# Duex Pulse 800W

Serial Number

Lab ID  DX80002503

Certification ID  252503

Test Result Report ID: 24PS2503A

Certificate Issue Date: Jul 12, 2024

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 | Duex |
| Model | Pulse 800W |
| OEM/ODM | Kinpower |
| Serial Number | |
| Product Specifications | |
| Manufacturer-Provided Information | |
| Rated Voltage (Vrms) | 100-240 |
| Rated Current (Arms) | 16 |

| | |
|---|---|
| Rated Frequency (Hz) | 50-60 |
| Rated Power (W) | 800 |
| Operating Temperature (Continuous Full Load) (°C) | |
| Type | ATX12V |
| Cable Design | Fully Modular |
| Warranty | - |
| Cybenetics Measurements | |
| Dimensions (W x H x D) | |
| Weight | |
| Cooling | 120mm Rifle Bearing Fan<br>(EFS-12E12H) |
| Semi-Passive Operation | ✓ |
| Cybenetics Testing Information | |
| Lab ID | DX80002503 |
| Date of receipt | Jul 1, 2024 |
| Testing Date | Jul 9, 2024 |
| Report Issued Date | Jul 12, 2024 |
| 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 | 18-22AWG | No |
| 4+4 pin EPS12V (700mm) | 2 | 2 | 18AWG | No |
| 6+2 pin PCIe (600mm+150mm) | 2 | 4 | 18AWG | No |
| SATA (450mm+150mm+150mm) | 2 | 6 | 18AWG | No |
| 4-pin Molex (450mm+150mm+150mm) | 1 | 3 | 18AWG | No |

## Protection Features

| | |
|---|---|
| Over Power Protection | ✓ |
| Over Current (+12V) Protection | ✓ |
| Over Temperature Protection | ✓ |
| Short Circuit Protection | ✓ |
| Surge Protection | ✓ |
| Inrush Current Protection | ✓ |
| Fan Failure Protection | ✗ |

## Power Specifications

| Rail | | 3.3V | 5V | 12V | 5VSB | -12V |
|---|---|---|---|---|---|---|
| Max. Power | Amps | 20 | 20 | 66 | 3 | 0.3 |
| | Watts | 103 | | 792 | 15 | 3.6 |
| Total Max. Power (W) | | 800 | | | | |

## Parts Description

| | |
|---|---|
| **General Data** | |
| Manufacturer (OEM) | Kinpower |
| PCB Type | Double-Sided |
| **Primary Side** | |
| Transient Filter | 2x Y caps, 1x X caps, 2x CM chokes, 1x MOV |
| Inrush Protection | 1x NTC Thermistor M72 5D-15 (5 Ohm @25°C) & Relay |
| Bridge Rectifier(s) | 2x HY Electronic GBU2506L (600V, 25A @ 150°C) |
| APFC MOSFETs | 2x Sanrise Tech SRC60R140B (600V, 11.2A @ 125°C, Rds(on): 140mOhm) |
| APFC Boost Diode | 1x Global Power Technology G3S06510A (650V, 10A @ 153.5°C) |
| Bulk Cap(s) | 1x Nippon Chemi-Con (400V, 680uF, 2000h @ 105°C, KMW) |

| | |
|---|---|
| Main Switchers | 2x Sanrise Tech SRC60R140B (600V, 11.2A @ 125°C, Rds(on): 140mOhm) |
| APFC Controller | Champion CM6500UNX |
| Resonant Controller | Champion CM6901X |
| Topology | Primary side: APFC, Half-Bridge & LLC converter Secondary side: Synchronous Rectification & DC-DC converters |
| **Secondary Side** | |
| +12V MOSFETs | 6x Alkaidsemi Technologies AKG40N025G (40V, 74A @ 100°C, Rds(on): 2.5mOhm) |
| 5V & 3.3V | DC-DC Converters: 4x Excelliance EMB06N03R (20V, 45A @ 100°C, Rds(on): 6mOhm PWM Controller(s): 2x Aplustek AT8853ZSPC |
| Filtering Capacitors | Electrolytic: 3x TK (105°C, SZ) Polymer: 34x Chengx (PC), 2x TK (SZ) |
| Supervisor IC | IN1S4291-SCG |
| Fan Model | DWPH EFS-12E12H (120mm, 12V, 0.50A, Rifle Bearing Fan) |
| **5VSB Circuit** | |
| Low Side Rectifier | Dongke DK5V45R15S (45V, Rds(on): 15mOhm) |
| Standby PWM Controller | FuXin Semiconductor FXI8252S |

