



## Thermaltake Toughpower TF3 1650W

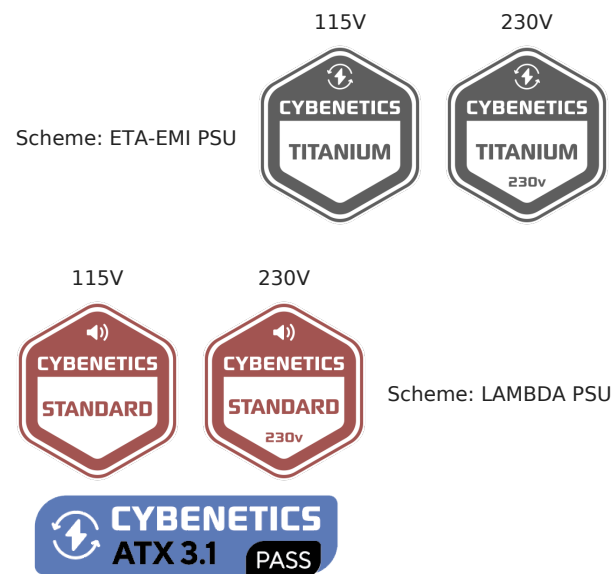
Serial Number PSTPD1650FNFATE1BVCH00463

Lab ID TT16503181

Certification ID 263181

Test Result Report ID: 26PS3181A

Certificate Issue Date: Mar 2, 2026



Outside Validation Scope

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## 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                             | Thermaltake               |
| Model                             | Toughpower TF3 1650W      |
| OEM/ODM                           | CE-Link                   |
| Serial Number                     | PSTPD1650FNFATE1BVCH00463 |
| Product Specifications            |                           |
| Manufacturer-Provided Information |                           |
| Rated Voltage (Vrms)              | 100-240                   |
| Rated Current (Arms)              | 10-20                     |

|                                                   |                                                                                     |
|---------------------------------------------------|-------------------------------------------------------------------------------------|
| Rated Frequency (Hz)                              | 50-60                                                                               |
| Rated Power (W)                                   | 1650                                                                                |
| Operating Temperature (Continuous Full Load) (°C) | 0 - 50                                                                              |
| Type                                              | ATX12V                                                                              |
| Cable Design                                      | Fully Modular                                                                       |
| Warranty                                          | 10 years                                                                            |
| Cybenetics Measurements                           |                                                                                     |
| Dimensions (W x H x D)                            | 150 x 85 x 165mm                                                                    |
| Weight                                            | 2.48 kg (5.47 lb)                                                                   |
| Cooling                                           | 140mm Hydraulic Bearing Fan (TT-1425 A1425S12S-2)                                   |
| Semi-Passive Operation                            | ✓                                                                                   |
| Cybenetics Testing Information                    |                                                                                     |
| Lab ID                                            | TT16503181                                                                          |
| Date of receipt                                   | Jan 23, 2026                                                                        |
| Testing Date                                      | Feb 27, 2026                                                                        |
| Report Issued Date                                | Mar 2, 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 24 pin (600mm)   | 1           | 1                       | 16-22AWG | Tinned Copper |
| 4+4 pin EPS12V (750mm)         | 1           | 1                       | 16AWG    | Tinned Copper |
| 8 pin EPS12V (750mm)           | 1           | 1                       | 16-AWG   | Tinned Copper |
| 6+2 pin PCIe (600mm+150mm)     | 3           | 6                       | 16-18AWG | Tinned Copper |
| 6+2 pin PCIe (600mm)           | 3           | 3                       | 16AWG    | Tinned Copper |
| 12+4 pin PCIe (700mm) (600W)   | 1           | 1                       | 16-28AWG | Tinned Copper |
| SATA (600mm+150mm+150mm+150mm) | 4           | 16                      | 18AWG    | Tinned Copper |

| Modular Cables                        |   |   |       |               |
|---------------------------------------|---|---|-------|---------------|
| 4-pin Molex (600mm+150mm+150mm+150mm) | 2 | 8 | 18AWG | Tinned Copper |
| AC Power Cord (1360mm) - C19 coupler  | 1 | 1 | 16AWG | -             |

### Protection Features(Manufacturer)

|                                |   |
|--------------------------------|---|
| 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(1) | 12V(2) | 12V(3) | 12V(4) | 12V(5) | 5VSB | -12V |
| Max. Power           | Amps  | 20   | 20 | 50     | 50     | 50     | 50     | 50     | 3    | 0.3  |
|                      | Watts | 120  |    |        | 1650   |        |        |        | 15   | 3.6  |
| Total Max. Power (W) |       | 1650 |    |        |        |        |        |        |      |      |

### Parts Description

| General Data       |                                                                              |
|--------------------|------------------------------------------------------------------------------|
| Manufacturer (OEM) | CE-Link                                                                      |
| PCB Type           | Double-Sided                                                                 |
| Primary Side       |                                                                              |
| Transient Filter   | 4x Y caps, 3x X caps, 2x CM chokes, 1x MOV                                   |
| Inrush Protection  | NTC Thermistor MF72-5D15 (5 Ohm @ 25°C) & Relay                              |
| Bridge Rectifier   | 6x Nexperia GS10M (1000V, 10A @ 122°C)                                       |
| APFC MOSFETs       | 4x Lonten LSB65R070GF (650V, 30A @ 100°C, Rds(on): 0.07Ohm)                  |
| APFC Boost Diode   | 2x Global Power Technology G4S06515AT (650V, 15A @ 143°C)                    |
| Bulk Cap(s)        | 2x Nippon Chemi-Con (400V, 820uF, 2000h @ 105°C,KMW)                         |
| Main Switchers     | 4x Reactor Microelectronics RMC60R068FD (600V, 48A @ 25°C, Rds(on): 0.07Ohm) |

|                                   |                                                                                                                                                                  |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| APFC Controller                   | Champion CM6500UNX<br>1x Champion CM03AX (reduce the no-load consumption)                                                                                        |
| Resonant Controller               | Champion CM6901T6X                                                                                                                                               |
| IC Driver                         | Novosense NSI6602BD                                                                                                                                              |
| Topology                          | Primary side: APFC, Full-Bridge & LLC Resonant Converter<br>Secondary side: [12V] Synchronous Rectification & [Minor Rails] DC-DC converters                     |
| <b>Secondary Side</b>             |                                                                                                                                                                  |
| +12V MOSFETs                      | 8x Infineon BSC014N04LS (40V, 124A @ 100°C, Rds(on): 1.4mOhm)                                                                                                    |
| 5V & 3.3V                         | DC-DC Converters: 6x Vergiga Semiconductor VS3610GPMT (60V, 49A @ 100°C, Rds(on): 2.5mOhm)<br>PWM Controller(s): 1x Anpec APW7159C                               |
| Filtering Capacitors              | Electrolytic:<br>1x Nippon Chemi-Con (2-5000h @ 105°C, KZE)<br>3x Rubycon (4-10,000 @ 105°C, YXJ)<br>2x Rubycon (6-10,000 @ 105°C, ZLH)<br>Polymer:<br>70x TEAPO |
| Supervisor IC                     | Greenergy GR8329N                                                                                                                                                |
| Fan Controller / Micro Controller | Nuvoton M252SD2AE                                                                                                                                                |
| Fan Model                         | Thermaltake TT-1425 A1425S12S (140mm, 12V, 0.70A, Fluid Dynamic Bearing Fan)                                                                                     |
| <b>5VSB Circuit</b>               |                                                                                                                                                                  |
| Rectifier                         | Microdiode Semiconductor 1SMA200A                                                                                                                                |
| Standby PWM Controller            | Sanken Electric A6069H                                                                                                                                           |

## 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                 | ✓                 |
| Conducted Emissions EN 55032 & CISPR 32      | Passed            |

