# ASUS TUF Gaming 650W Gold EVO

Serial Number 2Q014131925

Lab ID AS65003264

Certification ID 263264

Test Result Report ID: 26PS3264A

Certificate Issue Date: Apr 28, 2026

Scheme: ETA-EMI PSU

115V




230V




Scheme: LAMBDA PSU

115V




230V







Outside Validation Scope



# 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 | ASUS |
| Model | TUF Gaming 650W Gold EVO |
| OEM/ODM | Great Wall |
| Serial Number | 2Q014131925 |
| Product Specifications | |
| Manufacturer-Provided Information | |
| Rated Voltage (Vrms) | 100-240 |

| | |
|---|---|
| Rated Current (Arms) | 6-10 |
| Rated Frequency (Hz) | 47-63 |
| Rated Power (W) | 650 |
| Operating Temperature (Continuous Full Load) (°C) | 0 - 40 |
| Type | ATX12V |
| Cable Design | Fully Modular |
| Warranty | 8 years |
| Cybenetics Measurements | |
| Dimensions (W x H x D) | 150 x 85 x 140mm |
| Weight | 1.29 kg (2.84 lb) |
| Cooling | 135mm Ball Bearing Fan (HA13525M12B-Z) |
| Semi-Passive Operation | ✗ |
| Cybenetics Testing Information | |
| Lab ID | AS65003264 |
| Date of receipt | Apr 8, 2026 |
| Testing Date | Apr 24, 2026 |
| Report Issued Date | Apr 28, 2026 |
| Engineer Name | Ioannis Kalyviotis |
| Authorized By the Laboratory Technical Manager | Aristeidis Bitziopoulos |
| Signature |  |

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

| Modular Cables | | | | |
|---|---|---|---|---|
| **Description** | **Cable Count** | **Connector Count (Total)** | **Gauge** | **Cable Type** |
| ATX connector 20+4 pin (500mm) | 1 | 1 | 18AWG | Tinned Copper |
| 4+4 pin EPS12V (650mm+100mm) | 1 | 2 | 18AWG | Tinned Copper |
| 6+2 pin PCIe (500mm) | 1 | 1 | 18AWG | Tinned Copper |
| 12+4 pin PCIe (500mm) (600W) | 1 | 1 | 16-24AWG | Tinned Copper |
| SATA (400mm+115mm) / 4-pin Molex (+115mm) | 2 | 4 / 2 | 18AWG | Tinned Copper |

## Protection Features

| | |
|---|---|
| Under Voltage Protection | ✓ |
| 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 | 54.16 | 3 | 0.3 |
| | Watts | 110 | | 650 | 15 | 3.6 |
| Total Max. Power (W) | | 650 | | | | |

## Parts Description

| | |
|---|---|
| **General Data** | |
| Manufacturer (OEM) | Great Wall |
| PCB Type | Double-Sided |
| **Primary Side** | |
| Transient Filter | 4x Y caps, 3x X caps, 2x CM chokes, 1x MOV |
| Inrush Protection | 1x NTC Thermistor SCK-056 (5 Ohm @ 20°C) & Relay |
| Bridge Rectifier | 1x ( @ 100°C) |
| APFC MOSFETs | 1x CRMicro CRJQ69N60G2 (600V, 25A @ 100°C, Rds(on): 0.073 Ohm) |
| APFC Boost Diode | 1x SMC S3D06065A (650V, 6A @ 150°C) |
| Bulk Cap(s) | 1x Samxon (420V, 390uF, 2,000h @ 105°C, HP ) |
| Main Switchers | 2x ST STF24N60DM2 (600V, 11A @ 100°C, Rds(on): 0.2 Ohm) |
| PFC/PWM Combo Controller | MPS HR1280 |

| | |
|---|---|
| Topology | Primary side: APFC, Half-Bridge & LLC converter<br>Secondary side: Synchronous Rectification & DC-DC converters |
| **Secondary Side** | |
| +12V MOSFETs | 4x ONSEMI NTMFS5C430NL (40V, 140A @ 100°C, Rds(on): 1.4 mOhm) |
| 5V & 3.3V | DC-DC Converters: 4x AP4024GEMT-HF (30V, 60A @ 25°C, Rds(on): 4.5 mOhm)<br>PWM Controller(s): ANPEC APW7159C |
| Filtering Capacitors | Electrolytic:<br>4x Elite (5000 @ 105°C, EJ )<br>3x Elite (4000 @ 105°C, EK )<br>1x Elite (4000 @ 105°C, ED )<br>1x Elite (4000 @ 105°C, EY )<br>1x Lelon (1000 @ 105°C, RA )<br>Polymer:<br>3x Nichicon FPCAP, 2x Elite, 4x Nippon Chemi-con |
| Supervisor IC | NDP NDP5201KC |
| Fan Controller | BCD AS358M |
| Fan Model | Hong Hua HA13525M12B-Z (135mm, 12V, 0.36A, Dual Ball Bearing Fan) |
| **5VSB Circuit** | |
| Rectifier | DIODES SDT8A60VP5 (60V,8A) |
| Standby PWM Controller | Lendtrend LD5537E1 |

# 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 | ✓ |
| ATX v3.1 PSU Power Excursion | ✓ |

## Performance Summary

### 115V

| | |
|---|---|
| Accredited | |
| Average Efficiency (>1450 load combinations) | 88.561% |
| Average Noise Output (>1450 Load Combinations) | 22.89dBA |
| Average PF (>1450 Load Combinations) | 0.966 |
| Efficiency With 10W (≤500W) or 2% (>500W) Load | 71.500% |
| Standby Power Consumption | 0.0449W |
| Non-Accredited | |
| 12V Ripple (Full Load) | 64.44mV |
| 5V Ripple (Full Load) | 29.82mV |
| 3.3V Ripple (Full Load) | 27.40mV |
| 5VSB Ripple (Full Load) | 17.44mV |
| 12V Load Regulation | 1.04% |
| 5V Load Regulation | 1.55% |
| 3.3V Load Regulation | 3.42% |
| 5VSB Load Regulation | 2.66% |
| Inrush Current | 32.780A |

### 230V

| | |
|---|---|
| Accredited | |
| Average Efficiency (>1450 load combinations) | 91.045% |
| Average Noise Output (>1450 Load Combinations) | 22.24dBA |
| Average PF (>1450 Load Combinations) | 0.960 |
| Efficiency With 10W (≤500W) or 2% (>500W) Load | 74.115% |
| Standby Power Consumption | 0.1309W |
| Non-Accredited | |
| 12V Ripple (Full Load) | 58.92mV |
| 5V Ripple (Full Load) | 33.51mV |
| 3.3V Ripple (Full Load) | 31.40mV |

| | | |
|---|---|---|
| 5VSB Ripple (Full Load) | | 18.93mV |
| 12V Load Regulation | | 1.06% |
| 5V Load Regulation | | 1.55% |
| 3.3V Load Regulation | | 3.71% |
| 5VSB Load Regulation | | 2.68% |
| Inrush Current | | 74.660A |
| 12V Transient Response (200%) | | 11.42V |
| 5V Transient Response (200%) | | 4.967V |
| 3.3V Transient Response (200%) | | 3.169V |
| 5VSB Transient Response (200%) | | 5.071V |
| Hold-Up Time & PWR_OK Signal | | 20.10ms |
| AC Loss to PWR_OK Hold Up Time | | 18.10ms |
| PWR_OK Inactive to DC Loss Delay | | 2.00ms |
| PSU Timings: T1 (20% / 100%) | 53.0ms | 53.0ms |
| PSU Timings: T3 (20% / 100%) | 123.0ms | 126.0ms |
| 12V OCP (29.3°C / 41.2°C) | 68.40A (126.29%), 11.955V | 68.00A (125.55%), 11.957V |
| 5V OCP (29.3°C / 41.2°C) | 27.6A (138.00%), 5.065V *High Ripple (53.27mV) | 27.4A (137.00%), 5.065V |
| 3.3V OCP (29.3°C / 41.2°C) | 27.1A (135.50%), 3.206V | 26.9A (134.50%), 3.202V |
| 5VSB OCP (29.3°C / 41.2°C) | 4.2A (140.00%), 5.071V | 4.2A (140.00%), 5.072V |
| OPP (28.69°C / 41.74°C) | 124.72% | 123.94% |

