

**SAMA** 先马

**SAMA GT650W**

Serial Number

Lab ID SM65002570

Certification ID 252570

Test Result Report ID: 24PS2570A

Certificate Issue Date: Sep 17, 2024

Scheme: ETA-EMI PSU

115V



230V



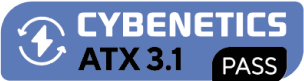
115V



230V



Scheme: LAMBDA PSU



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                             | SAMA    |
| Model                             | GT650W  |
| OEM/ODM                           | RSY     |
| Serial Number                     |         |
| Product Specifications            |         |
| Manufacturer-Provided Information |         |
| Rated Voltage (Vrms)              | 100-240 |
| Rated Current (Arms)              | 10      |

|                                                   |                                                                                     |
|---------------------------------------------------|-------------------------------------------------------------------------------------|
| Rated Frequency (Hz)                              | 50-60                                                                               |
| Rated Power (W)                                   | 650                                                                                 |
| Operating Temperature (Continuous Full Load) (°C) |                                                                                     |
| Type                                              | ATX12V                                                                              |
| Cable Design                                      | Fully Modular                                                                       |
| Warranty                                          | -                                                                                   |
| Cybenetics Measurements                           |                                                                                     |
| Dimensions (W x H x D)                            |                                                                                     |
| Weight                                            |                                                                                     |
| Cooling                                           | 120mm Fluid Dynamic Bearing Fan (S1202512L)                                         |
| Semi-Passive Operation                            | x                                                                                   |
| Cybenetics Testing Information                    |                                                                                     |
| Lab ID                                            | SM65002570                                                                          |
| Date of receipt                                   | Sep 4, 2024                                                                         |
| Testing Date                                      | Sep 16, 2024                                                                        |
| Report Issued Date                                | Sep 17, 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 (550mm)                  | 1           | 1                       | 16-24AWG | No                  |
| 4+4 pin EPS12V (600mm+150mm)                    | 1           | 2                       | 18AWG    | No                  |
| 6+2 pin PCIe (550mm+150mm)                      | 1           | 2                       | 18AWG    | No                  |
| 12+2 pin PCIe (600mm) (450W)                    | 1           | 1                       | 16-24AWG | No                  |
| SATA (460mm+150mm+150mm) / 4-pin Molex (+150mm) | 2           | 6 / 2                   | 18AWG    | No                  |

### Protection Features(Manufacturer)

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

### Power Specifications

|                      |       |      |    |       |      |      |
|----------------------|-------|------|----|-------|------|------|
| Rail                 |       | 3.3V | 5V | 12V   | 5VSB | -12V |
| Max. Power           | Amps  | 20   | 20 | 54.1  | 2.5  | 0.4  |
|                      | Watts | 100  |    | 649.2 | 12.5 | 4.8  |
| Total Max. Power (W) |       | 650  |    |       |      |      |

### Parts Description

|                     |                                                            |
|---------------------|------------------------------------------------------------|
| <b>General Data</b> |                                                            |
| Manufacturer (OEM)  | RSY                                                        |
| PCB Type            | Double-Sided                                               |
| <b>Primary Side</b> |                                                            |
| Transient Filter    | 6x Y caps, 3x X caps, 2x CM chokes, 1x MOV                 |
| Inrush Protection   | 1x NTC Thermistor MF72 2.5-D11 (2.5 ohm) & Relay           |
| Bridge Rectifier(s) | 1x GBU1006 (600V, 10A @ 100°C)                             |
| APFC MOSFETs        | 4x Shenzhen SIF13N50C (500V, 8A @ 100°C, Rds(on): 0.55Ohm) |
| APFC Boost Diode    | 1x STMicroelectronics STTH8R06FP (600V, 8A @ 85°C)         |
| Bulk Cap(s)         | 1x Rubycon (420V, 270uF, 3,000h @ 105°C, MXK)              |

|                        |                                                                                                                                                    |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| Main Switchers         | 2x Convert CS25N50FF (500V, 25A @ 25°C, Rds(on): 0.24Ohm) & 1x Sync Power CorpSPN5003 (For no load consumption)                                    |
| Resonant Controller    | Texas Instrument UCC25600                                                                                                                          |
| APFC Controller        | Texas Instrument UCC28180                                                                                                                          |
| Topology               | Primary side: APFC, Half-Bridge & LLC converter Secondary side: Synchronous Rectification & DC-DC converters                                       |
| <b>Secondary Side</b>  |                                                                                                                                                    |
| +12V MOSFETs           | 4x Maplesemi SLP130N04T (40V, 84A @ 100°C, Rds(on): 3.0mOhm)                                                                                       |
| 5V & 3.3V              | DC-DC Converters: 4x Infineon BSC0906NS (30V, 40A @ 100°C, Rds(on): 4.5mOhm) PWM Controller(s): 2x AnpecAPW7164                                    |
| Filtering Capacitors   | Electrolytic: 15x Teapo (2-6,000h @105°C, SY) 5x Teapo (2-6,000h @105°C, SJ) 1x Teapo (2,000h @105°C, SC) 1x Teapo (2,000h @105°C, H7) Polymer: 6x |
| Supervisor IC          | IN1S313I-SAG                                                                                                                                       |
| Fan Model              | Globe Fan S1202512L (120mm, 12V, 0.18A, Fluid Dynamic Bearing Fan)                                                                                 |
| <b>5VSB</b>            |                                                                                                                                                    |
| Rectifier              | US1D                                                                                                                                               |
| Standby PWM Controller | First Semiconductor FIR4N70L VDMOSFET (700V, 2.5A)                                                                                                 |

## 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)           | 88.531%  |
| Average Noise Output (>1450 Load Combinations)         | 33.94dBA |
| Average PF (>1450 Load Combinations)                   | 0.989    |
| Efficiency With 10W ( $\leq 500W$ ) or 2% (>500W) Load | 64.681%  |
| Standby Power Consumption                              | 0.0550W  |
| Non-Accredited                                         |          |
| 12V Ripple (Full Load)                                 | 29.52mV  |
| 5V Ripple (Full Load)                                  | 16.98mV  |
| 3.3V Ripple (Full Load)                                | 16.67mV  |
| 5VSB Ripple (Full Load)                                | 19.15mV  |
| 12V Load Regulation                                    | 0.10%    |
| 5V Load Regulation                                     | 1.75%    |
| 3.3V Load Regulation                                   | 3.33%    |
| 5VSB Load Regulation                                   | 2.81%    |
| Inrush Current                                         | 53.690A  |