## Performance Summary

### 115V

|                                                        |          |
|--------------------------------------------------------|----------|
| Accredited                                             |          |
| Average Efficiency (>1450 load combinations)           | 91.838%  |
| Average Noise Output (>1450 Load Combinations)         | 41.16dBA |
| Average PF (>1450 Load Combinations)                   | 0.985    |
| Efficiency With 10W ( $\leq 500W$ ) or 2% (>500W) Load | 71.816%  |
| Standby Power Consumption                              | 0.0517W  |
| Non-Accredited                                         |          |
| 12V Ripple (Full Load)                                 | 37.23mV  |
| 5V Ripple (Full Load)                                  | 23.15mV  |
| 3.3V Ripple (Full Load)                                | 23.75mV  |
| 5VSB Ripple (Full Load)                                | 20.42mV  |
| 12V Load Regulation                                    | 0.56%    |
| 5V Load Regulation                                     | 1.04%    |
| 3.3V Load Regulation                                   | 1.04%    |
| 5VSB Load Regulation                                   | 1.31%    |
| Inrush Current                                         | 33.610A  |

### 230V

|                                                        |          |
|--------------------------------------------------------|----------|
| Accredited                                             |          |
| Average Efficiency (>1450 load combinations)           | 93.823%  |
| Average Noise Output (>1450 Load Combinations)         | 40.87dBA |
| Average PF (>1450 Load Combinations)                   | 0.964    |
| Efficiency With 10W ( $\leq 500W$ ) or 2% (>500W) Load | 71.374%  |
| Standby Power Consumption                              | 0.0969W  |
| Non-Accredited                                         |          |
| 12V Ripple (Full Load)                                 | 44.24mV  |
| 5V Ripple (Full Load)                                  | 22.32mV  |
| 3.3V Ripple (Full Load)                                | 26.47mV  |

|                                  |                            |                            |
|----------------------------------|----------------------------|----------------------------|
| 5VSB Ripple (Full Load)          | 20.47mV                    |                            |
| 12V Load Regulation              | 0.55%                      |                            |
| 5V Load Regulation               | 1.04%                      |                            |
| 3.3V Load Regulation             | 1.01%                      |                            |
| 5VSB Load Regulation             | 1.33%                      |                            |
| Inrush Current                   | 65.660A                    |                            |
| 12V Transient Response (200%)    | 11.78V                     |                            |
| 5V Transient Response (200%)     | 4.943V                     |                            |
| 3.3V Transient Response (200%)   | 3.234V                     |                            |
| 5VSB Transient Response (200%)   | 4.970V                     |                            |
| Hold-Up Time & PWR_OK Signal     | 23.50ms                    |                            |
| AC Loss to PWR_OK Hold Up Time   | 20.50ms                    |                            |
| PWR_OK Inactive to DC Loss Delay | 3.00ms                     |                            |
| PSU Timings: T1 (20% / 100%)     | 101.0ms                    | 103.0ms                    |
| PSU Timings: T3 (20% / 100%)     | 121.0ms                    | 121.0ms                    |
| 12V OCP (30.4°C / 45.1°C)        | 195.20A (141.96%), 12.078V | 179.20A (130.33%), 12.080V |
| 5V OCP (30.4°C / 45.1°C)         | 25.7A (128.50%), 4.967V    | 25.8A (129.00%), 4.967V    |
| 3.3V OCP (30.4°C / 45.1°C)       | 25.6A (128.00%), 3.288V    | 25.7A (128.50%), 3.288V    |
| 5VSB OCP (30.4°C / 45.1°C)       | 6.4A (213.33%), 4.781V     | 6.3A (210.00%), 4.771V     |
| OPP (29.54°C / 44.31°C)          | 141.38%                    | 128.71%                    |

## Hold-Up Time & PWR\_OK Signal

|                                       |      |
|---------------------------------------|------|
| Hold-Up Time (ms)                     | 23.5 |
| AC Loss to PWR_OK Hold Up Time (ms)   | 20.5 |
| PWR_OK Inactive to DC Loss Delay (ms) | 3    |

## Vampire Power

### Tables

#### 115V

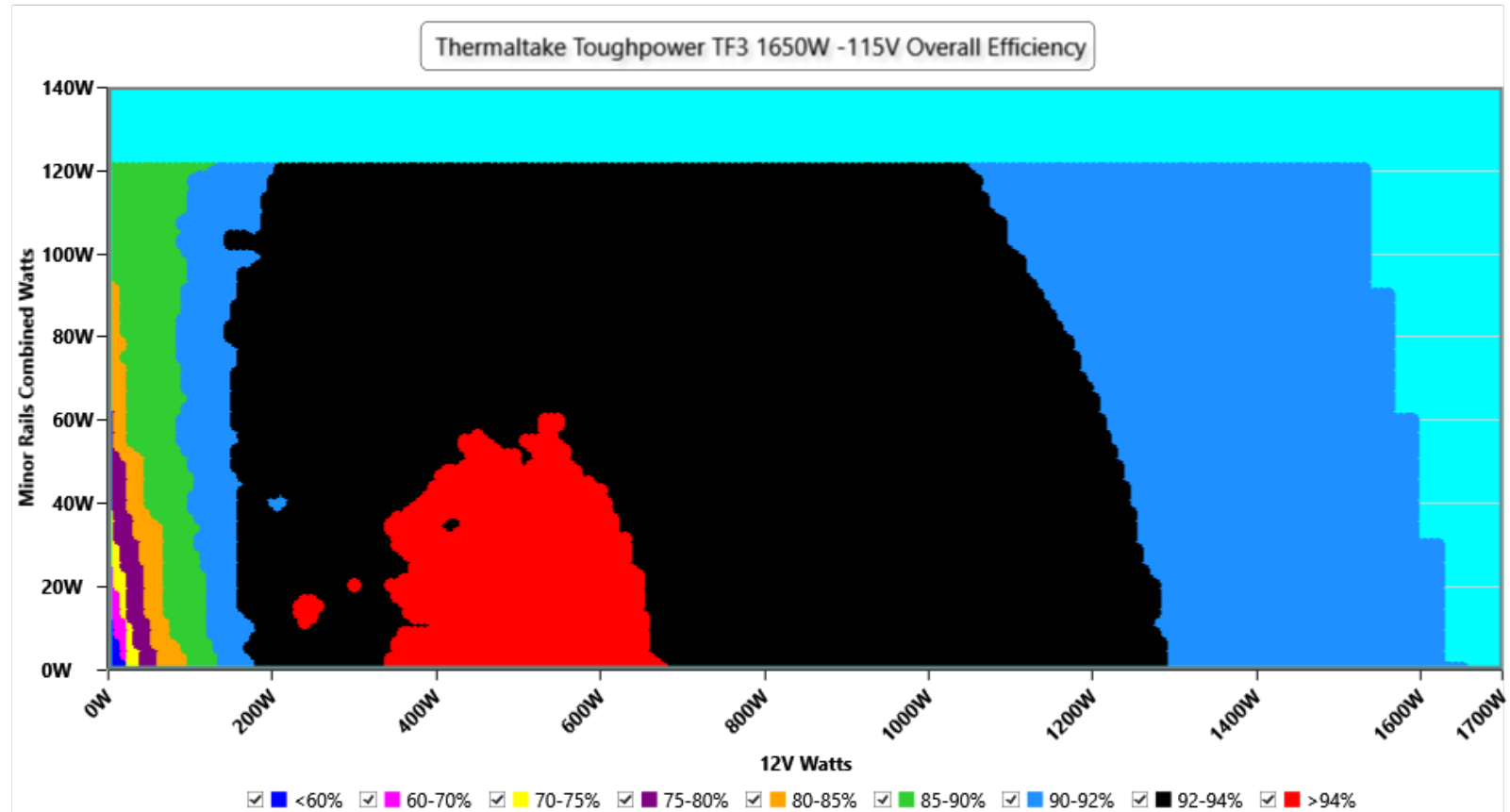
| Detailed Results   |          |          |           |          |           |        |
|--------------------|----------|----------|-----------|----------|-----------|--------|
|                    | Average  | Min      | Limit Min | Max      | Limit Max | Result |
| Mains Voltage RMS: | 115.05 V | 115.02 V | 113.85 V  | 115.06 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     | 1.417    | 1.490     | PASS   |
| Mains Voltage THD: | 0.13 %   | 0.09 %   | N/A       | 0.18 %   | 2.00 %    | PASS   |
| Real Power:        | 0.052 W  | 0.003 W  | N/A       | 0.080 W  | N/A       | N/A    |
| Apparent Power:    | 21.945 W | 21.925 W | N/A       | 21.966 W | N/A       | N/A    |
| Power Factor:      | 0.002    | N/A      | N/A       | N/A      | N/A       | N/A    |