# 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 | ✓ |
| ALPM (Alternative Low Power Mode) compatible | ✓ |

## Performance Summary 115V

| | |
|---|---|
| Accredited | |
| Average Efficiency (>1450 load combinations) | 89.364% |
| Average Noise Output (>1450 Load Combinations) | 29.61dBA |

| | |
|---|---|
| Average PF (>1450 Load Combinations) | 0.981 |
| Efficiency With 10W (≤500W) or 2% (>500W) Load | 50.783% |
| Standby Power Consumption | 0.0355W |
| Non-Accredited | |
| 12V Ripple (Full Load) | 41.79mV |
| 5V Ripple (Full Load) | 37.13mV |
| 3.3V Ripple (Full Load) | 26.67mV |
| 5VSB Ripple (Full Load) | 29.60mV |
| 12V Load Regulation | 0.99% |
| 5V Load Regulation | 3.02% |
| 3.3V Load Regulation | 4.45% |
| 5VSB Load Regulation | 3.09% |
| Inrush Current | 33.990A |

## Hold-Up Time & PWR_OK Signal

| | |
|---|---|
| Hold-Up Time (ms) | 20.6 |
| AC Loss to PWR_OK Hold Up Time (ms) | 17.3 |
| PWR_OK Inactive to DC Loss Delay (ms) | 3.3 |



