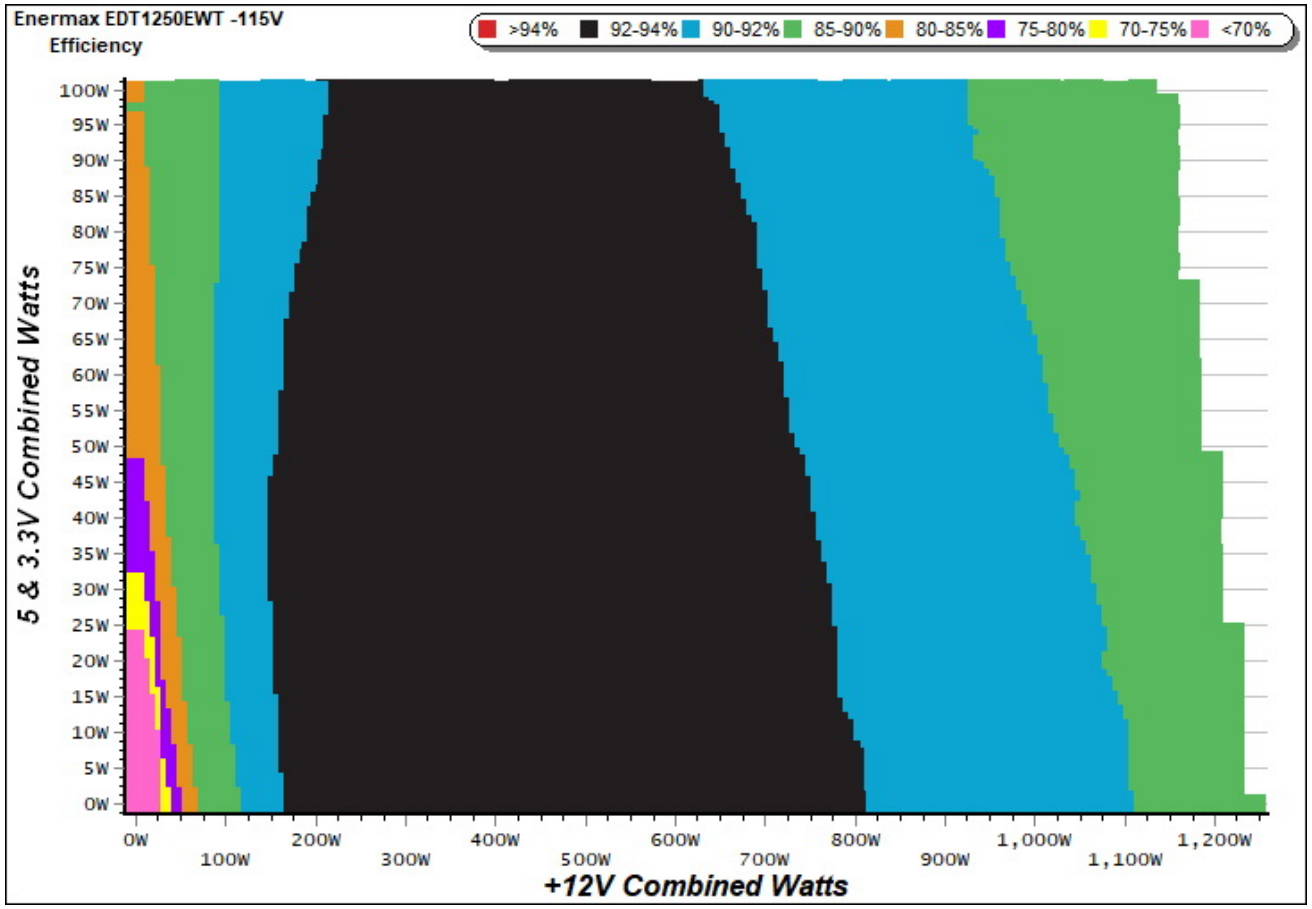
## Vampire Power

### Graphs 115V



## Efficiency Graph

### 115V

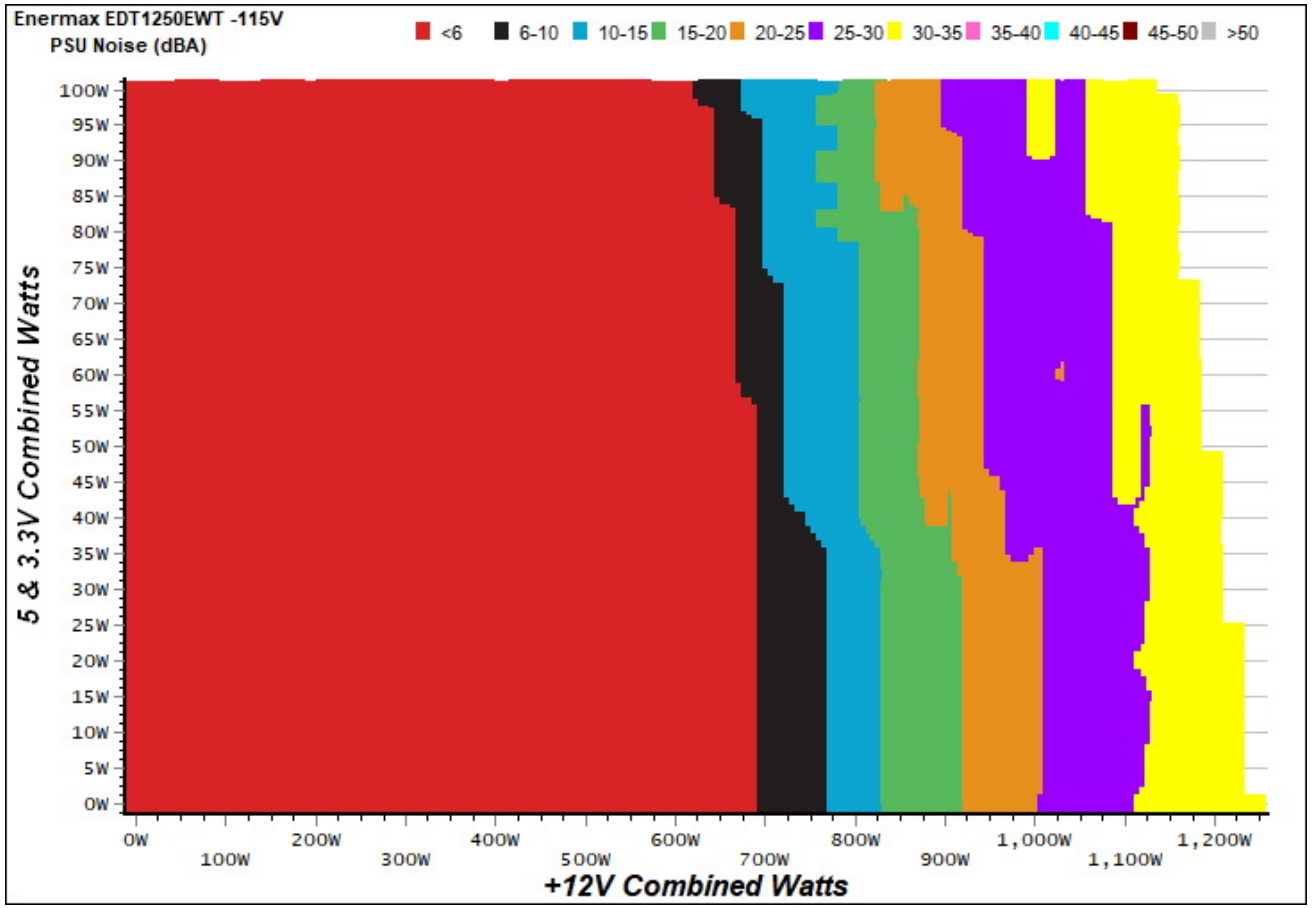