## Hold-Up Time & PWR_OK Signal

| | |
|---|---|
| Hold-Up Time (ms) | 20.1 |
| AC Loss to PWR_OK Hold Up Time (ms) | 18.1 |
| PWR_OK Inactive to DC Loss Delay (ms) | 2 |

## Stromverbrauch im Ruhezustand

### Tables

#### 115V

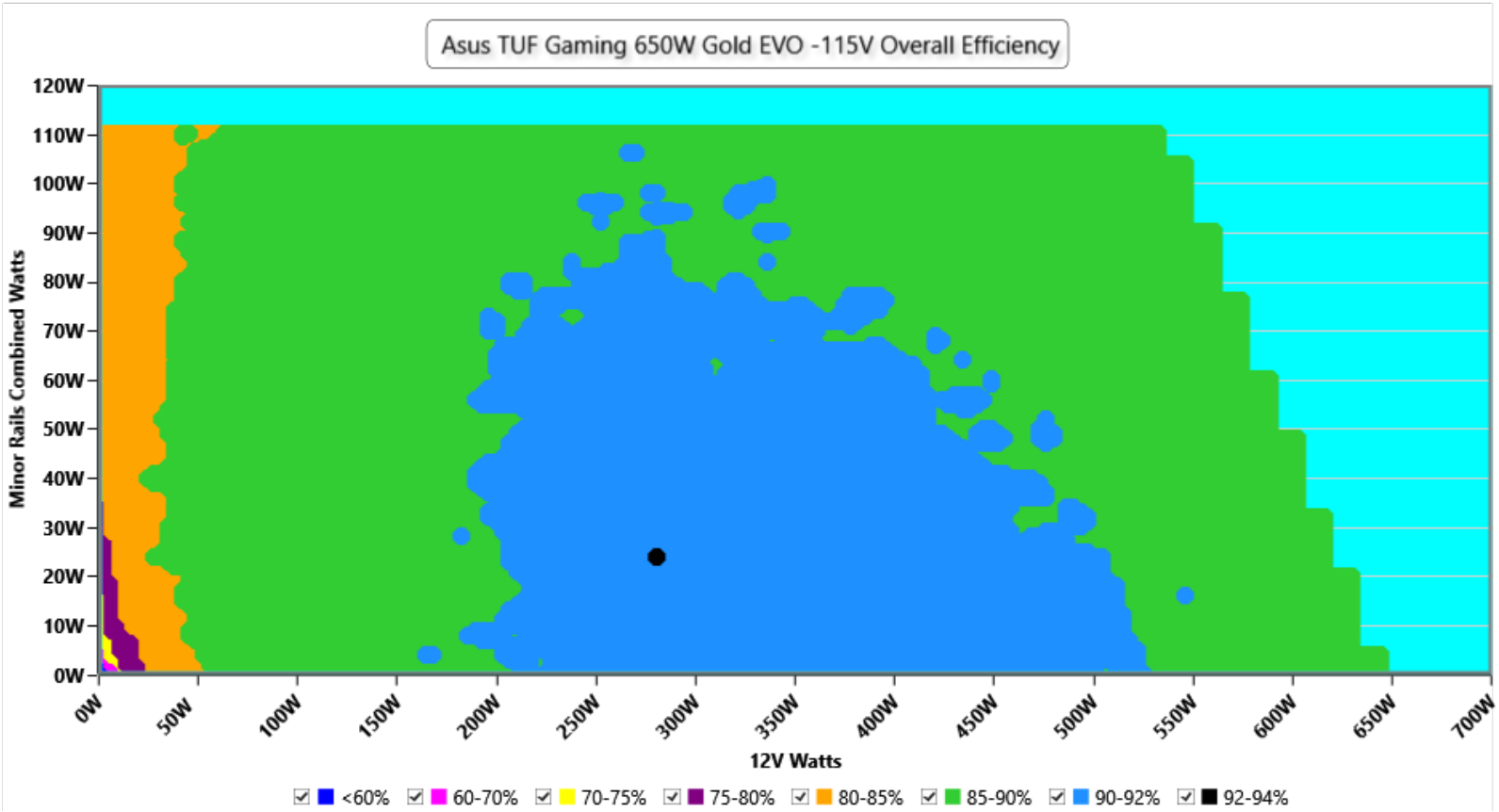
| Detailed Results | | | | | | |
|---|---|---|---|---|---|---|
| | Average | Min | Limit Min | Max | Limit Max | Result |
| Mains Voltage RMS: | 115.03 V | 115.02 V | 113.85 V | 115.06 V | 116.15 V | PASS |
| Mains Frequency: | 60.00 Hz | 59.94 Hz | 59.40 Hz | 60.01 Hz | 60.60 Hz | PASS |
| Mains Voltage CF: | 1.416 | 1.415 | 1.340 | 1.417 | 1.490 | PASS |
| Mains Voltage THD: | 0.13 % | 0.11 % | N/A | 0.16 % | 2.00 % | PASS |
| Real Power: | 0.045 W | 0.013 W | N/A | 0.075 W | N/A | N/A |
| Apparent Power: | 13.279 W | 13.259 W | N/A | 13.303 W | N/A | N/A |
| Power Factor: | 0.003 | N/A | N/A | N/A | N/A | N/A |

#### 230V

| Detailed Results | | | | | | |
|---|---|---|---|---|---|---|
| | Average | Min | Limit Min | Max | Limit Max | Result |
| Mains Voltage RMS: | 230.05 V | 230.03 V | 227.70 V | 230.12 V | 232.30 V | PASS |
| Mains Frequency: | 50.00 Hz | 50.00 Hz | 49.50 Hz | 50.00 Hz | 50.50 Hz | PASS |
| Mains Voltage CF: | 1.415 | 1.415 | 1.340 | 1.416 | 1.490 | PASS |
| Mains Voltage THD: | 0.14 % | 0.13 % | N/A | 0.16 % | 2.00 % | PASS |
| Real Power: | 0.131 W | 0.093 W | N/A | 0.177 W | N/A | N/A |
| Apparent Power: | 43.830 W | 43.780 W | N/A | 43.884 W | N/A | N/A |
| Power Factor: | 0.004 | N/A | N/A | N/A | N/A | N/A |