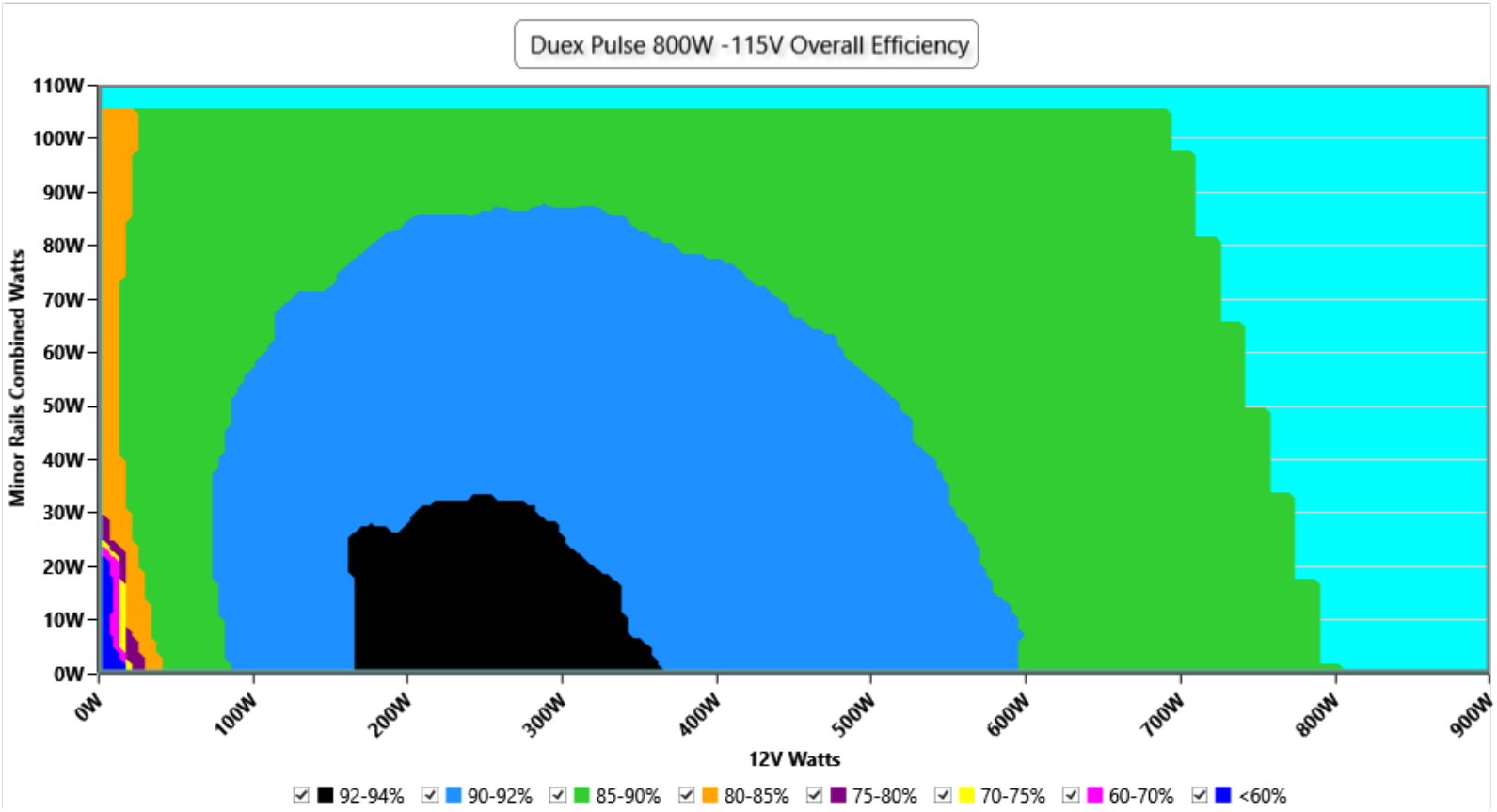
### Tables 115V

| Detailed Results | | | | | | |
|---|---|---|---|---|---|---|
| | Average | Min | Limit Min | Max | Limit Max | Result |
| Mains Voltage RMS: | 115.08 V | 115.04 V | 113.85 V | 115.12 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 % | 0.09 % | N/A | 0.18 % | 2.00 % | PASS |
| Real Power: | 0.036 W | -0.000 W | N/A | 0.063 W | N/A | N/A |
| Apparent Power: | 2.388 W | 2.317 W | N/A | 2.465 W | N/A | N/A |

| | | | | | | |
|---|---|---|---|---|---|---|
| Power Factor: | 0.021 | N/A | N/A | N/A | N/A | N/A |