### 230V

|                                                        |          |
|--------------------------------------------------------|----------|
| Accredited                                             |          |
| Average Efficiency (>1450 load combinations)           | 90.600%  |
| Average Noise Output (>1450 Load Combinations)         | 34.58dBA |
| Average PF (>1450 Load Combinations)                   | 0.960    |
| Efficiency With 10W ( $\leq 500W$ ) or 2% (>500W) Load | 62.376%  |
| Standby Power Consumption                              | 0.1251W  |
| Non-Accredited                                         |          |
| 12V Ripple (Full Load)                                 | 30.63mV  |
| 5V Ripple (Full Load)                                  | 16.41mV  |
| 3.3V Ripple (Full Load)                                | 15.52mV  |

|                                  |                           |                           |
|----------------------------------|---------------------------|---------------------------|
| 5VSB Ripple (Full Load)          | 18.46mV                   |                           |
| 12V Load Regulation              | 0.09%                     |                           |
| 5V Load Regulation               | 1.79%                     |                           |
| 3.3V Load Regulation             | 3.36%                     |                           |
| 5VSB Load Regulation             | 2.85%                     |                           |
| Inrush Current                   | 94.850A                   |                           |
| 12V Transient Response (200%)    | 11.48V                    |                           |
| 5V Transient Response (200%)     | 4.965V                    |                           |
| 3.3V Transient Response (200%)   | 3.163V                    |                           |
| 5VSB Transient Response (200%)   | 4.940V                    |                           |
| Hold-Up Time & PWR_OK Signal     | 16.60ms                   |                           |
| AC Loss to PWR_OK Hold Up Time   | 14.50ms                   |                           |
| PWR_OK Inactive to DC Loss Delay | 2.10ms                    |                           |
| PSU Timings: T1 (20% / 100%)     | 123.0ms                   | 126.0ms                   |
| PSU Timings: T3 (20% / 100%)     | 113.0ms                   | 114.0ms                   |
| 12V OCP (28.6°C / 44.2°C)        | 85.60A (158.23%), 12.158V | 86.40A (159.70%), 12.168V |
| 5V OCP (28.6°C / 44.2°C)         | 35.8A (179.00%), 5.046V   | 35.3A (176.50%), 5.047V   |
| 3.3V OCP (28.6°C / 44.2°C)       | 35.5A (177.50%), 3.275V   | 34.2A (171.00%), 3.274V   |
| 5VSB OCP (28.6°C / 44.2°C)       | 4A (160.00%), 5.019V      | 3.9A (156.00%), 5.017V    |
| OPP (26.65°C / 44.78°C)          | 149.80%                   | 149.80%                   |

## Hold-Up Time & PWR\_OK Signal

|                                       |      |
|---------------------------------------|------|
| Hold-Up Time (ms)                     | 16.6 |
| AC Loss to PWR_OK Hold Up Time (ms)   | 14.5 |
| PWR_OK Inactive to DC Loss Delay (ms) | 2.1  |

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### Tables

#### 115V

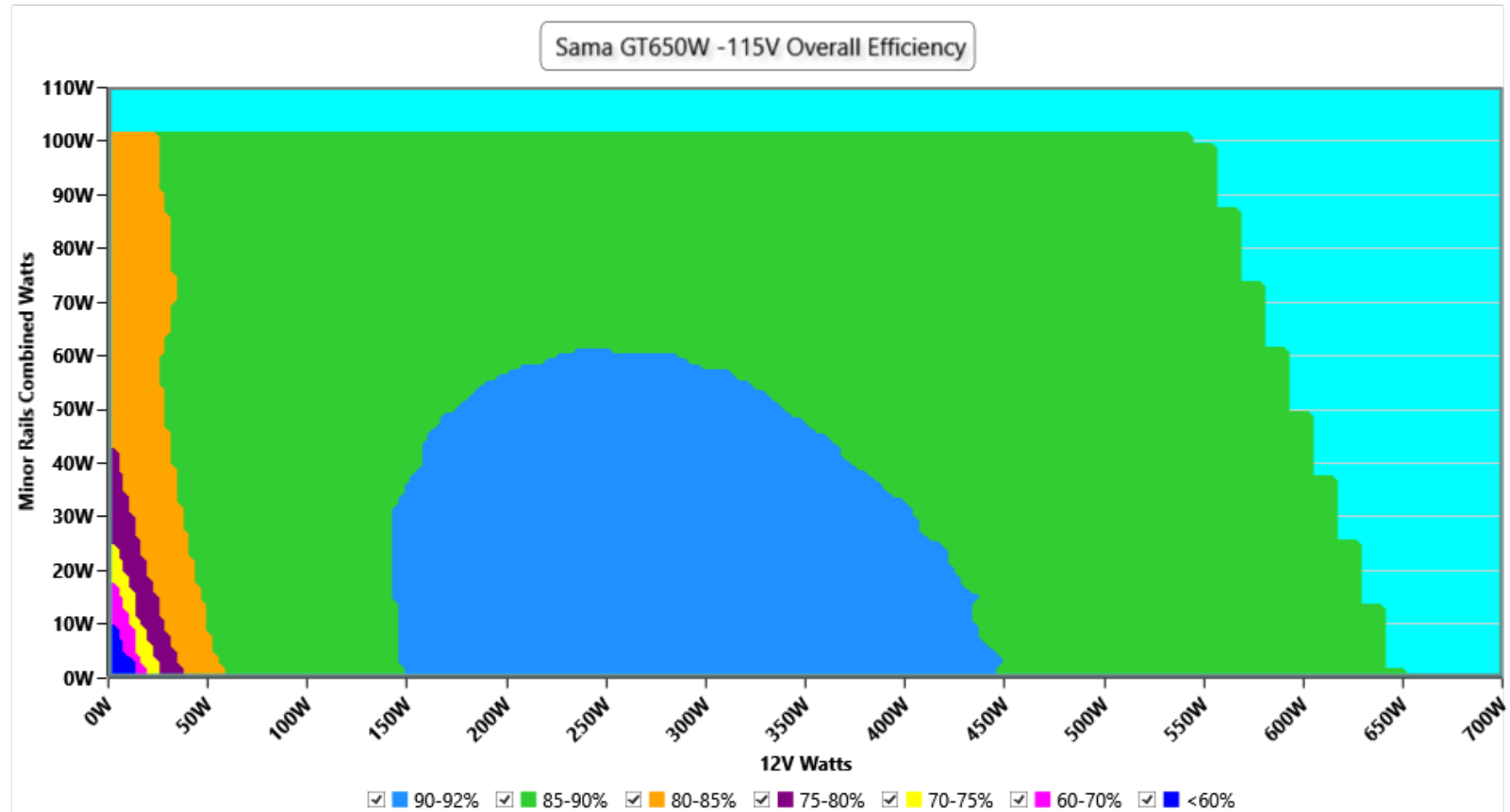
| Detailed Results   |          |          |           |          |           |        |
|--------------------|----------|----------|-----------|----------|-----------|--------|
|                    | Average  | Min      | Limit Min | Max      | Limit Max | Result |
| Mains Voltage RMS: | 115.08 V | 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       | 0.19 %   | 2.00 %    | PASS   |
| Real Power:        | 0.055 W  | 0.004 W  | N/A       | 0.090 W  | N/A       | N/A    |
| Apparent Power:    | 3.739 W  | 3.620 W  | N/A       | 3.844 W  | N/A       | N/A    |
| Power Factor:      | 0.019    | N/A      | N/A       | N/A      | N/A       | N/A    |