## Efficiency Graph

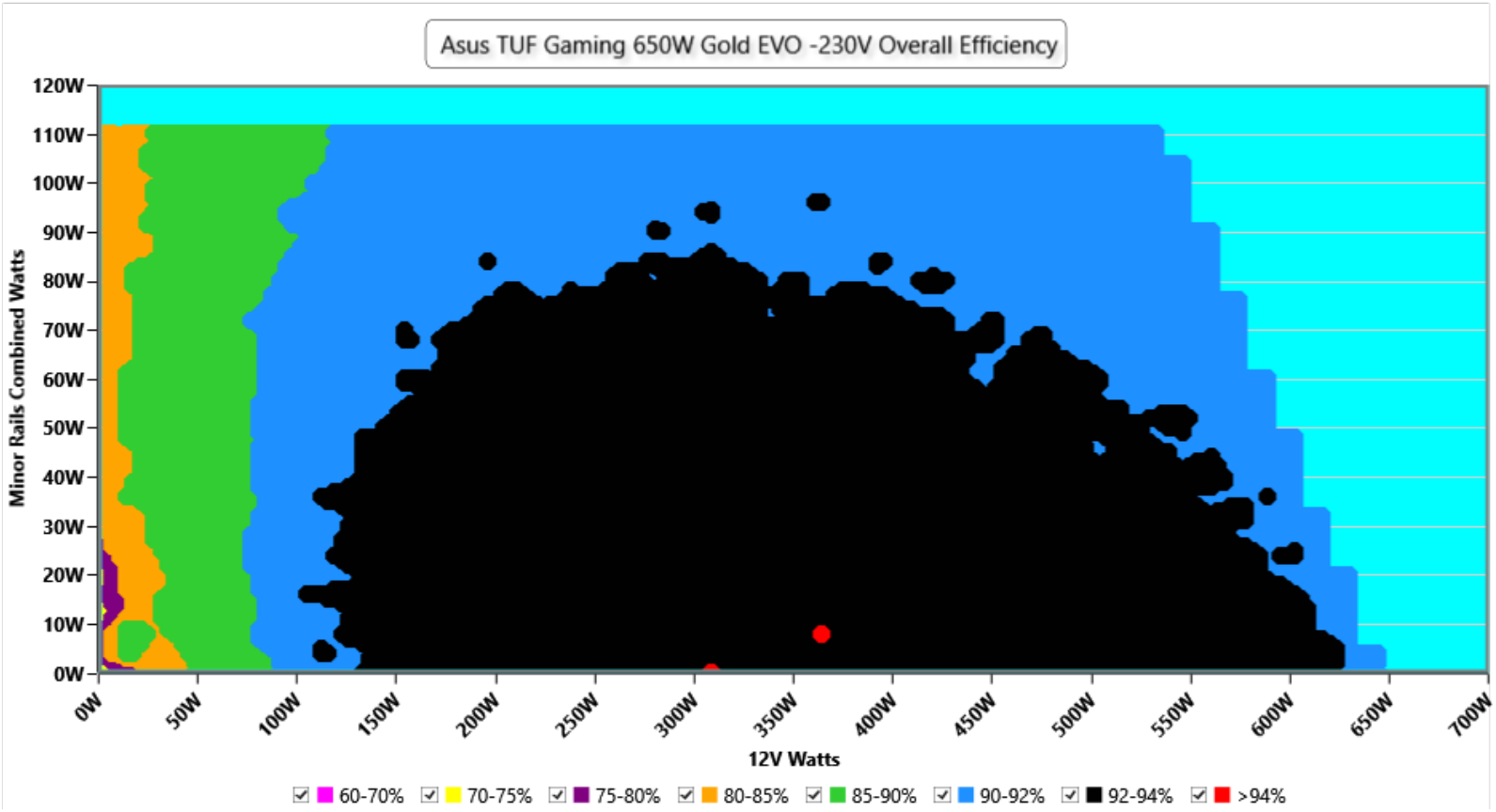
**115V**




**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

## 230V

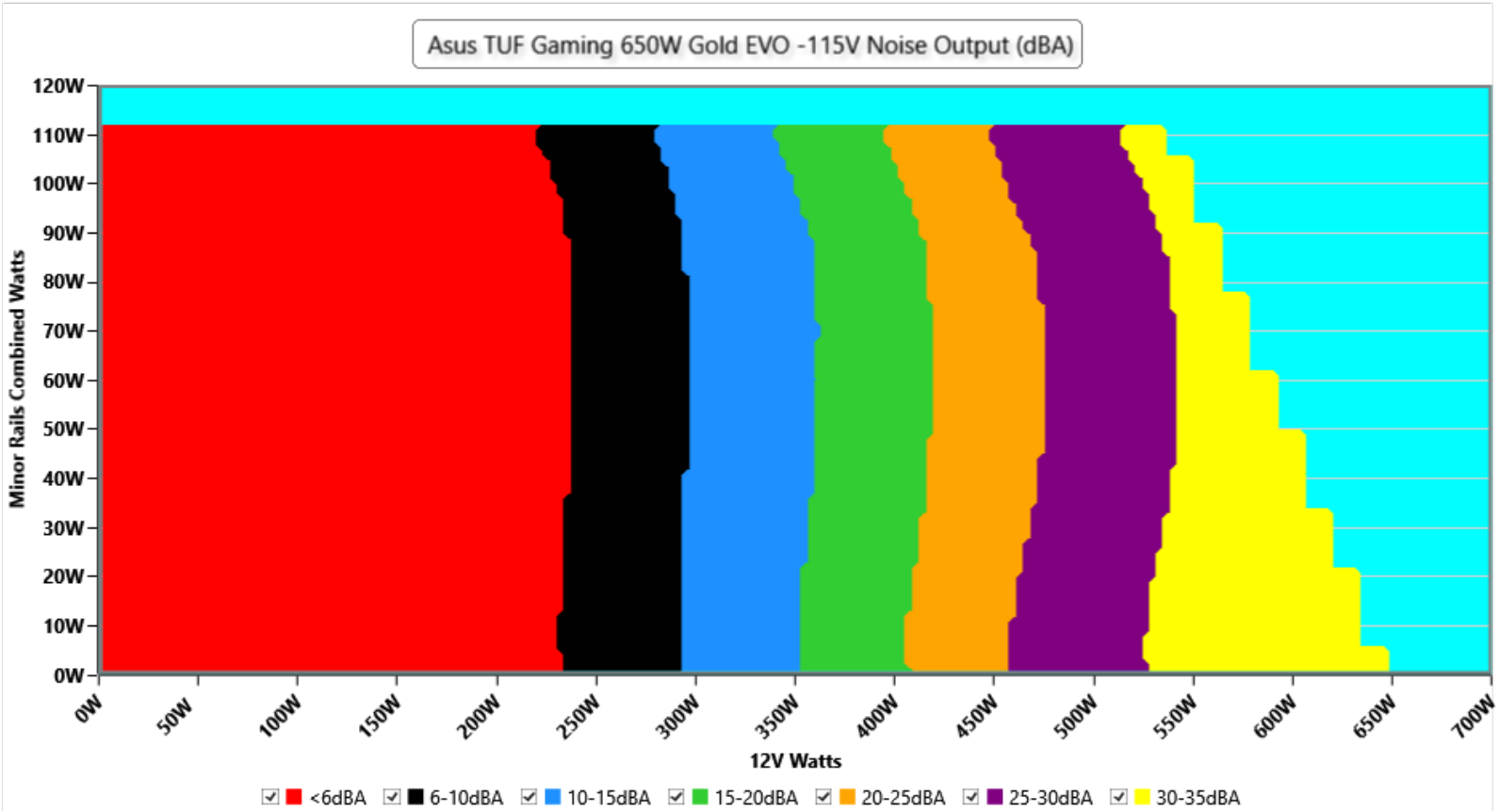



### INFO

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

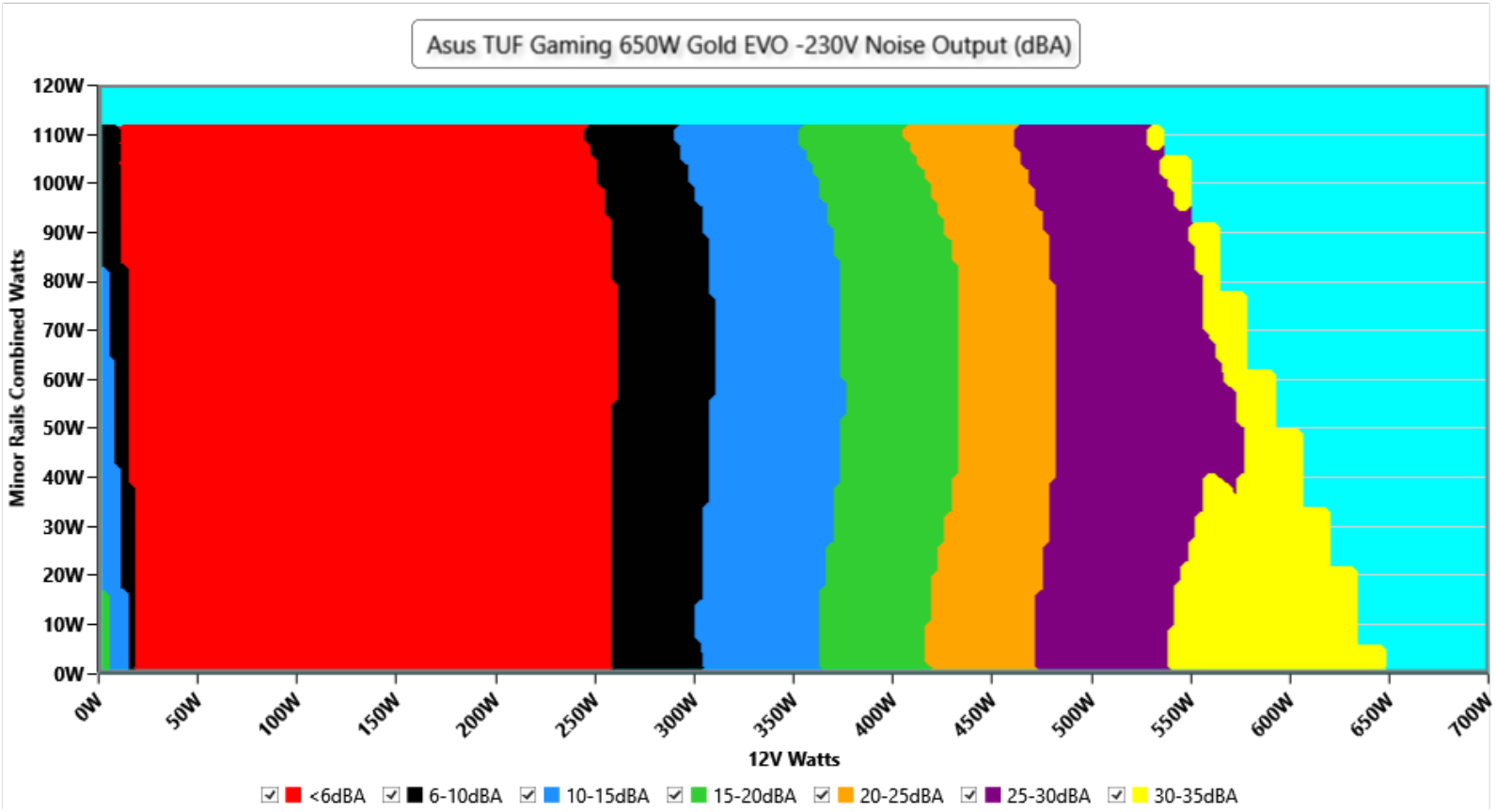
**115V**




**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

## 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

## Noise under high ambient temperature (indicative)

### 115V

| Load | Normal ambient<br>fan · noise · intake | High ambient<br>fan · noise · intake | Noise change |
|---|---|---|---|
| 10% | 329 RPM · <6.0 dB(A) · 30.9 °C | 396 RPM · <6.0 dB(A) · 40.2 °C | <6.0 in both |
| 20% | 352 RPM · <6.0 dB(A) · 31.1 °C | 470 RPM · 9.3 dB(A) · 41.0 °C | <6.0 → 9.3 dB(A) |