## Efficiency Graph

### 115V

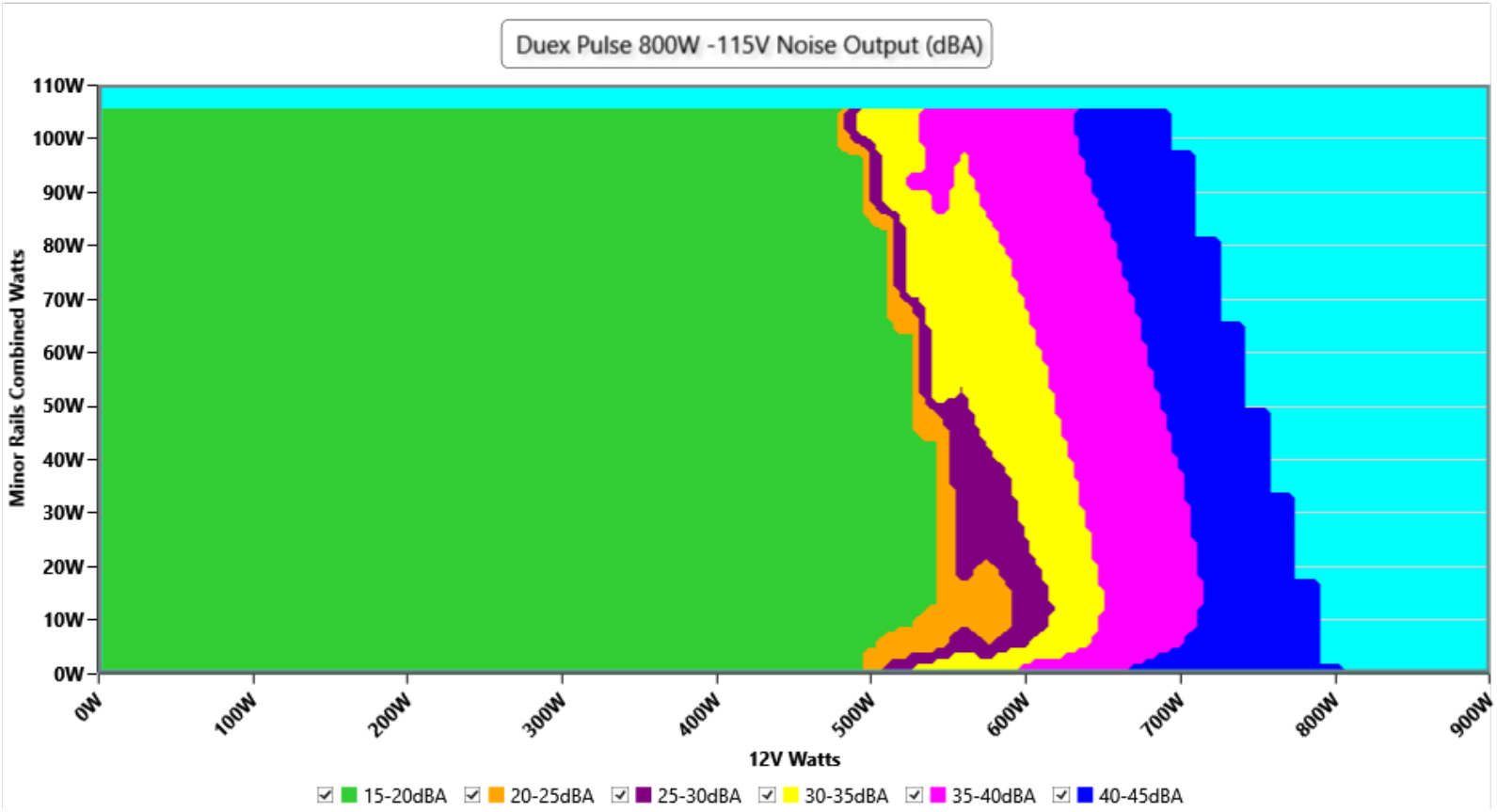



### INFO

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

## Noise under high ambient temperature (indicative)

### 115V

| Load | Normal ambient<br>fan · noise · intake | High ambient<br>fan · noise · intake | Noise change |
|---|---|---|---|
| 10% | 851 RPM · 19.5 dB(A) · 31.0 °C | 869 RPM · 20.4 dB(A) · 40.3 °C | **+0.9 dB(A)** |
| 20% | 856 RPM · 19.6 dB(A) · 30.5 °C | 870 RPM · 20.4 dB(A) · 40.5 °C | **+0.8 dB(A)** |
| 50% | 857 RPM · 19.6 dB(A) · 30.3 °C | 873 RPM · 20.5 dB(A) · 42.1 °C | **+0.9 dB(A)** |
| 100% | 1867 RPM · 44.2 dB(A) · 30.2 °C | 1872 RPM · 44.3 dB(A) · 45.1 °C | **+0.1 dB(A)** |