#### 230V

| Detailed Results   |          |          |           |          |           |        |
|--------------------|----------|----------|-----------|----------|-----------|--------|
|                    | Average  | Min      | Limit Min | Max      | Limit Max | Result |
| Mains Voltage RMS: | 231.04 V | 230.92 V | 227.70 V  | 231.09 V | 232.30 V  | PASS   |
| Mains Frequency:   | 50.00 Hz | 49.99 Hz | 49.50 Hz  | 50.01 Hz | 50.50 Hz  | PASS   |
| Mains Voltage CF:  | 1.417    | 1.416    | 1.340     | 1.419    | 1.490     | PASS   |
| Mains Voltage THD: | 0.17 %   | 0.15 %   | N/A       | 0.26 %   | 2.00 %    | PASS   |
| Real Power:        | 0.125 W  | 0.086 W  | N/A       | 0.180 W  | N/A       | N/A    |
| Apparent Power:    | 12.405 W | 12.182 W | N/A       | 12.588 W | N/A       | N/A    |
| Power Factor:      | 0.011    | N/A      | N/A       | N/A      | N/A       | N/A    |

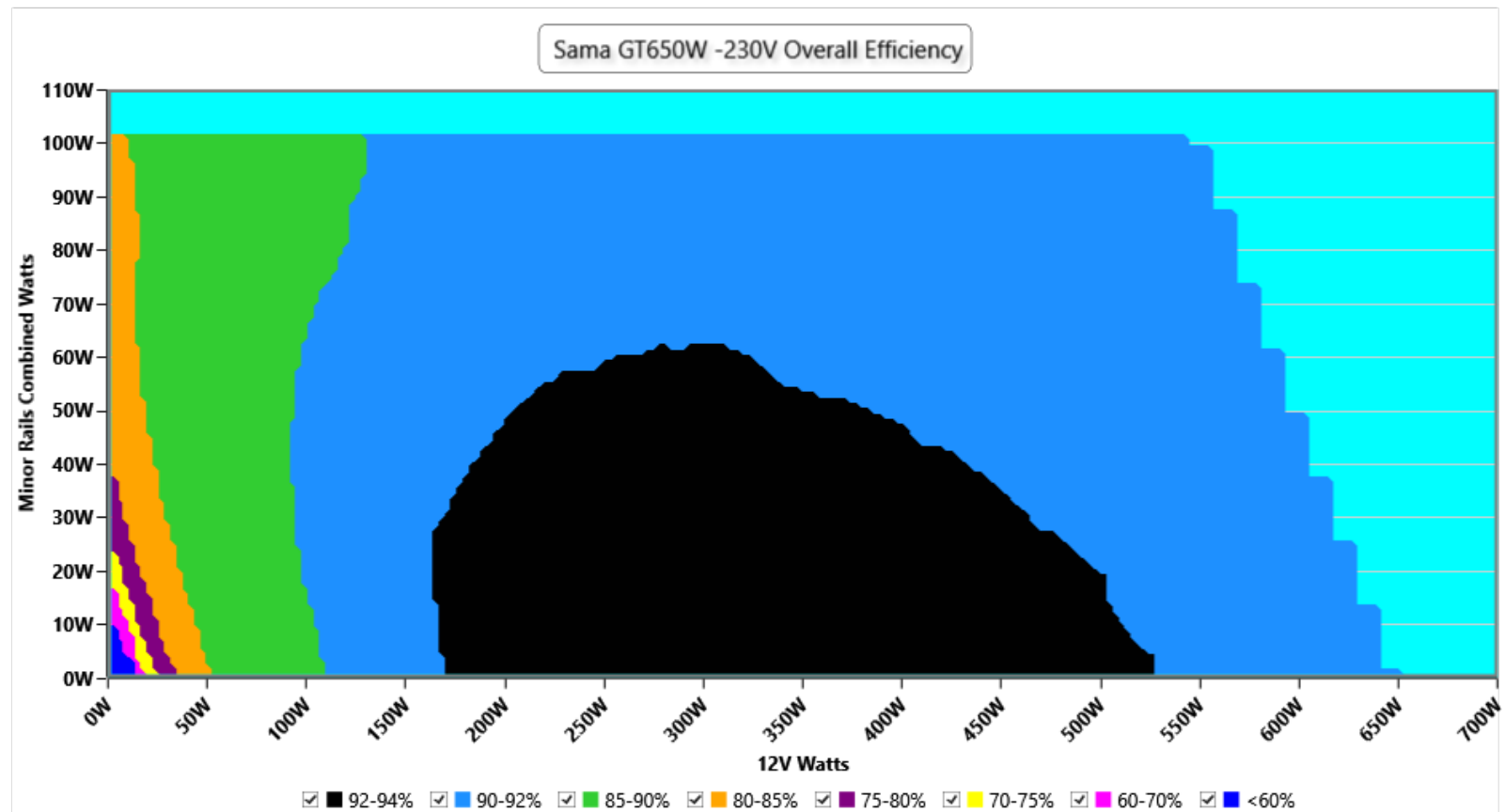
## Efficiency Graph

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