### INFO

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

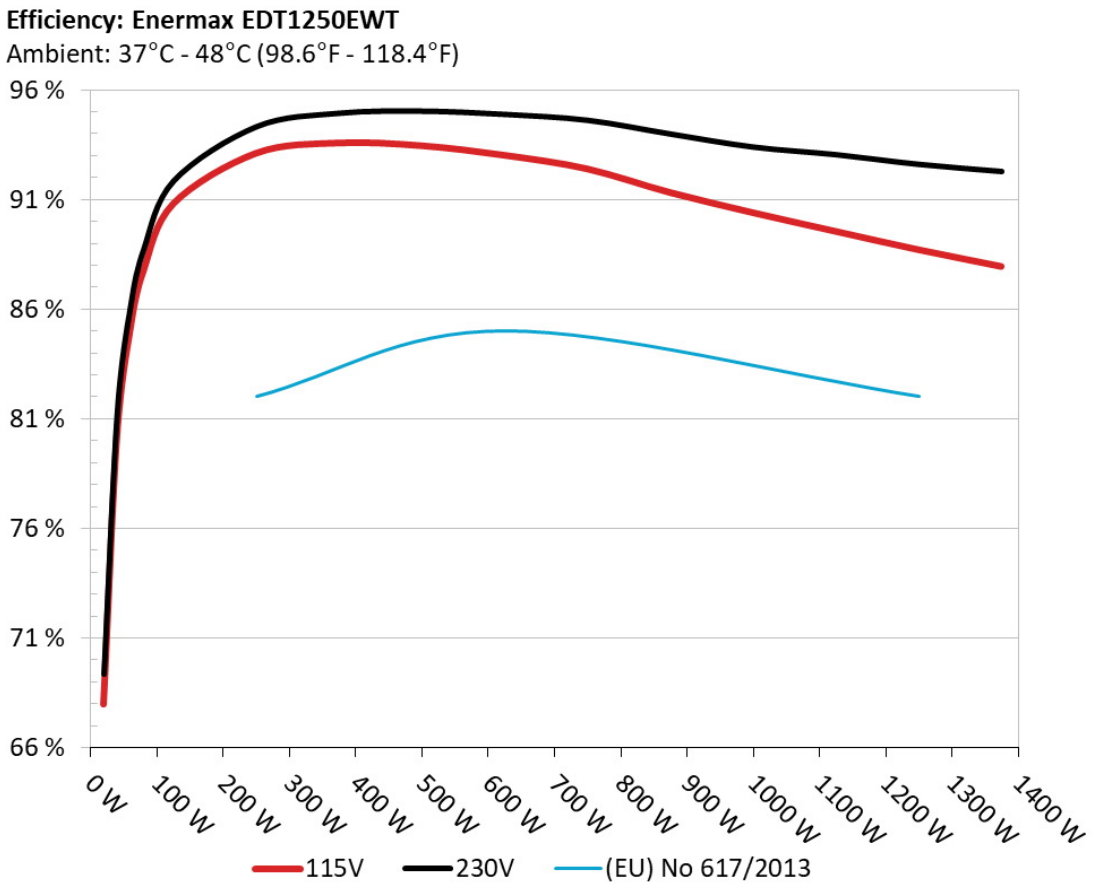



### INFO