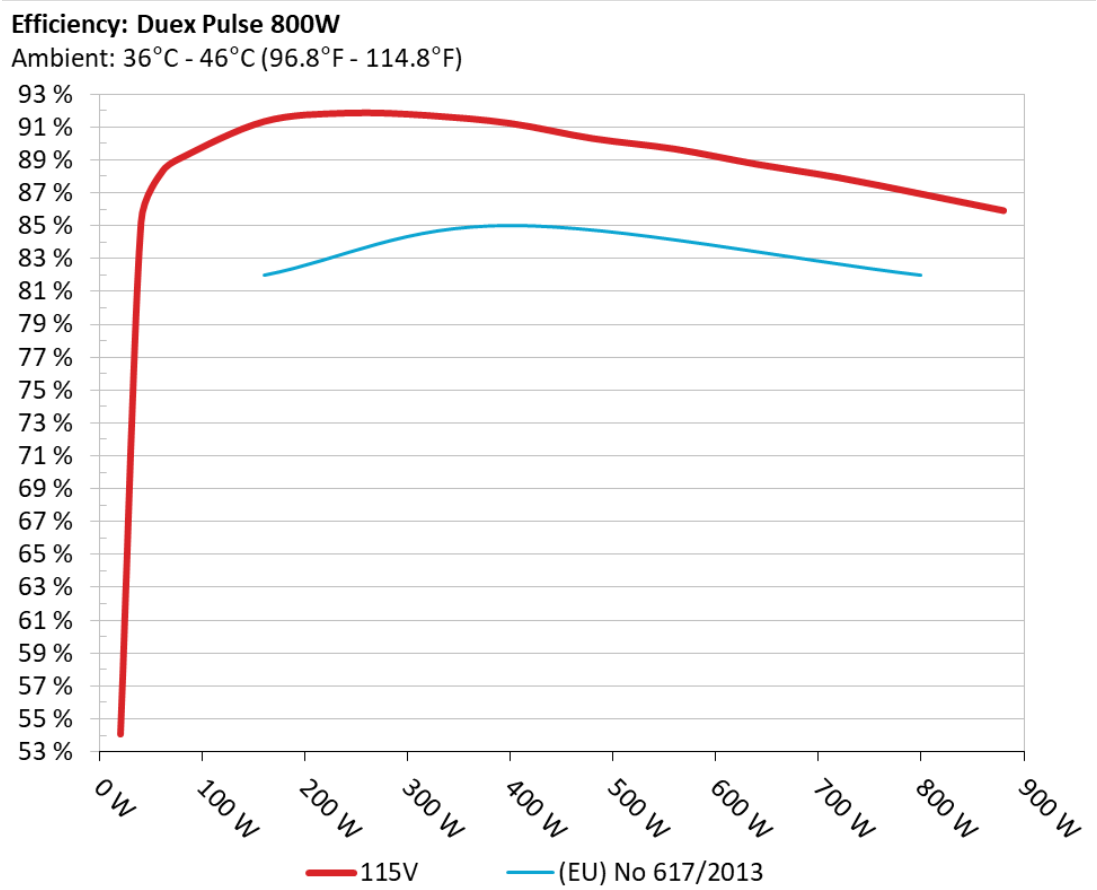
### INFO

Fan speed, noise and the measured intake temperature at 10, 20, 50 and 100 % load, from the two load regulation tests: at normal ambient (about 30-32 °C) and at high ambient (about 40-47 °C). These are stabilized readings at fixed loads, not averages over the certification sweep, so they are indicative of how the fan behaves when it is hot. "<6.0" is the floor of our sound meter: the fan is stopped or too quiet to measure (the fan speed column says which); with the fan stopped, the intake sensor can read higher than the chamber air.