| 50% | 401 RPM · <6.0 dB(A) · 30.2 °C | 673 RPM · 20.1 dB(A) · 42.4 °C | <6.0 → 20.1 dB(A) |
| 100% | 903 RPM · 29.1 dB(A) · 30.9 °C | 1450 RPM · 43.3 dB(A) · 45.7 °C | **+14.2 dB(A)** |

### 230V

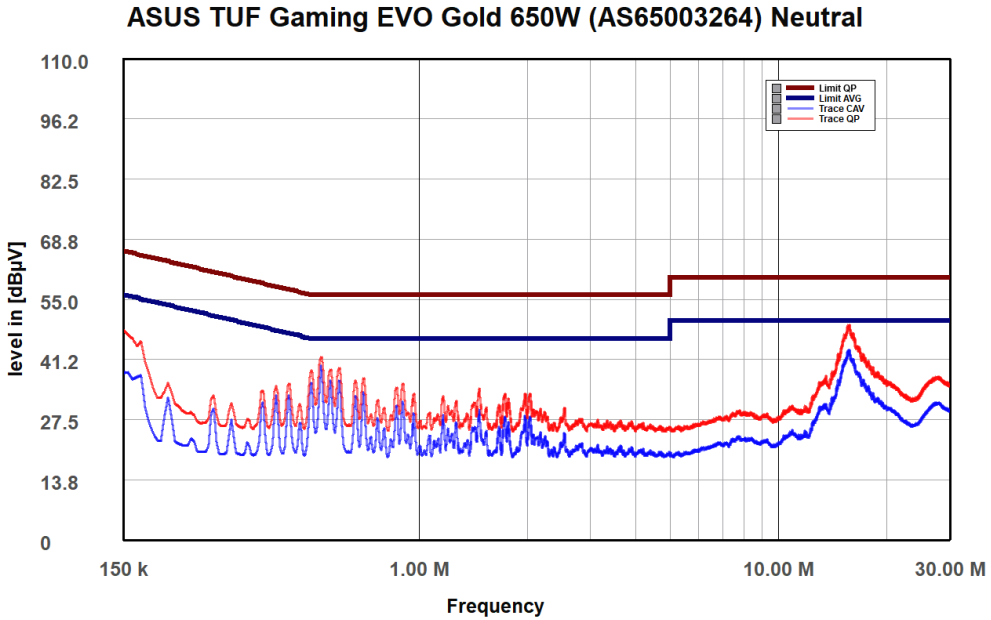
| Load | Normal ambient<br>fan · noise · intake | High ambient<br>fan · noise · intake | Noise change |
|---|---|---|---|
| 10% | 317 RPM · <6.0 dB(A) · 30.7 °C | 432 RPM · 7.5 dB(A) · 40.1 °C | <6.0 → 7.5 dB(A) |
| 20% | 321 RPM · <6.0 dB(A) · 31.0 °C | 493 RPM · 9.7 dB(A) · 40.8 °C | <6.0 → 9.7 dB(A) |
| 50% | 323 RPM · <6.0 dB(A) · 30.7 °C | 653 RPM · 19.3 dB(A) · 42.3 °C | <6.0 → 19.3 dB(A) |
| 100% | 821 RPM · 26.6 dB(A) · 30.5 °C | 1422 RPM · 42.8 dB(A) · 45.6 °C | **+16.2 dB(A)** |