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.

## Indicative Performance

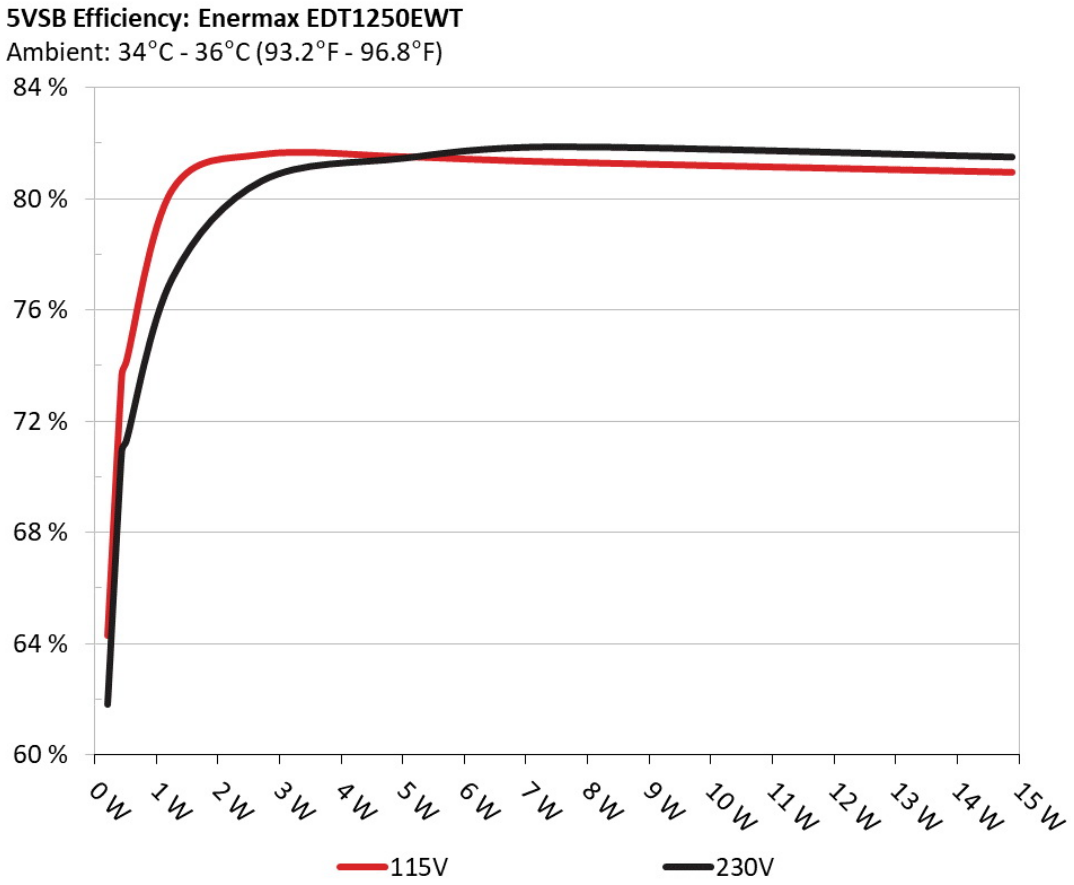
### Efficiency under high ambient temperature