*Informational. Not part of the ETA or LAMBDA rating.*

## Indicative Performance

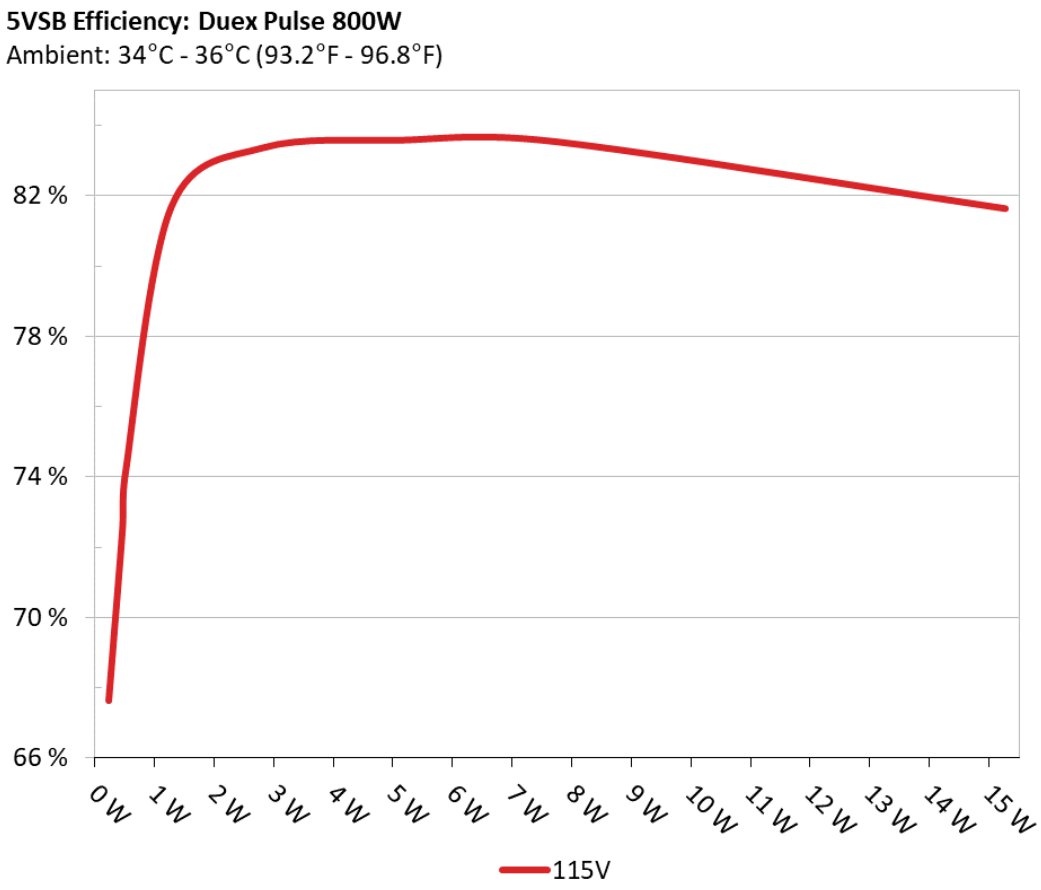
### Efficiency under high ambient temperature




**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** | **0.045A** | 0.232W | 67.626% | 0.12 |
| | 5.149V | 0.343W | | 114.86V |

| | | | | |
|---|---|---|---|---|
| **2** | **0.09A** | 0.463W | 72.536% | 0.195 |
| | 5.148V | 0.639W | | 114.86V |
| **3** | **0.55A** | 2.827W | 83.365% | 0.384 |
| | 5.139V | 3.391W | | 114.85V |
| **4** | **1A** | 5.13W | 83.578% | 0.429 |
| | 5.13V | 6.138W | | 114.84V |
| **5** | **1.5A** | 7.681W | 83.546% | 0.446 |
| | 5.12V | 9.194W | | 114.85V |
| **6** | **3A** | 15.274W | 81.632% | 0.479 |
| | 5.091V | 18.71W | | 114.85V |

## Protection Features

| | |
|---|---|
| OCP (Cold @ 25.4°C) | 12V: NaNA (NaN%), NaNV<br>5V: 29.1A (145.5%), 4.878V<br>3.3V: 30.7A (153.5%), 3.138V<br>5VSB: 4.1A (136.67%), 5.063V |
| OCP (Hot) @ -°C) | 12V: -<br>5V: -<br>3.3V: -<br>5VSB: - |
| OPP (Cold @ 27.8°C) | 987.52W (123.44%) |
| OPP (Hot @ -°C) | - |
| OTP | ✓ (139°C @ Heat Sink) |
| SCP | 12V to Earth: ✓<br>5V to Earth: ✓<br>3.3V to Earth: ✓<br>5VSB to Earth: ✓<br>-12V to Earth: ✓ |
| PWR_OK | Proper Operation |
| NLO | ✓ |
| Fan Failure Protection | ✗ |
| SIP | Surge: MOV<br>Inrush: NTC & Bypass Relay |