### INFO

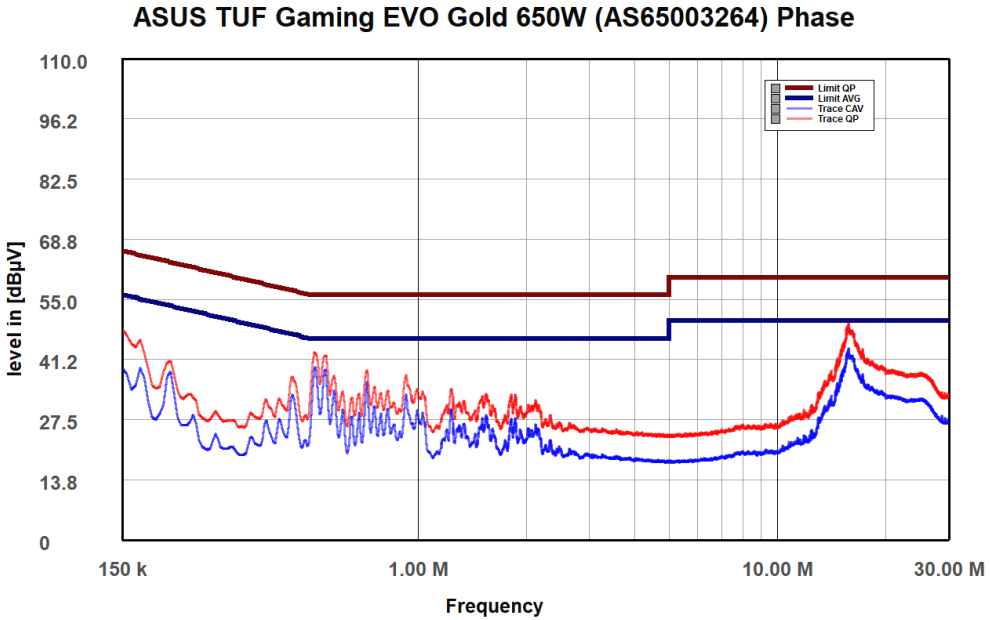
Fan speed, noise and the measured intake temperature at 10, 20, 50 and 100 % load, from the two load regulation tests: at normal ambient (about 30-32 °C) and at high ambient (about 40-47 °C). These are stabilized readings at fixed loads, not averages over the certification sweep, so they are indicative 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.*