#### 230V

| Detailed Results   |          |          |           |          |           |        |
|--------------------|----------|----------|-----------|----------|-----------|--------|
|                    | Average  | Min      | Limit Min | Max      | Limit Max | Result |
| Mains Voltage RMS: | 230.06 V | 230.07 V | 227.70 V  | 230.11 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: | 0.15 %   | 0.13 %   | N/A       | 0.16 %   | 2.00 %    | PASS   |
| Real Power:        | 0.097 W  | 0.055 W  | N/A       | 0.223 W  | N/A       | N/A    |
| Apparent Power:    | 72.862 W | 72.817 W | N/A       | 72.900 W | N/A       | N/A    |
| Power Factor:      | 0.001    | N/A      | N/A       | N/A      | N/A       | N/A    |

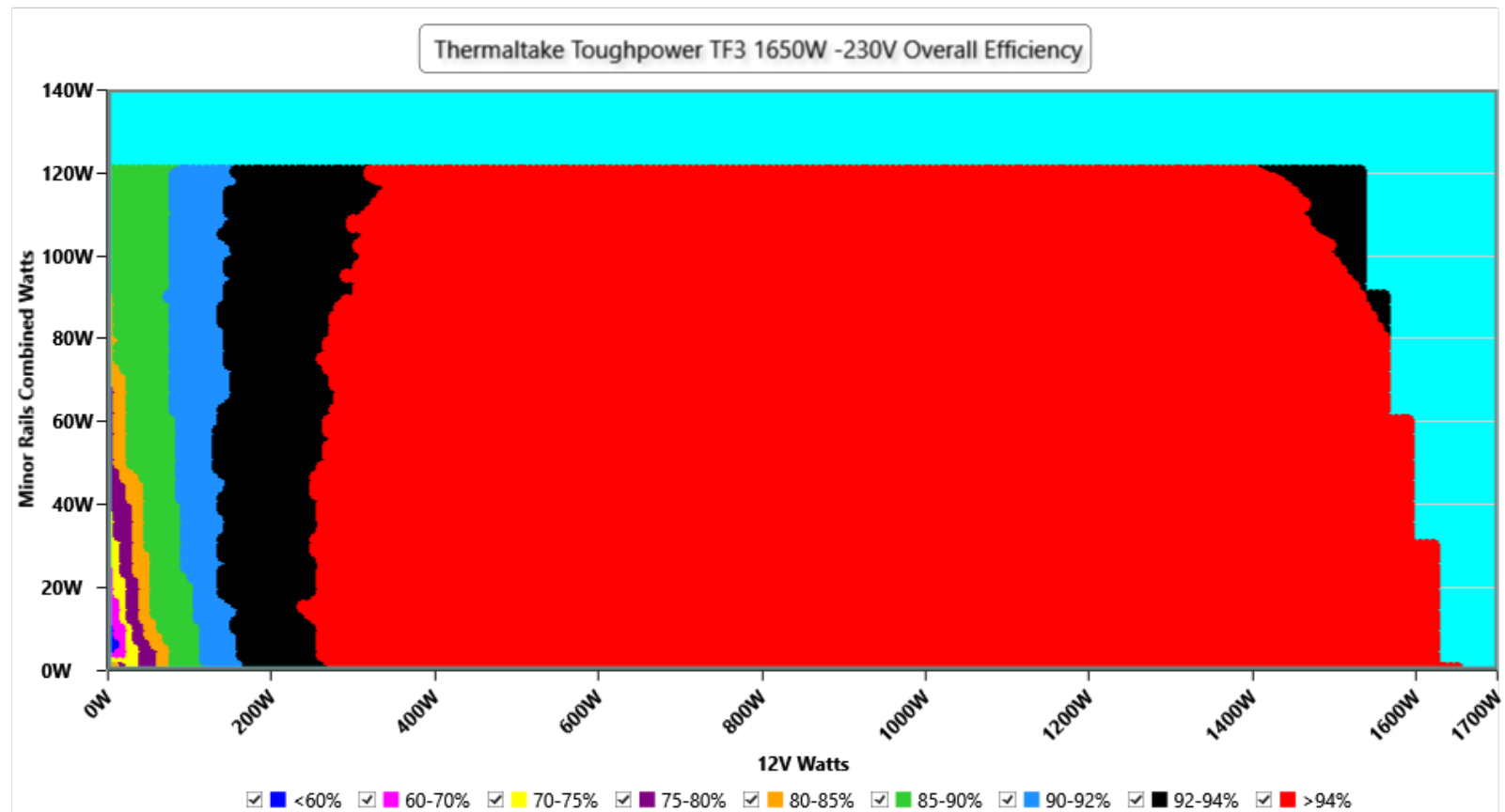
## Efficiency Graph

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

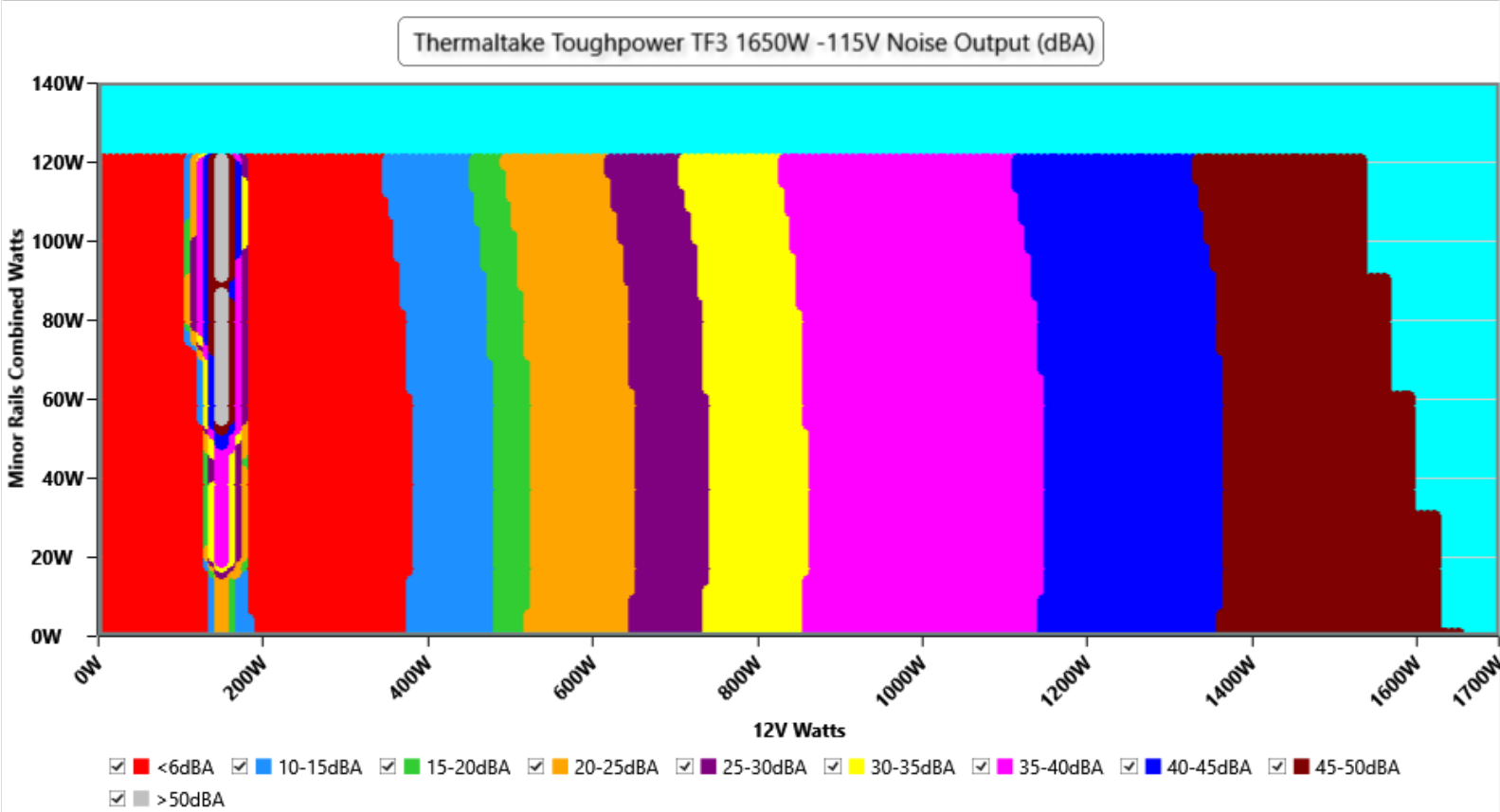


### INFO

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

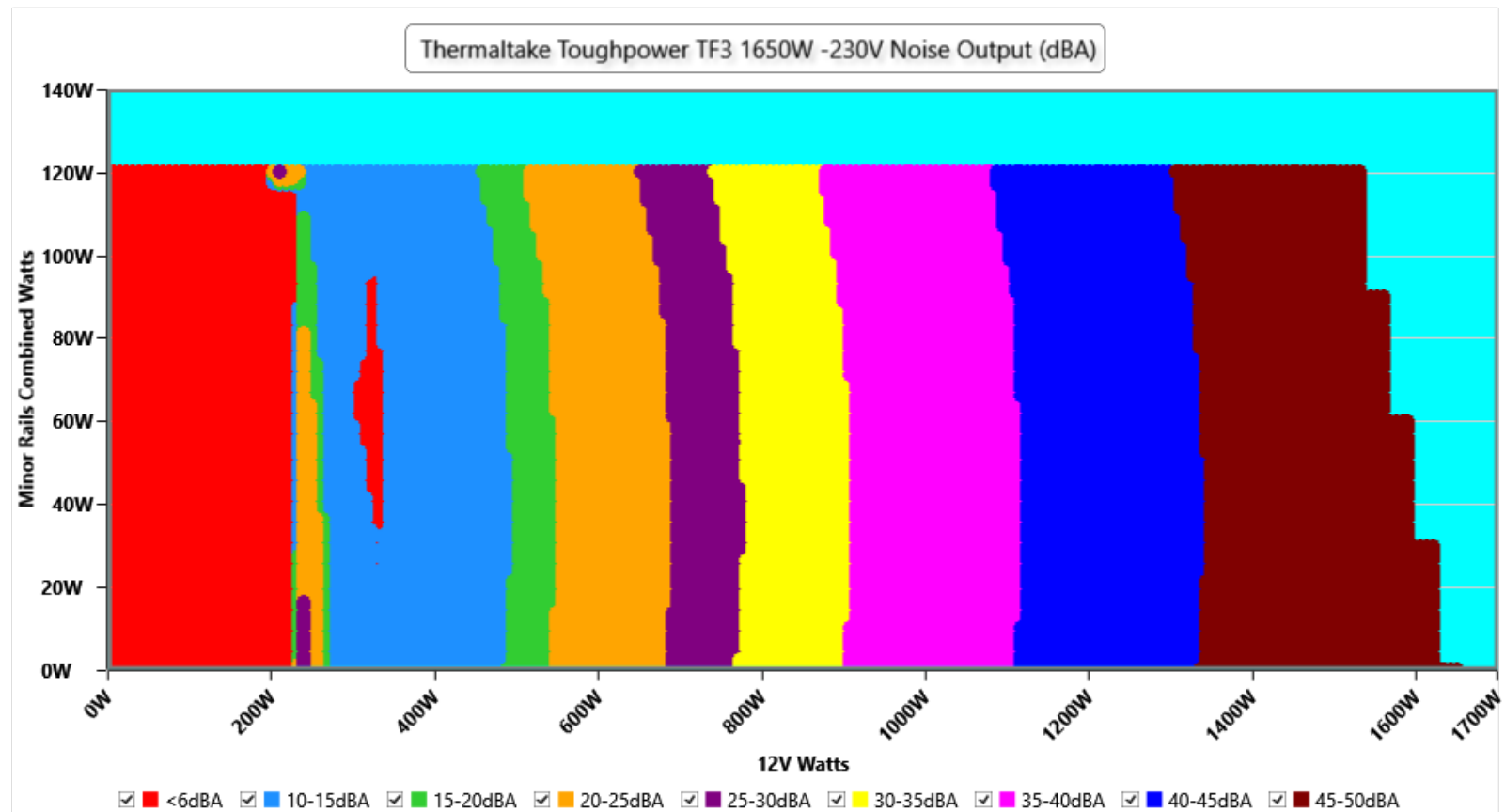
Noise Graph

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

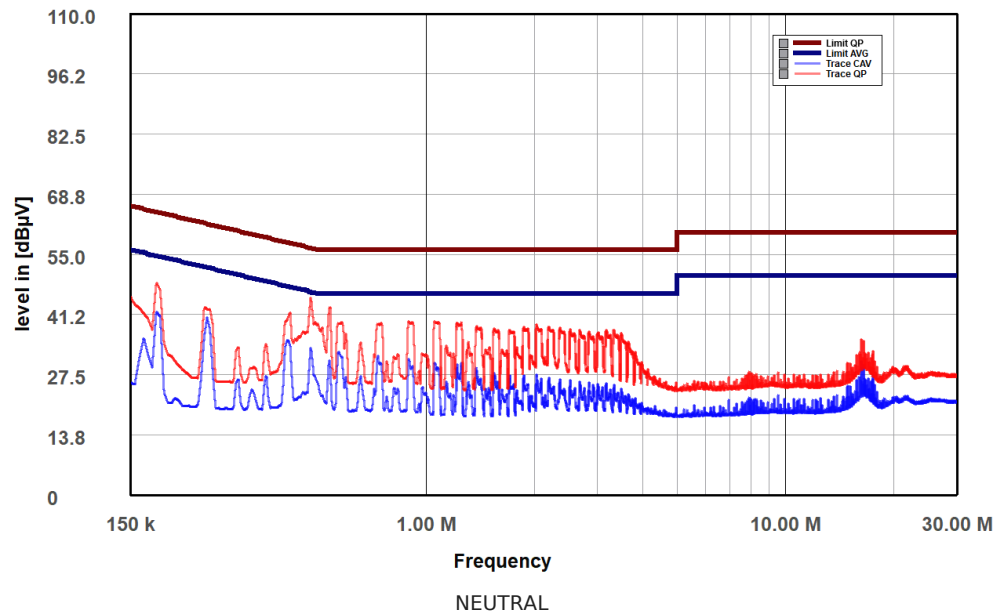


### INFO

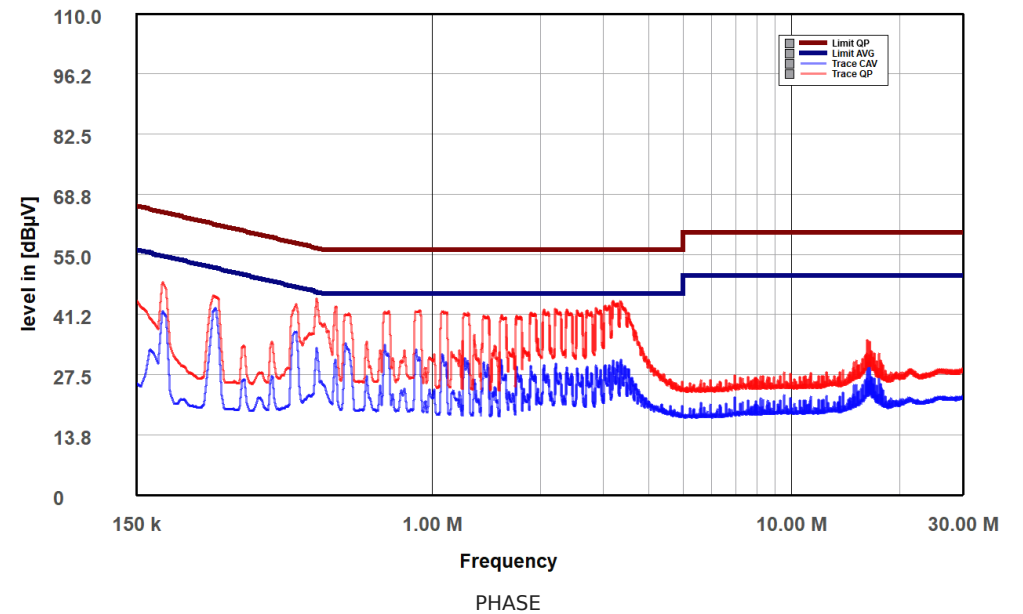