## 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 |
|---|---|---|---|---|---|---|---|---|---|---|
| **10%** | **4.802A** | **1.989A** | **1.99A** | **0.976A** | 79.999 | 89.161% | 869 | 20.4 | 40.31°C | 0.942 |
| | 12.162V | 5.026V | 3.317V | 5.121V | 89.724 | | | | 42.48°C | 114.82V |
| **20%** | **10.620A** | **2.993A** | **2.998A** | **1.175A** | 159.925 | 91.344% | 870 | 20.4 | 40.53°C | 0.965 |
| | 12.150V | 5.011V | 3.302V | 5.107V | 175.084 | | | | 43.7°C | 114.79V |
| **30%** | **16.800A** | **3.5A** | **3.51A** | **1.374A** | 239.963 | 91.856% | 872 | 20.5 | 41.49°C | 0.975 |
| | 12.138V | 4.999V | 3.29V | 5.093V | 261.237 | | | | 45.92°C | 114.77V |
| **40%** | **22.992A** | **4.01A** | **4.025A** | **1.575A** | 320.009 | 91.707% | 872 | 20.5 | 41.75°C | 0.983 |
| | 12.126V | 4.988V | 3.279V | 5.08V | 348.945 | | | | 47.67°C | 114.75V |
| **50%** | **28.784A** | **5.028A** | **5.055A** | **1.777A** | 399.192 | 91.231% | 873 | 20.5 | 42.07°C | 0.988 |
| | 12.114V | 4.972V | 3.264V | 5.065V | 437.562 | | | | 50.03°C | 114.71V |
| **60%** | **34.699A** | **6.052A** | **6.095A** | **1.98A** | 479.724 | 90.308% | 1348 | 34.4 | 42.91°C | 0.989 |
| | 12.102V | 4.957V | 3.248V | 5.05V | 531.209 | | | | 51.16°C | 114.69V |
| **70%** | **40.559A** | **7.081A** | **7.143A** | **2.185A** | 559.401 | 89.672% | 1626 | 39.3 | 43.23°C | 0.991 |
| | 12.089V | 4.943V | 3.234V | 5.035V | 623.83 | | | | 50.91°C | 114.66V |
| **80%** | **46.505A** | **8.117A** | **8.201A** | **2.29A** | 639.446 | 88.742% | 1865 | 44.2 | 43.84°C | 0.992 |
| | 12.075V | 4.927V | 3.219V | 5.021V | 720.567 | | | | 52.56°C | 114.62V |
| **90%** | **52.788A** | **8.647A** | **8.732A** | **2.396A** | 719.271 | 87.924% | 1869 | 44.2 | 44.26°C | 0.994 |
| | 12.063V | 4.914V | 3.206V | 5.009V | 818.065 | | | | 55.2°C | 114.6V |
| **100%** | **58.887A** | **9.182A** | **9.301A** | **3.009A** | 799.305 | 86.938% | 1872 | 44.3 | 45.12°C | 0.995 |
| | 12.050V | 4.9V | 3.193V | 4.986V | 919.393 | | | | 59.45°C | 114.56V |
| **110%** | **64.932A** | **10.239A** | **10.484A** | **3.016A** | 879.895 | 85.918% | 1872 | 44.3 | 46.21°C | 0.995 |
| | 12.037V | 4.883V | 3.176V | 4.974V | 1024.113 | | | | 62.16°C | 114.53V |
| **CL1** | **0.114A** | **12.582A** | **12.681A** | **0A** | 104.285 | 83.277% | 867 | 20.3 | 42.88°C | 0.954 |
| | 12.147V | 4.928V | 3.225V | 5.124V | 125.229 | | | | 51.81°C | 114.8V |
| **CL2** | **0.114A** | **20.28A** | **0A** | **0A** | 101.329 | 81.74% | 869 | 20.4 | 41.67°C | 0.954 |
| | 12.152V | 4.928V | 3.264V | 5.129V | 123.965 | | | | 48.98°C | 114.81V |

| Test | 12V | 5V | 3.3V | 5VSB | DC/AC (Watts) | Efficiency | Fan Speed (RPM) | PSU Noise (dB[A]) | Temps (In/Out) | PF/AC Volts |
|---|---|---|---|---|---|---|---|---|---|---|
| **CL3** | **0.113A** | **0A** | **20.51A** | **0A** | 67.38 | 75.15% | 862 | 20.1 | 41.77°C | 0.942 |
| | 12.152V | 4.956V | 3.218V | 5.129V | 89.66 | | | | 47.15°C | 114.82V |
| **CL4** | **66.307A** | **0A** | **0A** | **0.003A** | 799.908 | 87.948% | 1882 | 44.5 | 46.96°C | 0.995 |
| | 12.063V | 4.972V | 3.264V | 5.057V | 909.531 | | | | 56.11°C | 114.56V |