**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.

## 5VSB Efficiency (ERP LOT 3/6 & CEC) 115V

| Test # | 5VSB | DC/AC (Watts) | Efficiency | PF/AC Volts |
|---|---|---|---|---|
| 1 | 0.042A | 0.209 | 64.308% | 0.032 |
| | 5.016V | 0.325 | | 115.06V |

| | | | | |
|---|---|---|---|---|
| 2 | 0.088A | 0.439 | 73.658% | 0.059 |
| | 5.015V | 0.596 | | 115.06V |
| 3 | 0.542A | 2.716 | 81.586% | 0.270 |
| | 5.008V | 3.329 | | 115.04V |
| 4 | 1.002A | 5.010 | 81.503% | 0.389 |
| | 4.999V | 6.147 | | 115.05V |
| 5 | 1.502A | 7.493 | 81.313% | 0.456 |
| | 4.990V | 9.215 | | 115.05V |
| 6 | 3.001A | 14.892 | 80.944% | 0.529 |
| | 4.962V | 18.398 | | 115.05V |

## Supplementary Tests (For Reference)

### Typical 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 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 8.597A | 1.974A | 2.003A | 0.991A | 124.785 | 90.803% | 0 | <6.0 | 45.25°C | 0.983 |
| | 12.004V | 5.062V | 3.293V | 5.043V | 137.424 | | | | 38.07°C | 115.10V |
| 2 | 18.235A | 2.959A | 3.006A | 1.190A | 249.621 | 93.105% | 0 | <6.0 | 45.76°C | 0.995 |
| | 11.997V | 5.059V | 3.290V | 5.038V | 268.107 | | | | 38.41°C | 115.10V |
| 3 | 28.245A | 3.464A | 3.523A | 1.391A | 374.781 | 93.574% | 0 | <6.0 | 46.57°C | 0.997 |
| | 11.991V | 5.056V | 3.287V | 5.033V | 400.518 | | | | 38.77°C | 115.11V |
| 4 | 38.241A | 3.953A | 4.017A | 1.591A | 499.522 | 93.450% | 0 | <6.0 | 47.45°C | 0.998 |
| | 11.986V | 5.053V | 3.284V | 5.028V | 534.533 | | | | 39.30°C | 115.10V |
| 5 | 47.903A | 4.953A | 5.028A | 1.791A | 624.388 | 93.017% | 0 | <6.0 | 48.24°C | 0.999 |
| | 11.980V | 5.052V | 3.280V | 5.022V | 671.263 | | | | 39.75°C | 115.10V |
| 6 | 57.570A | 5.943A | 6.038A | 1.990A | 749.301 | 92.394% | 505 | 7.7 | 41.67°C | 0.999 |
| | 11.977V | 5.049V | 3.278V | 5.018V | 810.988 | | | | 50.48°C | 115.12V |
| 7 | 67.251A | 6.939A | 7.052A | 2.194A | 874.081 | 91.322% | 778 | 17.7 | 42.85°C | 0.999 |
| | 11.970V | 5.045V | 3.274V | 5.010V | 957.138 | | | | 52.11°C | 115.13V |
| 8 | 76.937A | 7.930A | 8.070A | 2.396A | 999.077 | 90.402% | 979 | 25.1 | 44.37°C | 0.999 |
| | 11.967V | 5.042V | 3.271V | 5.005V | 1105.151 | | | | 54.38°C | 115.13V |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 9 | 87.096A | 8.443A | 8.596A | 2.395A | 1124.191 | 89.549% | 1144 | 29.0 | 45.19°C | 0.999 |
| | 11.959V | 5.039V | 3.267V | 5.003V | 1255.396 | | | | 55.53°C | 115.14V |
| 10 | 97.008A | 8.940A | 9.096A | 3.006A | 1249.039 | 88.713% | 1357 | 33.9 | 46.71°C | 0.998 |
| | 11.951V | 5.035V | 3.264V | 4.988V | 1407.947 | | | | 57.34°C | 115.13V |
| 11 | 107.506A | 8.946A | 9.103A | 3.005A | 1373.966 | 87.951% | 1411 | 35.6 | 47.71°C | 0.998 |
| | 11.946V | 5.033V | 3.262V | 4.985V | 1562.199 | | | | 58.45°C | 115.14V |
| CL1 | 0.098A | 12.011A | 12.005A | 0.004A | 101.505 | 85.883% | 0 | <6.0 | 52.96°C | 0.977 |
| | 12.006V | 5.061V | 3.292V | 5.087V | 118.190 | | | | 46.72°C | 115.14V |
| CL2 | 104.103A | 1.002A | 1.004A | 1.002A | 1258.954 | 89.096% | 1410 | 35.6 | 47.10°C | 0.998 |
| | 11.965V | 5.039V | 3.270V | 5.019V | 1413.035 | | | | 56.61°C | 115.13V |