The PSU's noise in its entire operational range and under 30-32 °C ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails

## Conducted Emissions EN 55032 & CISPR 32

Thermaltake Toughpower TF3 1650W (TT16503181) Neutral



Thermaltake Toughpower TF3 1650W (TT16503181) Phase

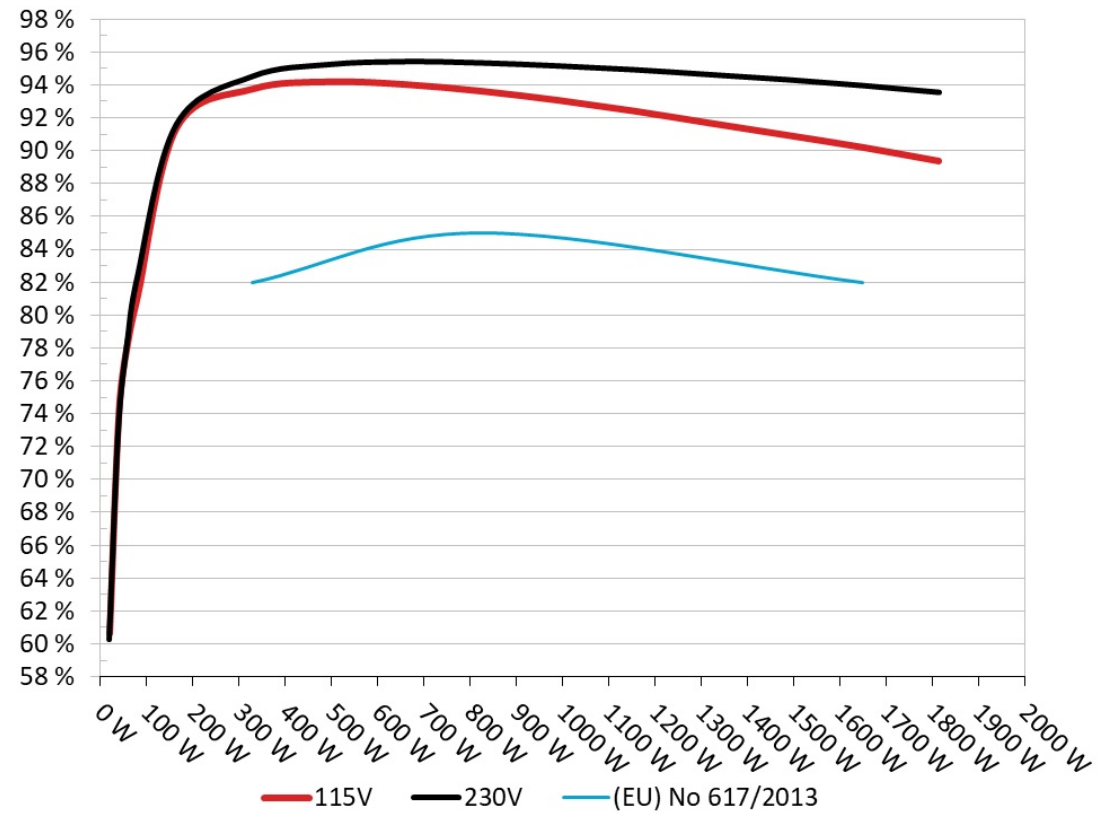


## Indicative Performance

### Efficiency under high ambient temperature

#### Efficiency: Thermaltake Toughpower TF3 1650W

Ambient: 36°C - 48°C (96.8°F - 118.4°F)



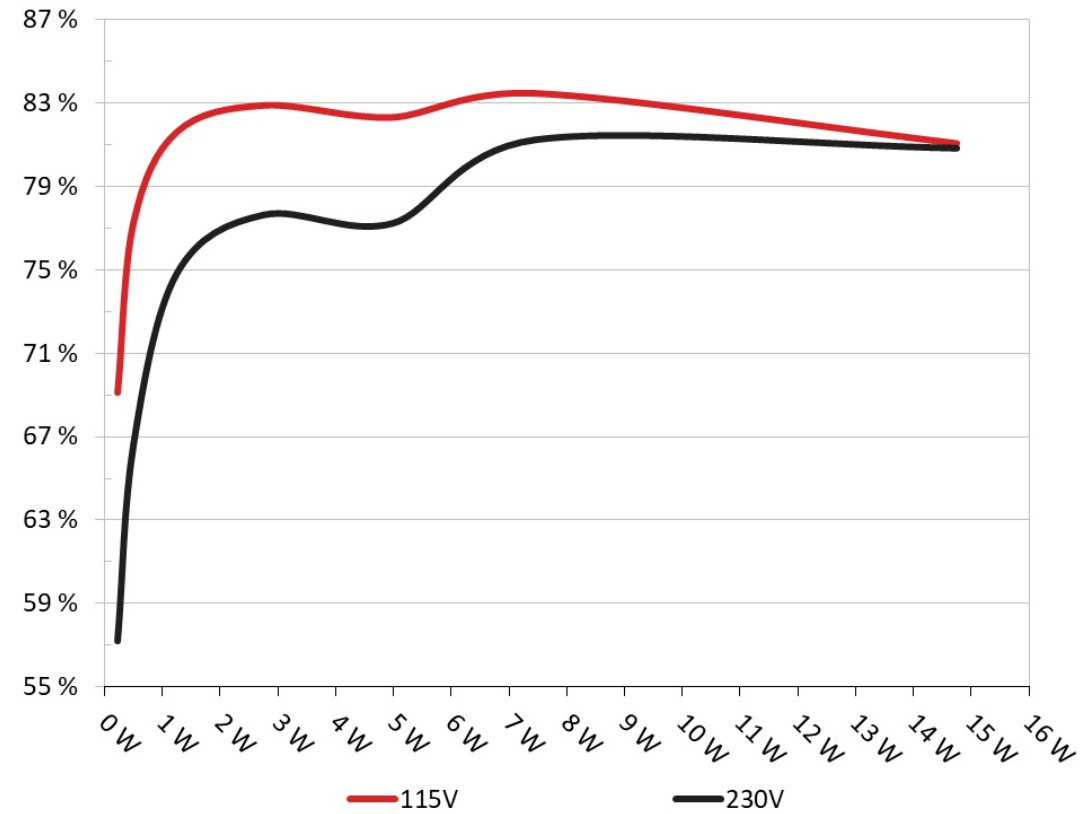
#### INFO

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: Thermaltake Toughpower TF3 1650W