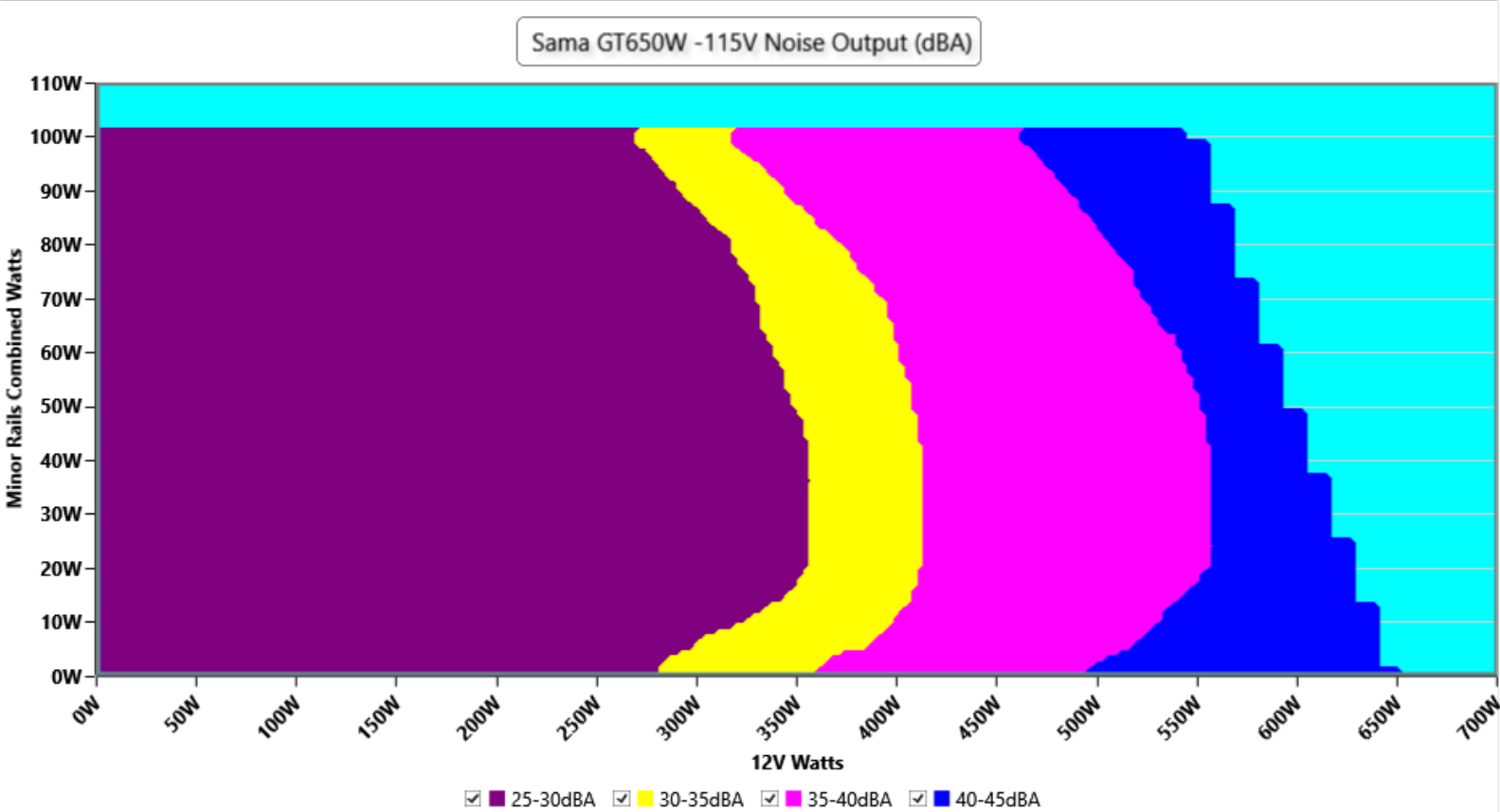


### INFO

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

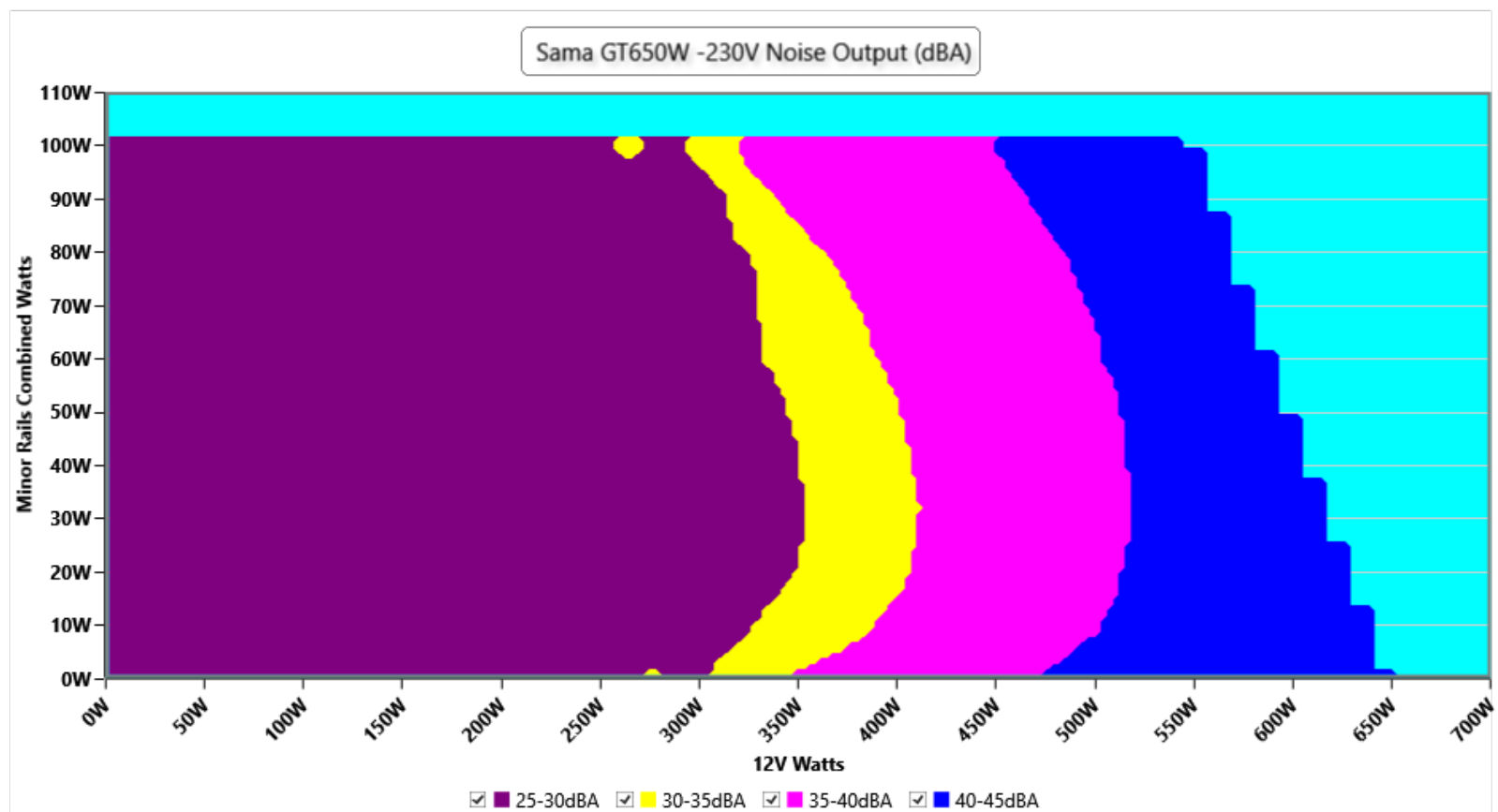
# Noise Graph

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

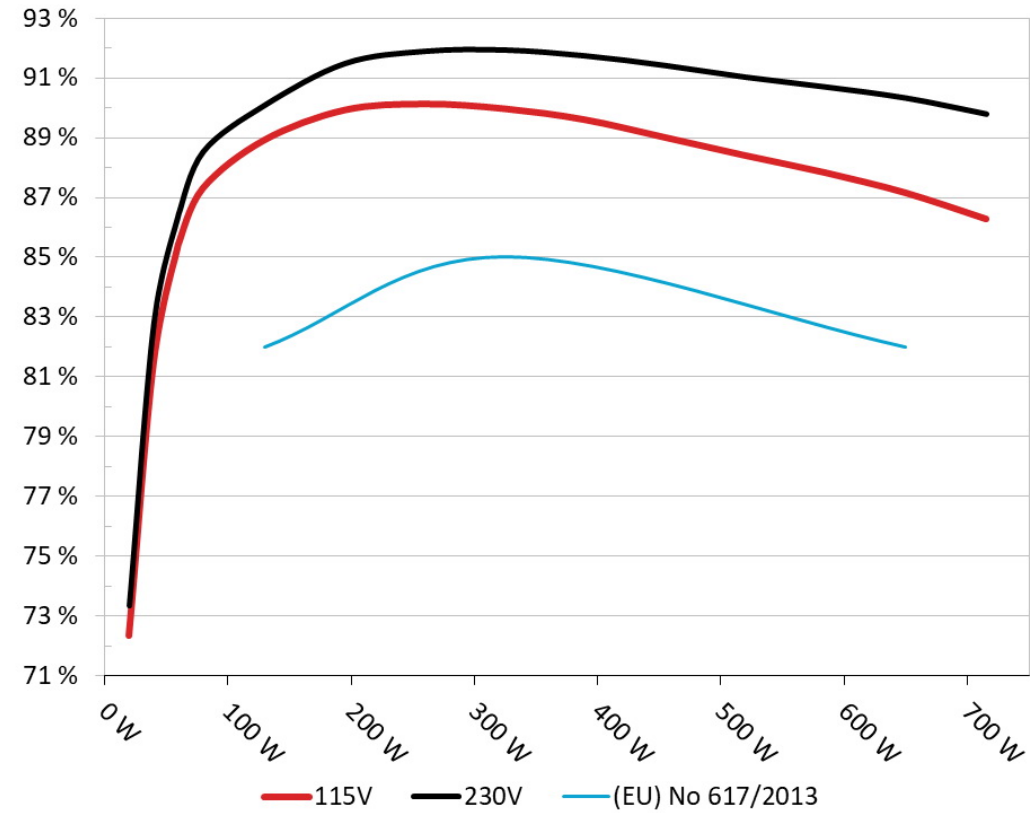
The PSU's noise in its entire operational range and under 30-32 °C ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails

## Indicative Performance

### Efficiency under high ambient temperature

#### Efficiency: SAMA GT650

Ambient: 36°C - 46°C (96.8°F - 114.8°F)