The results above are not used in the certification process

## Light Load Tests 115V

| Test # | 12V | 5V | 3.3V | 5VSB | DC/AC (Watts) | Efficiency | Fan Speed (RPM) | PSU Noise (dB[A]) | PF/AC Volts |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.217A | 0.490A | 0.484A | 0.195A | 19.679 | 68.013% | 0 | <6.0 | 0.822 |
| | 12.010V | 5.064V | 3.295V | 5.059V | 28.934 | | | | 115.10V |
| 2 | 2.458A | 0.979A | 1.000A | 0.396A | 39.769 | 80.212% | 0 | <6.0 | 0.909 |
| | 12.009V | 5.062V | 3.294V | 5.054V | 49.580 | | | | 115.10V |
| 3 | 3.698A | 1.476A | 1.513A | 0.590A | 59.842 | 85.095% | 0 | <6.0 | 0.938 |
| | 12.008V | 5.062V | 3.294V | 5.051V | 70.324 | | | | 115.10V |
| 4 | 4.932A | 1.973A | 2.001A | 0.790A | 79.780 | 87.753% | 0 | <6.0 | 0.955 |
| | 12.006V | 5.062V | 3.294V | 5.048V | 90.914 | | | | 115.10V |

The results above are not used in the certification process

## Ripple Measurements 115V

| Test | 12V | 5V | 3.3V | 5VSB | Pass/Fail |
|---|---|---|---|---|---|
| 10% Load | 15.1 mV | 7.9 mV | 5.9 mV | 5.7 mV | Pass |
| 20% Load | 23.3 mV | 8.3 mV | 6.3 mV | 7.1 mV | Pass |
| 30% Load | 31.5 mV | 9.5 mV | 7.0 mV | 9.1 mV | Pass |
| 40% Load | 35.6 mV | 10.5 mV | 7.4 mV | 10.8 mV | Pass |

| Test | 12V | 5V | 3.3V | 5VSB | Pass/Fail |
|---|---|---|---|---|---|
| 50% Load | 41.0 mV | 11.4 mV | 8.3 mV | 12.6 mV | Pass |
| 60% Load | 32.3 mV | 12.4 mV | 9.3 mV | 13.8 mV | Pass |
| 70% Load | 33.5 mV | 13.6 mV | 10.3 mV | 15.7 mV | Pass |
| 80% Load | 29.5 mV | 15.1 mV | 10.8 mV | 16.0 mV | Pass |
| 90% Load | 27.9 mV | 14.6 mV | 11.3 mV | 17.0 mV | Pass |
| 100% Load | 30.3 mV | 17.5 mV | 14.7 mV | 21.4 mV | Pass |
| 110% Load | 32.0 mV | 16.7 mV | 12.4 mV | 20.9 mV | Pass |
| Crossload 1 | 14.4 mV | 13.2 mV | 9.0 mV | 4.9 mV | Pass |
| Crossload 2 | 29.1 mV | 13.7 mV | 12.0 mV | 22.1 mV | Pass |

The results above are not used in the certification process

## Enermax MaxTytan 1250W




Top side




Power specifications label

All data and graphs included in this test report can be used by any individual on the following conditions:

› It should be mentioned that the test results are provided by Cybenetics

› The link to the original test results document should be provided in any case

Cybenetics runs voluntary certification programs for power supplies - ETA for efficiency, LAMBDA for noise and SAFE for safety and correct operation - and for cooling products, with DELTA for chassis soundproofing and PHI for fan airflow and static pressure. THETA rates cooler performance on AMD AM5 and Intel LGA1851 outside ISO 17065 and accreditation scope

CYBENETICS LTD Syrou 6, Latsia, 2231, Nicosia Cyprus

www.cybenetics.com - info@cybenetics.com