## Conducted Emissions EN 55032 & CISPR 32



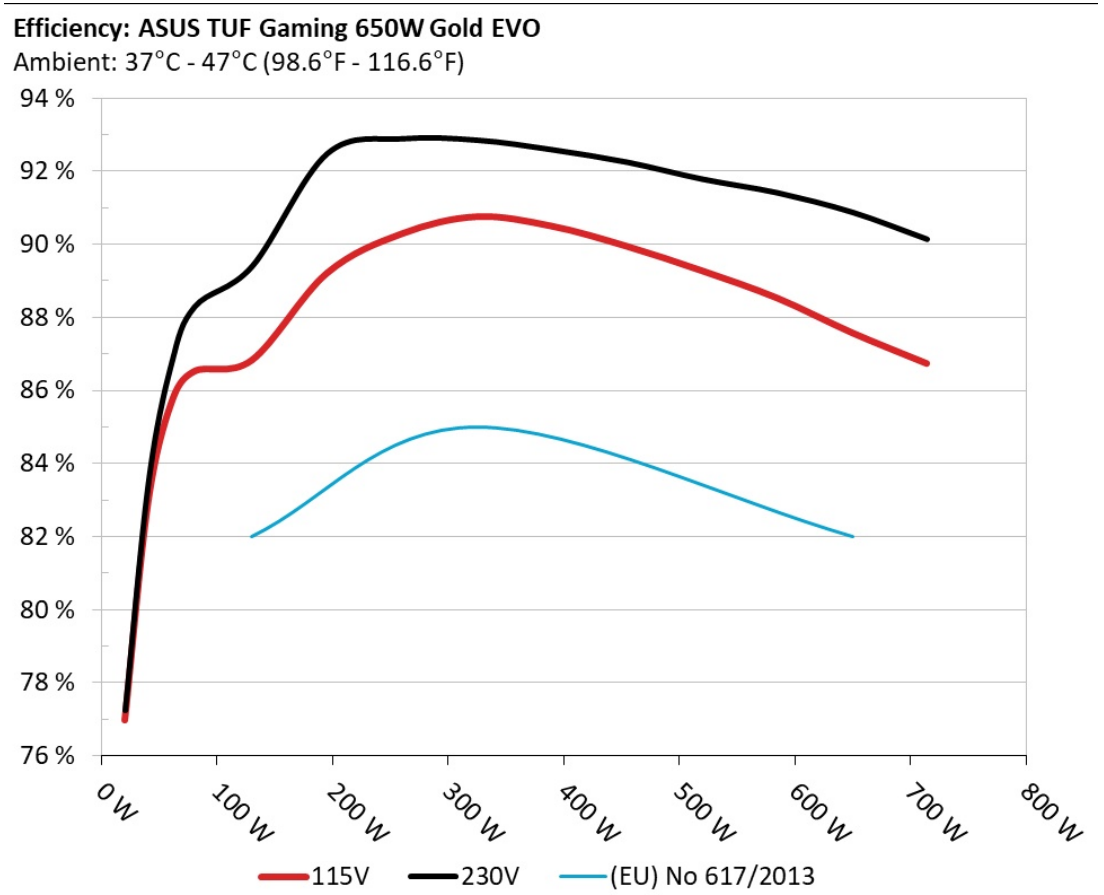

NEUTRAL




PHASE

## Indicative Performance

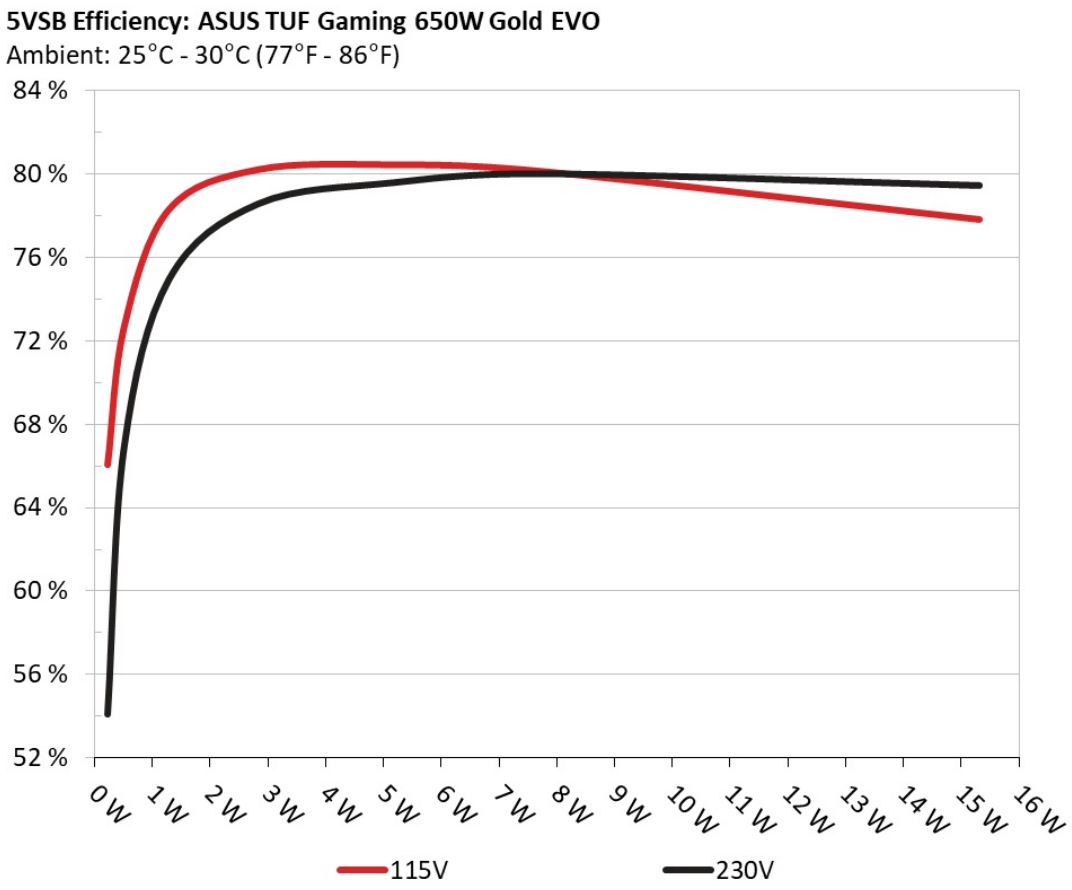
### Efficiency under high ambient temperature




**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** | 0.233W | 66.08% | 0.027 |
| | 5.181V | 0.353W | | 114.9V |
| **2** | **0.09A** | 0.466W | 72.253% | 0.048 |
| | 5.179V | 0.645W | | 114.9V |
| **3** | **0.55A** | 2.842W | 80.206% | 0.225 |
| | 5.167V | 3.543W | | 114.89V |
| **4** | **1A** | 5.157W | 80.438% | 0.33 |
| | 5.156V | 6.411W | | 114.89V |
| **5** | **1.5A** | 7.716W | 80.128% | 0.392 |
| | 5.143V | 9.63W | | 114.89V |
| **6** | **3A** | 15.315W | 77.818% | 0.484 |
| | 5.105V | 19.681W | | 114.89V |

### 230V

| Test # | 5VSB | DC/AC (Watts) | Efficiency | PF/AC Volts |
|---|---|---|---|---|
| **1** | **0.045A** | 0.233W | 54.125% | 0.01 |
| | 5.183V | 0.433W | | 229.89V |
| **2** | **0.09A** | 0.466W | 66.963% | 0.015 |
| | 5.181V | 0.697W | | 229.89V |
| **3** | **0.55A** | 2.843W | 78.569% | 0.077 |
| | 5.169V | 3.62W | | 229.88V |
| **4** | **1A** | 5.158W | 79.573% | 0.133 |
| | 5.157V | 6.483W | | 229.89V |
| **5** | **1.5A** | 7.717W | 80.003% | 0.185 |
| | 5.144V | 9.646W | | 229.89V |
| **6** | **3A** | 15.317W | 79.439% | 0.298 |
| | 5.105V | 19.28W | | 229.89V |

## Protection Features

| | |
|---|---|
| OCP (Normal @ 29.3°C) | 12V: 68.4A (126.29%), 11.955V<br>5V: 27.6A (138%), 5.065V *High Ripple (53.27mV)<br>3.3V: 27.1A (135.5%), 3.206V<br>5VSB: 4.2A (140%), 5.071V |
| OCP (Hot @ 41.2°C) | 12V: 68A (125.55%), 11.957V<br>5V: 27.4A (137%), 5.065V<br>3.3V: 26.9A (134.5%), 3.202V<br>5VSB: 4.2A (140%), 5.072V |
| OPP (Normal @ 28.7°C) | 810.66W (124.72%) |
| OPP (Hot @ 41.7°C) | 805.61W (123.94%) |
| OTP | ✓ (110°C @ 12V Heatsink) |
| 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 |
| UVP (Full Load @ 90V) | ✓ |
| UVP (No Damage @ 80V) | ✓ |
| Conducted Emissions EN55032 & CISPR 32 | ✓ |
| 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%** | **3.584A** | **1.966A** | **1.992A** | **0.971A** | 65.002 | 84.897% | 396 | <6.0 | 40.16°C | 0.866 |
| | 12.108V | 5.087V | 3.314V | 5.152V | 76.574 | | | | 43.59°C | 114.86V |
| **20%** | **8.188A** | **2.953A** | **2.998A** | **1.167A** | 129.932 | 86.82% | 470 | 9.3 | 40.95°C | 0.908 |
| | 12.095V | 5.079V | 3.302V | 5.141V | 149.547 | | | | 45.86°C | 114.76V |
| **30%** | **13.150A** | **3.45A** | **3.507A** | **1.365A** | 194.935 | 89.2% | 505 | 11 | 41.28°C | 0.932 |
| | 12.082V | 5.072V | 3.293V | 5.13V | 218.122 | | | | 47.01°C | 114.75V |
| **40%** | **18.132A** | **3.949A** | **4.02A** | **1.563A** | 260.022 | 90.284% | 565 | 13.9 | 41.52°C | 0.968 |
| | 12.068V | 5.065V | 3.284V | 5.119V | 288.02 | | | | 47.88°C | 114.8V |
| **50%** | **22.770A** | **4.944A** | **5.043A** | **1.762A** | 325.021 | 90.748% | 673 | 20.1 | 42.37°C | 0.987 |
| | 12.056V | 5.057V | 3.272V | 5.107V | 358.179 | | | | 48.78°C | 114.77V |
| **60%** | **27.368A** | **5.942A** | **6.075A** | **1.963A** | 389.37 | 90.492% | 771 | 23.9 | 42.73°C | 0.995 |
| | 12.041V | 5.049V | 3.26V | 5.096V | 430.272 | | | | 49.3°C | 114.75V |
| **70%** | **32.051A** | **6.944A** | **7.115A** | **2.164A** | 454.689 | 89.938% | 922 | 29.7 | 43.08°C | 0.996 |
| | 12.030V | 5.041V | 3.247V | 5.084V | 505.58 | | | | 50.94°C | 114.73V |
| **80%** | **36.749A** | **7.947A** | **8.161A** | **2.267A** | 519.483 | 89.271% | 1084 | 34.8 | 43.75°C | 0.997 |
| | 12.016V | 5.032V | 3.235V | 5.074V | 581.924 | | | | 51.93°C | 114.7V |
| **90%** | **41.859A** | **8.457A** | **8.679A** | **2.369A** | 584.905 | 88.521% | 1278 | 40 | 44.53°C | 0.998 |
| | 12.002V | 5.025V | 3.226V | 5.066V | 660.812 | | | | 53.4°C | 114.68V |
| **100%** | **46.716A** | **8.968A** | **9.231A** | **2.975A** | 649.749 | 87.572% | 1450 | 43.3 | 45.73°C | 0.998 |
| | 11.989V | 5.017V | 3.217V | 5.043V | 741.915 | | | | 55.46°C | 114.64V |
| **110%** | **51.452A** | **9.982A** | **10.391A** | **2.979A** | 714.374 | 86.73% | 1590 | 46.5 | 46.59°C | 0.999 |
| | 11.974V | 5.009V | 3.204V | 5.036V | 823.665 | | | | 58.25°C | 114.61V |
| **CL1** | **0.116A** | **13.088A** | **13.491A** | **0A** | 111.295 | 81.667% | 968 | 31.4 | 41.51°C | 0.901 |
| | 12.104V | 5.058V | 3.239V | 5.164V | 135.926 | | | | 51.11°C | 114.59V |