Ambient: 25°C - 30°C (77°F - 86°F)



### 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 | 0.226W        | 69.133%    | 0.015       |
|        | 5.019V | 0.327W        |            | 114.9V      |
| 2      | 0.09A  | 0.452W        | 76.561%    | 0.027       |
|        | 5.018V | 0.59W         |            | 114.9V      |
| 3      | 0.55A  | 2.751W        | 82.865%    | 0.143       |
|        | 5.001V | 3.32W         |            | 114.89V     |
| 4      | 1A     | 4.986W        | 82.293%    | 0.237       |
|        | 4.985V | 6.059W        |            | 114.89V     |
| 5      | 1.5A   | 7.452W        | 83.442%    | 0.31        |
|        | 4.967V | 8.93W         |            | 114.88V     |
| 6      | 3A     | 14.741W       | 81.048%    | 0.433       |
|        | 4.913V | 18.196W       |            | 114.88V     |

#### 230V

| Test # | 5VSB   | DC/AC (Watts) | Efficiency | PF/AC Volts |
|--------|--------|---------------|------------|-------------|
| 1      | 0.045A | 0.226W        | 57.206%    | 0.006       |
|        | 5.019V | 0.397W        |            | 229.9V      |
| 2      | 0.09A  | 0.452W        | 67.078%    | 0.009       |
|        | 5.018V | 0.674W        |            | 229.89V     |
| 3      | 0.55A  | 2.751W        | 77.649%    | 0.048       |
|        | 5.001V | 3.542W        |            | 229.89V     |
| 4      | 1A     | 4.986W        | 77.244%    | 0.086       |
|        | 4.985V | 6.454W        |            | 229.89V     |
| 5      | 1.5A   | 7.452W        | 81.254%    | 0.12        |
|        | 4.967V | 9.172W        |            | 229.88V     |
| 6      | 3A     | 14.741W       | 80.846%    | 0.216       |
|        | 4.913V | 18.234W       |            | 229.89V     |

## Protection Features

|                                        |                                                                                                                                 |
|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| OCP (Normal @ 30.4°C)                  | 12V: 195.20A (141.96%), 12.078V<br>5V: 25.7A (128.50%), 4.967V<br>3.3V: 25.6A (128.00%), 3.288V<br>5VSB: 6.4A (213.33%), 4.781V |
| OCP (Hot @ 45.1°C)                     | 12V: 179.20A (130.33%), 12.080V<br>5V: 25.8A (129.00%), 4.967V<br>3.3V: 25.7A (128.50%), 3.288V<br>5VSB: 6.3A (210.00%), 4.771V |
| OPP (Normal @ 29.5°C)                  | 2332.69W (141.38%)                                                                                                              |
| OPP (Hot @ 44.3°C)                     | 2123.70W (128.71%)                                                                                                              |
| OTP                                    | ✓ (156°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%  | 11.798A  | 1.989A  | 2.002A  | 0.996A | 164.949       | 91.395%    | 502             | 14.5              | 40.4°C         | 0.98        |
|      | 12.150V  | 5.027V  | 3.296V  | 5.022V | 180.475       |            |                 |                   | 43.4°C         | 114.98V     |
| 20%  | 24.624A  | 2.987A  | 3.007A  | 1.196A | 329.951       | 93.752%    | 621             | 21.4              | 40.79°C        | 0.978       |
|      | 12.144V  | 5.021V  | 3.292V  | 5.017V | 351.945       |            |                 |                   | 44.53°C        | 114.94V     |
| 30%  | 37.757A  | 3.488A  | 3.511A  | 1.397A | 494.329       | 94.183%    | 802             | 29.3              | 41.34°C        | 0.985       |
|      | 12.138V  | 5.017V  | 3.289V  | 5.011V | 524.862       |            |                 |                   | 46.05°C        | 114.9V      |
| 40%  | 50.974A  | 3.989A  | 4.016A  | 1.599A | 659.557       | 94.024%    | 1006            | 35.3              | 41.64°C        | 0.986       |
|      | 12.131V  | 5.013V  | 3.286V  | 5.005V | 701.471       |            |                 |                   | 47.85°C        | 114.85V     |
| 50%  | 63.871A  | 4.993A  | 5.026A  | 1.8A   | 824.879       | 93.615%    | 1211            | 40.2              | 42.4°C         | 0.987       |
|      | 12.124V  | 5.007V  | 3.283V  | 5V     | 881.138       |            |                 |                   | 49.69°C        | 114.79V     |
| 60%  | 76.722A  | 5.998A  | 6.038A  | 2A     | 989.392       | 93.068%    | 1399            | 43.6              | 42.95°C        | 0.988       |
|      | 12.117V  | 5.002V  | 3.279V  | 4.995V | 1063.081      |            |                 |                   | 52.45°C        | 114.74V     |
| 70%  | 89.654A  | 7.006A  | 7.052A  | 2.205A | 1154.759      | 92.414%    | 1571            | 46.6              | 43.1°C         | 0.99        |
|      | 12.109V  | 4.996V  | 3.276V  | 4.99V  | 1249.55       |            |                 |                   | 55.5°C         | 114.69V     |
| 80%  | 102.603A | 8.015A  | 8.067A  | 2.307A | 1319.557      | 91.675%    | 1703            | 48.2              | 43.97°C        | 0.992       |
|      | 12.101V  | 4.99V   | 3.272V  | 4.986V | 1439.389      |            |                 |                   | 58.77°C        | 114.63V     |
| 90%  | 115.969A | 8.523A  | 8.563A  | 2.409A | 1484.987      | 90.945%    | 1803            | 49.9              | 44.48°C        | 0.993       |
|      | 12.093V  | 4.986V  | 3.269V  | 4.981V | 1632.834      |            |                 |                   | 62.4°C         | 114.57V     |
| 100% | 129.086A | 9.032A  | 9.092A  | 3.019A | 1649.784      | 90.203%    | 1883            | 50.7              | 45.86°C        | 0.995       |
|      | 12.085V  | 4.982V  | 3.266V  | 4.97V  | 1828.98       |            |                 |                   | 66.89°C        | 114.49V     |
| 110% | 142.100A | 10.046A | 10.205A | 3.02A  | 1814.406      | 89.371%    | 1894            | 50.7              | 47.28°C        | 0.996       |
|      | 12.077V  | 4.976V  | 3.263V  | 4.967V | 2030.198      |            |                 |                   | 72.63°C        | 114.42V     |
| CL1  | 0.116A   | 14.484A | 14.538A | 0A     | 121.311       | 81.86%     | 1398            | 43.6              | 40.92°C        | 0.969       |
|      | 12.148V  | 4.985V  | 3.281V  | 5.062V | 148.261       |            |                 |                   | 59.7°C         | 114.99V     |

| Test       | 12V             | 5V             | 3.3V           | 5VSB          | DC/AC (Watts) | Efficiency | Fan Speed (RPM) | PSU Noise (dB[A]) | Temps (In/Out) | PF/AC Volts |
|------------|-----------------|----------------|----------------|---------------|---------------|------------|-----------------|-------------------|----------------|-------------|
| <b>CL2</b> | <b>0.115A</b>   | <b>20.064A</b> | <b>0A</b>      | <b>0.001A</b> | 101.352       | 78.556%    | 1141            | 36.2              | 40.46°C        | 0.97        |
|            | 12.149V         | 4.981V         | 3.282V         | 5.074V        | 129.018       |            |                 |                   | 53.54°C        | 114.99V     |
| <b>CL3</b> | <b>0.114A</b>   | <b>0A</b>      | <b>20.051A</b> | <b>0A</b>     | 67.386        | 74.208%    | 925             | 33                | 40.48°C        | 0.965       |
|            | 12.145V         | 5.021V         | 3.291V         | 5.035V        | 90.791        |            |                 |                   | 50.86°C        | 115V        |
| <b>CL4</b> | <b>136.466A</b> | <b>0A</b>      | <b>0A</b>      | <b>0A</b>     | 1649.522      | 90.649%    | 1814            | 50.3              | 45.67°C        | 0.993       |
|            | 12.087V         | 5.014V         | 3.279V         | 4.996V        | 1819.688      |            |                 |                   | 60.39°C        | 114.49V     |