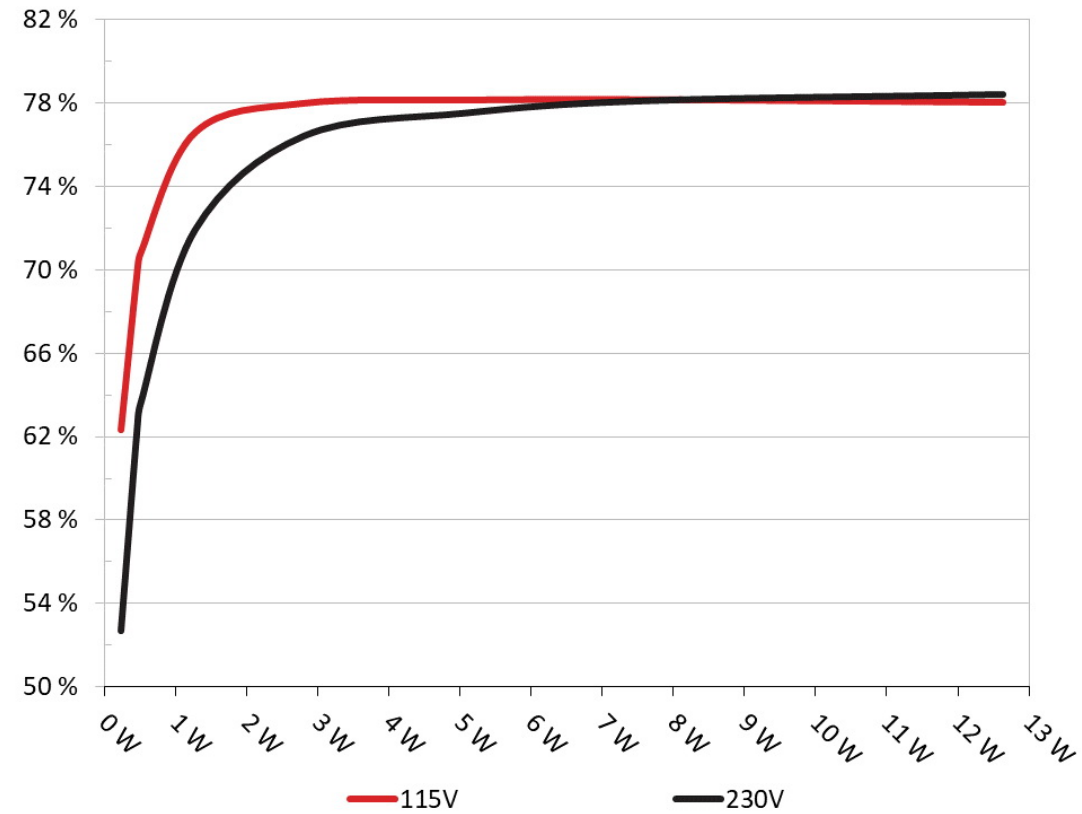
#### INFO

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: SAMA GT650

Ambient: 34°C - 36°C (93.2°F - 96.8°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 | 0.229W        | 62.344%    | 0.076       |
|        | 5.097V | 0.322W        |            | 115.17V     |
| 2      | 0.09A  | 0.459W        | 69.968%    | 0.145       |
|        | 5.095V | 0.656W        |            | 115.17V     |
| 3      | 0.55A  | 2.799W        | 78.002%    | 0.365       |
|        | 5.087V | 3.589W        |            | 115.17V     |
| 4      | 1A     | 5.081W        | 78.155%    | 0.418       |
|        | 5.079V | 6.5W          |            | 115.17V     |
| 5      | 1.5A   | 7.608W        | 78.178%    | 0.438       |
|        | 5.071V | 9.731W        |            | 115.17V     |
| 6      | 2.501A | 12.633W       | 78.046%    | 0.47        |
|        | 5.052V | 16.186W       |            | 115.16V     |

#### 230V

| Test # | 5VSB   | DC/AC (Watts) | Efficiency | PF/AC Volts |
|--------|--------|---------------|------------|-------------|
| 1      | 0.045A | 0.229W        | 52.689%    | 0.033       |
|        | 5.096V | 0.435W        |            | 230.39V     |
| 2      | 0.09A  | 0.459W        | 62.484%    | 0.055       |
|        | 5.095V | 0.735W        |            | 230.39V     |
| 3      | 0.55A  | 2.8W          | 76.39%     | 0.213       |
|        | 5.089V | 3.669W        |            | 230.41V     |
| 4      | 1A     | 5.081W        | 77.495%    | 0.289       |
|        | 5.08V  | 6.556W        |            | 230.39V     |
| 5      | 1.5A   | 7.609W        | 78.08%     | 0.325       |
|        | 5.071V | 9.744W        |            | 230.41V     |
| 6      | 2.501A | 12.635W       | 78.382%    | 0.367       |
|        | 5.053V | 16.121W       |            | 230.4V      |

Protection Features

|                        |                                                                                                                                |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| OCP (Normal @ 28.6°C)  | 12V: 85.60A (158.23%), 12.158V<br>5V: 35.8A (179.00%), 5.046V<br>3.3V: 35.5A (177.50%), 3.275V<br>5VSB: 4A (160.00%), 5.019V   |
| OCP (Hot @ 44.2°C)     | 12V: 86.40A (159.70%), 12.168V<br>5V: 35.3A (176.50%), 5.047V<br>3.3V: 34.2A (171.00%), 3.274V<br>5VSB: 3.9A (156.00%), 5.017V |
| OPP (Normal @ 26.6°C)  | 973.70W (149.80%)                                                                                                              |
| OPP (Hot @ 44.8°C)     | 973.72W (149.80%)                                                                                                              |
| OTP                    | ✓ (153°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%  | 3.570A  | 1.957A | 1.973A | 0.987A | 65.005        | 84.96%     | 992             | 26.3              | 40.16°C        | 0.957       |
|      | 12.157V | 5.11V  | 3.345V | 5.069V | 76.513        |            |                 |                   | 41.91°C        | 115.14V     |