| Test | 12V | 5V | 3.3V | 5VSB | DC/AC (Watts) | Efficiency | Fan Speed (RPM) | PSU Noise (dB[A]) | Temps (In/Out) | PF/AC Volts |
|---|---|---|---|---|---|---|---|---|---|---|
| **CL2** | **0.116A** | **19.699A** | **0A** | **0A** | 101.353 | 80.654% | 797 | 25.3 | 40.05°C | 0.897 |
| | 12.108V | 5.074V | 3.303V | 5.168V | 125.657 | | | | 49.34°C | 114.84V |
| **CL3** | **0.114A** | **0A** | **20.479A** | **0A** | 67.382 | 74.327% | 698 | 21.2 | 41.56°C | 0.877 |
| | 12.107V | 5.062V | 3.222V | 5.168V | 90.651 | | | | 49.79°C | 114.86V |
| **CL4** | **54.210A** | **0A** | **0A** | **0A** | 649.562 | 88.782% | 1317 | 40.4 | 45.71°C | 0.998 |
| | 11.982V | 5.041V | 3.278V | 5.131V | 731.583 | | | | 53.87°C | 114.64V |

The results above are not used in the certification process

## 230V

| Test | 12V | 5V | 3.3V | 5VSB | DC/AC (Watts) | Efficiency | Fan Speed (RPM) | PSU Noise (dB[A]) | Temps (In/Out) | PF/AC Volts |
|---|---|---|---|---|---|---|---|---|---|---|
| **10%** | **3.586A** | **1.966A** | **1.992A** | **0.971A** | 65.009 | 86.562% | 432 | 7.5 | 40.07°C | 0.809 |
| | 12.107V | 5.087V | 3.313V | 5.152V | 75.065 | | | | 44.24°C | 229.88V |
| **20%** | **8.189A** | **2.954A** | **3A** | **1.167A** | 129.949 | 89.396% | 493 | 9.7 | 40.81°C | 0.927 |
| | 12.094V | 5.079V | 3.3V | 5.141V | 145.348 | | | | 45.26°C | 229.86V |
| **30%** | **13.153A** | **3.451A** | **3.51A** | **1.365A** | 194.954 | 92.472% | 493 | 9.7 | 41.17°C | 0.956 |
| | 12.080V | 5.072V | 3.291V | 5.13V | 210.824 | | | | 45.81°C | 229.86V |
| **40%** | **18.135A** | **3.949A** | **4.023A** | **1.563A** | 260.049 | 92.879% | 558 | 13.8 | 41.65°C | 0.973 |
| | 12.067V | 5.065V | 3.282V | 5.119V | 279.976 | | | | 46.71°C | 229.84V |
| **50%** | **22.776A** | **4.945A** | **5.049A** | **1.763A** | 325.048 | 92.84% | 653 | 19.3 | 42.25°C | 0.979 |
| | 12.053V | 5.057V | 3.269V | 5.107V | 350.125 | | | | 47.35°C | 229.83V |
| **60%** | **27.375A** | **5.943A** | **6.083A** | **1.963A** | 389.427 | 92.58% | 763 | 23.7 | 42.87°C | 0.984 |
| | 12.040V | 5.049V | 3.255V | 5.095V | 420.618 | | | | 48.37°C | 229.82V |
| **70%** | **32.061A** | **6.945A** | **7.126A** | **2.164A** | 454.752 | 92.237% | 912 | 29.5 | 43.29°C | 0.986 |
| | 12.028V | 5.041V | 3.242V | 5.083V | 493.059 | | | | 49.55°C | 229.82V |
| **80%** | **36.759A** | **7.948A** | **8.175A** | **2.267A** | 519.542 | 91.776% | 1089 | 34.8 | 43.71°C | 0.989 |
| | 12.015V | 5.032V | 3.229V | 5.073V | 566.078 | | | | 50.89°C | 229.79V |
| **90%** | **41.869A** | **8.458A** | **8.697A** | **2.37A** | 584.955 | 91.4% | 1256 | 39.6 | 44.51°C | 0.99 |
| | 12.001V | 5.025V | 3.219V | 5.065V | 640.038 | | | | 52.5°C | 229.79V |

| Test | 12V | 5V | 3.3V | 5VSB | DC/AC (Watts) | Efficiency | Fan Speed (RPM) | PSU Noise (dB[A]) | Temps (In/Out) | PF/AC Volts |
|---|---|---|---|---|---|---|---|---|---|---|
| **100%** | **46.726A** | **8.969A** | **9.254A** | **2.976A** | 649.784 | 90.868% | 1422 | 42.8 | 45.58°C | 0.991 |
| | 11.987V | 5.017V | 3.209V | 5.042V | 715.067 | | | | 54.06°C | 229.78V |
| **110%** | **51.464A** | **9.984A** | **10.421A** | **2.98A** | 714.418 | 90.133% | 1573 | 46.5 | 46.09°C | 0.994 |
| | 11.972V | 5.008V | 3.195V | 5.035V | 792.657 | | | | 56.03°C | 229.76V |
| **CL1** | **0.116A** | **13.09A** | **13.539A** | **0A** | 111.298 | 84.596% | 861 | 27.7 | 40.96°C | 0.915 |
| | 12.103V | 5.057V | 3.227V | 5.162V | 131.505 | | | | 49.68°C | 229.87V |
| **CL2** | **0.116A** | **19.702A** | **0A** | **0A** | 101.359 | 82.938% | 735 | 22.7 | 40.97°C | 0.905 |
| | 12.107V | 5.074V | 3.303V | 5.168V | 122.238 | | | | 48.85°C | 229.89V |
| **CL3** | **0.115A** | **0A** | **20.536A** | **0A** | 67.384 | 75.831% | 665 | 19.8 | 40.62°C | 0.851 |
| | 12.106V | 5.061V | 3.213V | 5.168V | 88.853 | | | | 48.54°C | 229.88V |
| **CL4** | **54.223A** | **0A** | **0A** | **0A** | 649.614 | 91.752% | 1283 | 40 | 45.45°C | 0.991 |
| | 11.980V | 5.04V | 3.278V | 5.131V | 707.906 | | | | 52.25°C | 229.77V |