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 |
|------------|-----------------|---------------|---------------|---------------|---------------|------------|-----------------|-------------------|----------------|-------------|
| <b>10%</b> | <b>11.800A</b>  | <b>1.99A</b>  | <b>2.003A</b> | <b>0.996A</b> | 164.973       | 91.581%    | 515             | 15.6              | 40.23°C        | 0.861       |
|            | 12.150V         | 5.026V        | 3.295V        | 5.022V        | 180.137       |            |                 |                   | 42.7°C         | 229.87V     |
| <b>20%</b> | <b>24.629A</b>  | <b>2.988A</b> | <b>3.007A</b> | <b>1.196A</b> | 329.988       | 94.517%    | 643             | 22.8              | 40.54°C        | 0.945       |
|            | 12.144V         | 5.021V        | 3.292V        | 5.017V        | 349.136       |            |                 |                   | 43.4°C         | 229.84V     |
| <b>30%</b> | <b>37.766A</b>  | <b>3.488A</b> | <b>3.512A</b> | <b>1.397A</b> | 494.42        | 95.233%    | 822             | 30                | 41.35°C        | 0.973       |
|            | 12.137V         | 5.017V        | 3.289V        | 5.011V        | 519.178       |            |                 |                   | 44.27°C        | 229.81V     |
| <b>40%</b> | <b>50.981A</b>  | <b>3.99A</b>  | <b>4.017A</b> | <b>1.599A</b> | 659.638       | 95.411%    | 1018            | 35.8              | 41.6°C         | 0.986       |
|            | 12.131V         | 5.013V        | 3.286V        | 5.005V        | 691.361       |            |                 |                   | 44.53°C        | 229.79V     |
| <b>50%</b> | <b>63.876A</b>  | <b>4.993A</b> | <b>5.027A</b> | <b>1.8A</b>   | 824.948       | 95.33%     | 1219            | 40.3              | 42.13°C        | 0.993       |
|            | 12.124V         | 5.007V        | 3.283V        | 5V            | 865.366       |            |                 |                   | 45.29°C        | 229.76V     |
| <b>60%</b> | <b>76.725A</b>  | <b>5.999A</b> | <b>6.039A</b> | <b>2A</b>     | 989.46        | 95.152%    | 1404            | 43.6              | 42.91°C        | 0.994       |
|            | 12.117V         | 5.002V        | 3.279V        | 4.995V        | 1039.767      |            |                 |                   | 46.44°C        | 229.73V     |
| <b>70%</b> | <b>89.646A</b>  | <b>7.007A</b> | <b>7.053A</b> | <b>2.205A</b> | 1154.807      | 94.921%    | 1563            | 46.4              | 43.16°C        | 0.996       |
|            | 12.111V         | 4.996V        | 3.276V        | 4.99V         | 1216.594      |            |                 |                   | 47.26°C        | 229.7V      |
| <b>80%</b> | <b>102.591A</b> | <b>8.015A</b> | <b>8.068A</b> | <b>2.307A</b> | 1319.604      | 94.62%     | 1698            | 48.2              | 43.58°C        | 0.996       |
|            | 12.103V         | 4.99V         | 3.272V        | 4.986V        | 1394.628      |            |                 |                   | 48.44°C        | 229.68V     |
| <b>90%</b> | <b>115.949A</b> | <b>8.523A</b> | <b>8.565A</b> | <b>2.41A</b>  | 1485.021      | 94.316%    | 1799            | 49.9              | 44.83°C        | 0.996       |
|            | 12.096V         | 4.986V        | 3.269V        | 4.981V        | 1574.521      |            |                 |                   | 49.87°C        | 229.65V     |

| Test        | 12V             | 5V             | 3.3V           | 5VSB          | DC/AC (Watts) | Efficiency | Fan Speed (RPM) | PSU Noise (dB[A]) | Temps (In/Out) | PF/AC Volts |
|-------------|-----------------|----------------|----------------|---------------|---------------|------------|-----------------|-------------------|----------------|-------------|
| <b>100%</b> | <b>129.069A</b> | <b>9.031A</b>  | <b>9.093A</b>  | <b>3.019A</b> | 1649.813      | 93.953%    | 1876            | 50.7              | 45.5°C         | 0.996       |
|             | 12.087V         | 4.982V         | 3.266V         | 4.969V        | 1756.001      |            |                 |                   | 51.33°C        | 229.62V     |
| <b>110%</b> | <b>142.073A</b> | <b>10.045A</b> | <b>10.206A</b> | <b>3.02A</b>  | 1814.413      | 93.542%    | 1893            | 50.7              | 47.58°C        | 0.996       |
|             | 12.079V         | 4.977V         | 3.262V         | 4.967V        | 1939.679      |            |                 |                   | 53.58°C        | 229.59V     |
| <b>CL1</b>  | <b>0.116A</b>   | <b>14.481A</b> | <b>14.539A</b> | <b>0A</b>     | 121.318       | 82.839%    | 1354            | 42.6              | 40.98°C        | 0.825       |
|             | 12.148V         | 4.986V         | 3.28V          | 5.062V        | 146.471       |            |                 |                   | 46.4°C         | 229.87V     |
| <b>CL2</b>  | <b>0.116A</b>   | <b>20.06A</b>  | <b>0A</b>      | <b>0.001A</b> | 101.362       | 81.545%    | 1029            | 36.2              | 40.43°C        | 0.793       |
|             | 12.151V         | 4.983V         | 3.281V         | 5.075V        | 124.304       |            |                 |                   | 44.6°C         | 229.88V     |
| <b>CL3</b>  | <b>0.115A</b>   | <b>0A</b>      | <b>20.053A</b> | <b>0A</b>     | 67.391        | 74.447%    | 900             | 32.1              | 41.68°C        | 0.71        |
|             | 12.145V         | 5.02V          | 3.291V         | 5.035V        | 90.527        |            |                 |                   | 44.55°C        | 229.88V     |
| <b>CL4</b>  | <b>136.439A</b> | <b>0A</b>      | <b>0A</b>      | <b>0A</b>     | 1649.543      | 94.243%    | 1804            | 49.9              | 45.54°C        | 0.996       |
|             | 12.090V         | 5.014V         | 3.278V         | 4.995V        | 1750.294      |            |                 |                   | 49.5°C         | 229.62V     |