| Test | 12V     | 5V      | 3.3V    | 5VSB   | DC/AC (Watts) | Efficiency | Fan Speed (RPM) | PSU Noise (dB[A]) | Temps (In/Out) | PF/AC Volts |
|------|---------|---------|---------|--------|---------------|------------|-----------------|-------------------|----------------|-------------|
| 20%  | 8.147A  | 2.941A  | 2.97A   | 1.187A | 129.95        | 88.94%     | 996             | 26.8              | 40.8°C         | 0.987       |
|      | 12.157V | 5.102V  | 3.334V  | 5.056V | 146.109       |            |                 |                   | 42.67°C        | 115.11V     |
| 30%  | 13.070A | 3.437A  | 3.475A  | 1.388A | 194.96        | 89.942%    | 1001            | 27.1              | 41.06°C        | 0.988       |
|      | 12.158V | 5.094V  | 3.324V  | 5.043V | 216.757       |            |                 |                   | 43.75°C        | 115.1V      |
| 40%  | 17.999A | 3.934A  | 3.984A  | 1.591A | 260.045       | 90.144%    | 1342            | 33.8              | 41.89°C        | 0.991       |
|      | 12.158V | 5.085V  | 3.314V  | 5.031V | 288.477       |            |                 |                   | 44.4°C         | 115.08V     |
| 50%  | 22.578A | 4.927A  | 4.997A  | 1.794A | 325.041       | 89.984%    | 1571            | 39.3              | 42.21°C        | 0.993       |
|      | 12.160V | 5.076V  | 3.302V  | 5.017V | 361.222       |            |                 |                   | 44.36°C        | 115.06V     |
| 60%  | 27.116A | 5.923A  | 6.017A  | 1.999A | 389.566       | 89.62%     | 1799            | 40.7              | 42.71°C        | 0.994       |
|      | 12.160V | 5.067V  | 3.291V  | 5.003V | 434.69        |            |                 |                   | 45.78°C        | 115.04V     |
| 70%  | 31.717A | 6.924A  | 7.047A  | 2.206A | 454.881       | 89.024%    | 1984            | 44.5              | 43.26°C        | 0.995       |
|      | 12.163V | 5.057V  | 3.278V  | 4.988V | 510.967       |            |                 |                   | 46.45°C        | 115.02V     |
| 80%  | 36.319A | 7.927A  | 8.082A  | 2.312A | 519.678       | 88.422%    | 2031            | 44.8              | 43.96°C        | 0.995       |
|      | 12.164V | 5.047V  | 3.266V  | 4.976V | 587.727       |            |                 |                   | 47.72°C        | 115V        |
| 90%  | 41.319A | 8.438A  | 8.601A  | 2.418A | 585.122       | 87.843%    | 2037            | 44.8              | 44.37°C        | 0.995       |
|      | 12.165V | 5.038V  | 3.255V  | 4.964V | 666.098       |            |                 |                   | 48.85°C        | 114.98V     |
| 100% | 46.252A | 8.949A  | 9.154A  | 2.525A | 649.861       | 87.172%    | 2044            | 44.9              | 45.15°C        | 0.995       |
|      | 12.165V | 5.029V  | 3.244V  | 4.952V | 745.496       |            |                 |                   | 50.49°C        | 114.96V     |
| 110% | 50.918A | 9.963A  | 10.306A | 2.531A | 715.291       | 86.297%    | 2048            | 45                | 46.32°C        | 0.995       |
|      | 12.166V | 5.019V  | 3.231V  | 4.94V  | 828.878       |            |                 |                   | 52.13°C        | 114.95V     |
| CL1  | 0.115A  | 11.84A  | 11.98A  | 0A     | 101.307       | 81.949%    | 1726            | 39.9              | 40.57°C        | 0.979       |
|      | 12.166V | 5.085V  | 3.314V  | 5.065V | 123.62        |            |                 |                   | 44.1°C         | 115.13V     |
| CL2  | 0.115A  | 19.671A | 0A      | 0A     | 101.396       | 81.615%    | 1546            | 37.9              | 40.65°C        | 0.979       |
|      | 12.165V | 5.084V  | 3.33V   | 5.073V | 124.236       |            |                 |                   | 42.7°C         | 115.13V     |
| CL3  | 0.115A  | 0A      | 19.931A | 0A     | 67.39         | 74.9%      | 1441            | 35.2              | 40.83°C        | 0.968       |
|      | 12.161V | 5.099V  | 3.311V  | 5.069V | 89.973        |            |                 |                   | 42.79°C        | 115.13V     |
| CL4  | 53.466A | 0A      | 0A      | 0A     | 649.724       | 88.278%    | 2042            | 44.9              | 45.55°C        | 0.995       |
|      | 12.152V | 5.054V  | 3.271V  | 5.015V | 735.994       |            |                 |                   | 49.8°C         | 114.96V     |