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]) | Temps (In/Out) | PF/AC Volts |
|---|---|---|---|---|---|---|---|---|---|---|
| **20W** | **1.220A** | **0.495A** | **0.495A** | **0.195A** | 19.993 | 54.062% | 866 | 20.3 | 36.31°C | 0.903 |
| | 12.166V | 5.048V | 3.335V | 5.14V | 36.978 | | | | 41.53°C | 114.84V |
| **40W** | **2.686A** | **0.694A** | **0.693A** | **0.292A** | 39.994 | 85.217% | 864 | 20.2 | 37.09°C | 0.912 |
| | 12.169V | 5.041V | 3.331V | 5.14V | 46.934 | | | | 39.44°C | 114.83V |
| **60W** | **4.154A** | **0.893A** | **0.892A** | **0.389A** | 59.994 | 88.239% | 865 | 20.2 | 38.88°C | 0.93 |
| | 12.166V | 5.038V | 3.328V | 5.136V | 67.994 | | | | 39.27°C | 114.82V |
| **80W** | **5.616A** | **1.092A** | **1.092A** | **0.487A** | 79.931 | 89.835% | 868 | 20.4 | 39.13°C | 0.942 |
| | 12.162V | 5.034V | 3.325V | 5.131V | 88.977 | | | | 41.02°C | 114.82V |

The results above are not used in the certification process

## Ripple Measurements 115V

| Test | 12V | 5V | 3.3V | 5VSB | Pass/Fail |
|---|---|---|---|---|---|
| 10% Load | 22.30mV | 20.27mV | 17.75mV | 12.57mV | Pass |
| 20% Load | 24.35mV | 22.89mV | 18.11mV | 14.78mV | Pass |
| 30% Load | 25.98mV | 23.35mV | 18.27mV | 16.16mV | Pass |
| 40% Load | 26.13mV | 23.66mV | 19.70mV | 17.29mV | Pass |
| 50% Load | 27.26mV | 26.33mV | 23.14mV | 19.55mV | Pass |
| 60% Load | 27.77mV | 28.48mV | 23.75mV | 20.22mV | Pass |
| 70% Load | 30.23mV | 31.00mV | 23.55mV | 24.01mV | Pass |
| 80% Load | 34.47mV | 32.80mV | 24.99mV | 27.76mV | Pass |
| 90% Load | 33.35mV | 33.31mV | 24.47mV | 26.22mV | Pass |

| Test | 12V | 5V | 3.3V | 5VSB | Pass/Fail |
|---|---|---|---|---|---|
| 100% Load | 41.79mV | 37.13mV | 26.67mV | 29.60mV | Pass |
| 110% Load | 44.07mV | 37.17mV | 27.27mV | 31.08mV | Pass |
| Crossload1 | 33.87mV | 38.36mV | 28.12mV | 12.67mV | Pass |
| Crossload2 | 24.24mV | 25.10mV | 23.09mV | 12.37mV | Pass |
| Crossload3 | 29.10mV | 89.61mV | 24.47mV | 11.13mV | Fail |
| Crossload4 | 39.22mV | 26.05mV | 19.99mV | 26.28mV | Pass |

The results above are not used in the certification process

## Duex Pulse 800W



Top side




Power specifications label

Cybenetics □□□□□□□□□□□□□□□□□□ ETA□□□□□ LAMBDA□□□□□ SAFE□□□□□□□□□□□□□□□□□ DELTA□□□□□□□ PHI□□□□□□□□□

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