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 |
|------------|---------------|---------------|-------------|---------------|---------------|------------|-----------------|-------------------|----------------|-------------|
| <b>20W</b> | <b>1.222A</b> | <b>0.497A</b> | <b>0.5A</b> | <b>0.199A</b> | 19.997        | 60.674%    | 0               | <6.0              | 41.05°C        | 0.822       |
|            | 12.150V       | 5.034V        | 3.3V        | 5.035V        | 32.956        |            |                 |                   | 36.17°C        | 115.02V     |
| <b>40W</b> | <b>2.690A</b> | <b>0.695A</b> | <b>0.7A</b> | <b>0.298A</b> | 39.997        | 74.1%      | 0               | <6.0              | 41.3°C         | 0.922       |
|            | 12.149V       | 5.034V        | 3.299V      | 5.033V        | 53.978        |            |                 |                   | 37.27°C        | 115.01V     |
| <b>60W</b> | <b>4.160A</b> | <b>0.894A</b> | <b>0.9A</b> | <b>0.397A</b> | 59.997        | 78.488%    | 0               | <6.0              | 43.14°C        | 0.943       |
|            | 12.148V       | 5.033V        | 3.299V      | 5.033V        | 76.445        |            |                 |                   | 38.31°C        | 115.01V     |
| <b>80W</b> | <b>5.622A</b> | <b>1.093A</b> | <b>1.1A</b> | <b>0.497A</b> | 79.934        | 81.086%    | 636             | 22.6              | 39.35°C        | 0.963       |
|            | 12.151V       | 5.032V        | 3.298V      | 5.031V        | 98.584        |            |                 |                   | 42.65°C        | 115V        |

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 |
|------------|---------------|---------------|---------------|---------------|---------------|------------|-----------------|-------------------|----------------|-------------|
| <b>20W</b> | <b>1.223A</b> | <b>0.497A</b> | <b>0.5A</b>   | <b>0.199A</b> | 20.005        | 60.305%    | 0               | <6.0              | 42.7°C         | 0.389       |
|            | 12.146V       | 5.034V        | 3.299V        | 5.035V        | 33.18         |            |                 |                   | 36.5°C         | 229.88V     |
| <b>40W</b> | <b>2.692A</b> | <b>0.695A</b> | <b>0.7A</b>   | <b>0.298A</b> | 40.005        | 73.256%    | 574             | 19.1              | 37.32°C        | 0.553       |
|            | 12.145V       | 5.034V        | 3.299V        | 5.034V        | 54.619        |            |                 |                   | 41.87°C        | 229.89V     |
| <b>60W</b> | <b>4.160A</b> | <b>0.894A</b> | <b>0.9A</b>   | <b>0.398A</b> | 60.005        | 78.574%    | 472             | 12.6              | 38.77°C        | 0.664       |
|            | 12.146V       | 5.032V        | 3.298V        | 5.031V        | 76.378        |            |                 |                   | 41.99°C        | 229.89V     |
| <b>80W</b> | <b>5.624A</b> | <b>1.093A</b> | <b>1.101A</b> | <b>0.497A</b> | 79.951        | 82.191%    | 521             | 15.9              | 39.27°C        | 0.728       |
|            | 12.149V       | 5.031V        | 3.298V        | 5.03V         | 97.271        |            |                 |                   | 42.3°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   | 28.69mV | 20.99mV | 21.60mV | 16.78mV | Pass      |
| 20% Load   | 31.91mV | 20.79mV | 21.29mV | 17.19mV | Pass      |
| 30% Load   | 37.90mV | 25.56mV | 23.70mV | 17.34mV | Pass      |
| 40% Load   | 32.27mV | 21.40mV | 22.93mV | 17.55mV | Pass      |
| 50% Load   | 34.63mV | 21.50mV | 23.40mV | 16.93mV | Pass      |
| 60% Load   | 70.89mV | 23.51mV | 24.11mV | 18.57mV | Pass      |
| 70% Load   | 34.22mV | 22.33mV | 24.52mV | 18.37mV | Pass      |
| 80% Load   | 34.12mV | 22.68mV | 24.47mV | 18.58mV | Pass      |
| 90% Load   | 38.77mV | 22.73mV | 25.91mV | 20.63mV | Pass      |
| 100% Load  | 37.23mV | 23.15mV | 23.75mV | 20.42mV | Pass      |
| 110% Load  | 40.35mV | 25.40mV | 25.75mV | 20.73mV | Pass      |
| Crossload1 | 42.50mV | 21.66mV | 24.32mV | 17.80mV | Pass      |
| Crossload2 | 26.29mV | 24.94mV | 23.14mV | 19.55mV | Pass      |

| Test       | 12V     | 5V      | 3.3V    | 5VSB    | Pass/Fail |
|------------|---------|---------|---------|---------|-----------|
| Crossload3 | 28.85mV | 21.45mV | 25.45mV | 16.21mV | Pass      |
| Crossload4 | 37.08mV | 21.61mV | 22.68mV | 18.27mV | Pass      |

The results above are not used in the certification process

## 230V

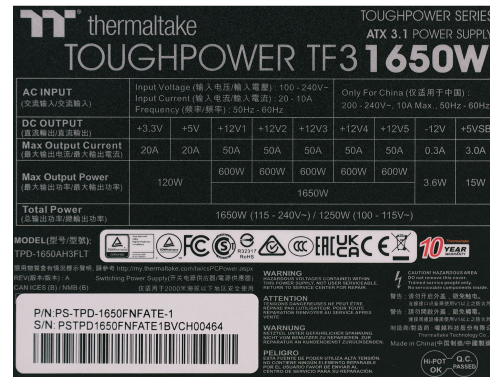
| Test       | 12V     | 5V      | 3.3V    | 5VSB    | Pass/Fail |
|------------|---------|---------|---------|---------|-----------|
| 10% Load   | 32.07mV | 21.04mV | 21.55mV | 16.93mV | Pass      |
| 20% Load   | 70.32mV | 23.97mV | 25.50mV | 15.85mV | Pass      |
| 30% Load   | 56.16mV | 20.99mV | 24.27mV | 17.14mV | Pass      |
| 40% Load   | 33.45mV | 20.22mV | 21.75mV | 16.88mV | Pass      |
| 50% Load   | 33.04mV | 19.76mV | 24.57mV | 16.68mV | Pass      |
| 60% Load   | 32.38mV | 18.73mV | 23.50mV | 16.73mV | Pass      |
| 70% Load   | 33.35mV | 20.89mV | 24.73mV | 19.03mV | Pass      |
| 80% Load   | 39.23mV | 26.12mV | 25.34mV | 18.88mV | Pass      |
| 90% Load   | 50.28mV | 23.15mV | 24.78mV | 20.83mV | Pass      |
| 100% Load  | 44.24mV | 22.32mV | 26.47mV | 20.47mV | Pass      |
| 110% Load  | 39.02mV | 22.22mV | 23.91mV | 19.29mV | Pass      |
| Crossload1 | 62.55mV | 23.56mV | 25.86mV | 17.55mV | Pass      |
| Crossload2 | 50.48mV | 23.66mV | 23.55mV | 18.42mV | Pass      |
| Crossload3 | 23.27mV | 19.55mV | 23.40mV | 16.27mV | Pass      |
| Crossload4 | 37.39mV | 20.53mV | 22.16mV | 17.19mV | Pass      |

The results above are not used in the certification process

## Thermaltake Toughpower TF3 1650W



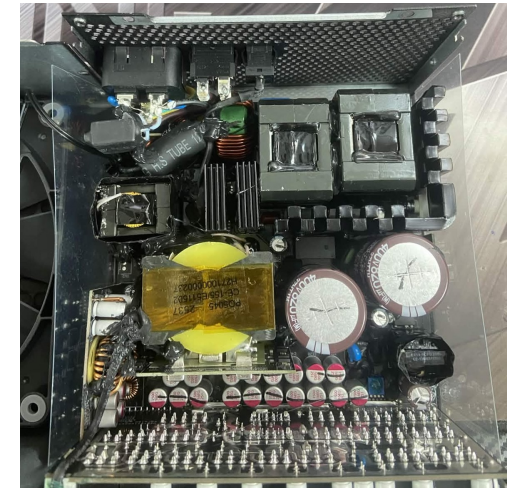
Top side



### Power specifications label



Fan



PSU Internals

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

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