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** | **1.226A** | **0.491A** | **0.496A** | **0.193A** | 19.996 | 76.967% | 326 | <6.0 | 36.63°C | 0.744 |
| | 12.114V | 5.095V | 3.327V | 5.177V | 26.008 | | | | 39.17°C | 114.88V |
| **40W** | **2.700A** | **0.687A** | **0.695A** | **0.29A** | 39.998 | 82.905% | 327 | <6.0 | 37.73°C | 0.828 |
| | 12.110V | 5.093V | 3.325V | 5.173V | 48.243 | | | | 40.43°C | 114.87V |
| **60W** | **4.174A** | **0.884A** | **0.894A** | **0.387A** | 59.999 | 85.628% | 334 | <6.0 | 38.44°C | 0.862 |
| | 12.106V | 5.091V | 3.322V | 5.169V | 70.075 | | | | 41.17°C | 114.88V |
| **80W** | **5.644A** | **1.081A** | **1.094A** | **0.484A** | 79.94 | 86.513% | 377 | <6.0 | 39.14°C | 0.879 |
| | 12.104V | 5.088V | 3.319V | 5.164V | 92.403 | | | | 42.83°C | 114.86V |

The results above are not used in the certification process

### 230V

| Test | 12V | 5V | 3.3V | 5VSB | DC/AC (Watts) | Efficiency | Fan Speed (RPM) | PSU Noise (dB[A]) | Temps (In/Out) | PF/AC Volts |
|---|---|---|---|---|---|---|---|---|---|---|
| **20W** | **1.226A** | **0.491A** | **0.496A** | **0.193A** | 20.007 | 77.251% | 365 | <6.0 | 36.48°C | 0.413 |
| | 12.114V | 5.095V | 3.328V | 5.177V | 25.96 | | | | 41.25°C | 229.89V |
| **40W** | **2.700A** | **0.687A** | **0.695A** | **0.29A** | 40.007 | 83.455% | 363 | <6.0 | 37.2°C | 0.653 |
| | 12.110V | 5.093V | 3.325V | 5.172V | 47.947 | | | | 41.25°C | 229.88V |
| **60W** | **4.174A** | **0.884A** | **0.894A** | **0.387A** | 60.006 | 86.728% | 376 | <6.0 | 38.45°C | 0.786 |
| | 12.106V | 5.09V | 3.321V | 5.168V | 69.192 | | | | 41.92°C | 229.88V |
| **80W** | **5.646A** | **1.081A** | **1.094A** | **0.484A** | 79.956 | 88.284% | 397 | <6.0 | 39.41°C | 0.856 |
| | 12.102V | 5.088V | 3.318V | 5.164V | 90.563 | | | | 43.01°C | 229.88V |

The results above are not used in the certification process

## Ripple Measurements

### 115V

| Test | 12V | 5V | 3.3V | 5VSB | Pass/Fail |
|---|---|---|---|---|---|
| 10% Load | 38.77mV | 23.09mV | 20.83mV | 14.98mV | Pass |
| 20% Load | 39.30mV | 24.94mV | 22.98mV | 17.80mV | Pass |
| 30% Load | 36.77mV | 26.74mV | 24.68mV | 18.98mV | Pass |
| 40% Load | 40.61mV | 29.10mV | 26.22mV | 18.73mV | Pass |
| 50% Load | 41.33mV | 27.61mV | 25.04mV | 18.93mV | Pass |
| 60% Load | 44.70mV | 28.17mV | 24.68mV | 17.65mV | Pass |
| 70% Load | 46.24mV | 29.46mV | 26.94mV | 16.52mV | Pass |
| 80% Load | 50.58mV | 29.61mV | 27.14mV | 19.75mV | Pass |
| 90% Load | 59.48mV | 27.20mV | 25.29mV | 16.93mV | Pass |
| 100% Load | 64.44mV | 29.82mV | 27.40mV | 17.44mV | Pass |
| 110% Load | 68.54mV | 30.64mV | 28.78mV | 17.44mV | Pass |
| Crossload1 | 37.90mV | 33.92mV | 30.01mV | 20.47mV | Pass |
| Crossload2 | 60.40mV | 43.73mV | 27.86mV | 21.55mV | Pass |

| Test | 12V | 5V | 3.3V | 5VSB | Pass/Fail |
|---|---|---|---|---|---|
| Crossload3 | 50.79mV | 25.97mV | 34.99mV | 19.03mV | Pass |
| Crossload4 | 63.83mV | 26.38mV | 25.03mV | 17.80mV | Pass |

The results above are not used in the certification process

**230V**

| Test | 12V | 5V | 3.3V | 5VSB | Pass/Fail |
|---|---|---|---|---|---|
| 10% Load | 34.52mV | 24.53mV | 21.39mV | 14.83mV | Pass |
| 20% Load | 27.16mV | 24.99mV | 21.65mV | 14.47mV | Pass |
| 30% Load | 32.02mV | 28.58mV | 23.34mV | 16.11mV | Pass |
| 40% Load | 37.24mV | 27.45mV | 25.19mV | 16.11mV | Pass |
| 50% Load | 41.22mV | 27.66mV | 25.70mV | 15.85mV | Pass |
| 60% Load | 43.22mV | 29.51mV | 28.17mV | 17.09mV | Pass |
| 70% Load | 45.18mV | 30.74mV | 28.93mV | 17.04mV | Pass |
| 80% Load | 51.91mV | 31.41mV | 28.68mV | 20.06mV | Pass |
| 90% Load | 53.96mV | 32.23mV | 29.40mV | 22.22mV | Pass |
| 100% Load | 58.92mV | 33.51mV | 31.40mV | 18.93mV | Pass |
| 110% Load | 62.35mV | 33.98mV | 31.45mV | 18.68mV | Pass |
| Crossload1 | 32.07mV | 31.61mV | 26.78mV | 16.73mV | Pass |
| Crossload2 | 49.05mV | 39.83mV | 24.63mV | 17.29mV | Pass |
| Crossload3 | 47.67mV | 26.89mV | 35.25mV | 17.29mV | Pass |
| Crossload4 | 57.90mV | 28.02mV | 26.52mV | 19.81mV | Pass |

The results above are not used in the certification process

## ASUS TUF Gaming 650W Gold EVO



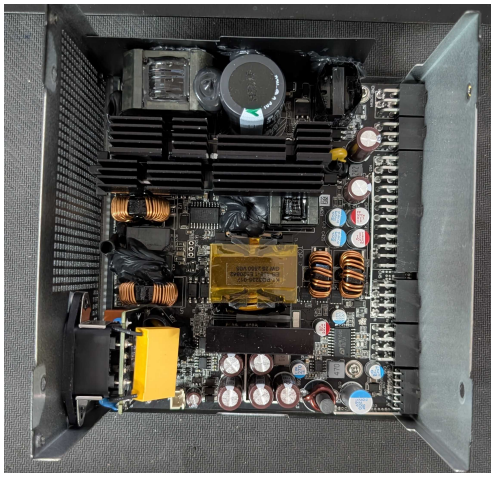

Top side




Power specifications label




Third Photo



Fourth Photo

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