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%  | 3.570A  | 1.957A  | 1.974A  | 0.987A | 65.01         | 86.212%    | 995             | 26.4              | 40.07°C        | 0.83        |
|      | 12.156V | 5.111V  | 3.344V  | 5.069V | 75.408        |            |                 |                   | 41.71°C        | 230.39V     |
| 20%  | 8.149A  | 2.941A  | 2.971A  | 1.187A | 129.969       | 90.084%    | 998             | 26.9              | 40.96°C        | 0.917       |
|      | 12.157V | 5.102V  | 3.333V  | 5.055V | 144.279       |            |                 |                   | 42.76°C        | 230.39V     |
| 30%  | 13.072A | 3.437A  | 3.476A  | 1.389A | 194.977       | 91.476%    | 1243            | 32.1              | 41.14°C        | 0.952       |
|      | 12.157V | 5.094V  | 3.323V  | 5.043V | 213.145       |            |                 |                   | 43.09°C        | 230.38V     |
| 40%  | 18.002A | 3.934A  | 3.985A  | 1.591A | 260.069       | 91.884%    | 1442            | 35.5              | 41.5°C         | 0.97        |
|      | 12.157V | 5.085V  | 3.313V  | 5.03V  | 283.039       |            |                 |                   | 43.61°C        | 230.37V     |
| 50%  | 22.581A | 4.927A  | 4.998A  | 1.795A | 325.067       | 91.925%    | 1636            | 38.4              | 42.49°C        | 0.979       |
|      | 12.159V | 5.076V  | 3.302V  | 5.016V | 353.621       |            |                 |                   | 44.71°C        | 230.36V     |
| 60%  | 27.121A | 5.924A  | 6.019A  | 2A     | 389.612       | 91.732%    | 1833            | 42.5              | 42.61°C        | 0.983       |
|      | 12.160V | 5.066V  | 3.29V   | 5.002V | 424.727       |            |                 |                   | 45.04°C        | 230.35V     |
| 70%  | 31.723A | 6.925A  | 7.048A  | 2.206A | 454.929       | 91.406%    | 1993            | 44.7              | 43.51°C        | 0.986       |
|      | 12.161V | 5.056V  | 3.278V  | 4.988V | 497.7         |            |                 |                   | 46.01°C        | 230.33V     |
| 80%  | 36.322A | 7.928A  | 8.084A  | 2.312A | 519.71        | 91.018%    | 2036            | 44.8              | 43.76°C        | 0.988       |
|      | 12.163V | 5.047V  | 3.265V  | 4.975V | 570.995       |            |                 |                   | 47.03°C        | 230.32V     |
| 90%  | 41.321A | 8.437A  | 8.602A  | 2.419A | 585.141       | 90.689%    | 2034            | 44.9              | 44.3°C         | 0.988       |
|      | 12.164V | 5.038V  | 3.254V  | 4.963V | 645.215       |            |                 |                   | 48.59°C        | 230.3V      |
| 100% | 46.256A | 8.95A   | 9.156A  | 2.525A | 649.872       | 90.321%    | 2039            | 44.8              | 45.57°C        | 0.987       |
|      | 12.164V | 5.029V  | 3.243V  | 4.95V  | 719.515       |            |                 |                   | 50.17°C        | 230.29V     |
| 110% | 50.921A | 9.965A  | 10.307A | 2.532A | 715.299       | 89.785%    | 2039            | 44.8              | 46.39°C        | 0.986       |
|      | 12.166V | 5.018V  | 3.23V   | 4.938V | 796.679       |            |                 |                   | 51.58°C        | 230.28V     |
| CL1  | 0.115A  | 11.84A  | 11.981A | 0A     | 101.306       | 83.473%    | 1712            | 39.2              | 40.8°C         | 0.898       |
|      | 12.165V | 5.085V  | 3.313V  | 5.065V | 121.364       |            |                 |                   | 44.25°C        | 230.38V     |
| CL2  | 0.115A  | 19.672A | 0A      | 0A     | 101.398       | 82.904%    | 1590            | 39.5              | 40.16°C        | 0.899       |
|      | 12.165V | 5.083V  | 3.33V   | 5.072V | 122.306       |            |                 |                   | 42.64°C        | 230.38V     |
| CL3  | 0.115A  | 0A      | 19.931A | 0A     | 67.39         | 76.004%    | 1418            | 35.4              | 40.62°C        | 0.857       |
|      | 12.160V | 5.098V  | 3.311V  | 5.069V | 88.668        |            |                 |                   | 42.41°C        | 230.38V     |

| Test | 12V     | 5V     | 3.3V   | 5VSB   | DC/AC (Watts) | Efficiency | Fan Speed (RPM) | PSU Noise (dB[A]) | Temps (In/Out) | PF/AC Volts |
|------|---------|--------|--------|--------|---------------|------------|-----------------|-------------------|----------------|-------------|
| CL4  | 53.473A | 0A     | 0A     | 0A     | 649.736       | 91.423%    | 2037            | 44.8              | 45.83°C        | 0.987       |
|      | 12.151V | 5.054V | 3.271V | 5.015V | 710.691       |            |                 |                   | 49.18°C        | 230.3V      |

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  | 1.222A  | 0.489A | 0.492A | 0.196A | 20.004        | 72.346%    | 980             | 26.2              | 36.41°C        | 0.885       |
|      | 12.154V | 5.117V | 3.352V | 5.091V | 27.65         |            |                 |                   | 38.12°C        | 115.14V     |
| 40W  | 2.690A  | 0.684A | 0.69A  | 0.295A | 40.002        | 81.486%    | 985             | 26.4              | 37.11°C        | 0.927       |
|      | 12.153V | 5.116V | 3.35V  | 5.087V | 49.09         |            |                 |                   | 39.13°C        | 115.14V     |
| 60W  | 4.157A  | 0.88A  | 0.887A | 0.394A | 60.001        | 85.445%    | 987             | 26.4              | 38.41°C        | 0.951       |
|      | 12.155V | 5.113V | 3.348V | 5.082V | 70.221        |            |                 |                   | 40.06°C        | 115.14V     |
| 80W  | 5.622A  | 1.076A | 1.085A | 0.493A | 79.958        | 87.322%    | 988             | 26.4              | 39.51°C        | 0.969       |
|      | 12.155V | 5.111V | 3.345V | 5.077V | 91.566        |            |                 |                   | 41.2°C         | 115.13V     |

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  | 1.222A  | 0.488A | 0.492A | 0.196A | 20.007        | 73.346%    | 984             | 26.5              | 36.82°C        | 0.712       |
|      | 12.154V | 5.119V | 3.352V | 5.091V | 27.279        |            |                 |                   | 37.65°C        | 230.37V     |
| 40W  | 2.690A  | 0.684A | 0.69A  | 0.295A | 40.007        | 82.819%    | 987             | 26.4              | 37.44°C        | 0.797       |
|      | 12.153V | 5.117V | 3.349V | 5.086V | 48.306        |            |                 |                   | 38.86°C        | 230.39V     |
| 60W  | 4.158A  | 0.88A  | 0.887A | 0.394A | 60.007        | 86.459%    | 988             | 26.4              | 38.72°C        | 0.819       |
|      | 12.154V | 5.114V | 3.348V | 5.082V | 69.407        |            |                 |                   | 39.82°C        | 230.41V     |
| 80W  | 5.623A  | 1.076A | 1.085A | 0.493A | 79.977        | 88.53%     | 992             | 26.3              | 39.22°C        | 0.86        |
|      | 12.154V | 5.112V | 3.345V | 5.077V | 90.341        |            |                 |                   | 40.19°C        | 230.4V      |

The results above are not used in the certification process

## Ripple Measurements

### 115V

| Test       | 12V     | 5V      | 3.3V    | 5VSB    | Pass/Fail |
|------------|---------|---------|---------|---------|-----------|
| 10% Load   | 8.04mV  | 9.34mV  | 5.70mV  | 8.66mV  | Pass      |
| 20% Load   | 9.16mV  | 10.97mV | 7.17mV  | 9.93mV  | Pass      |
| 30% Load   | 11.54mV | 10.15mV | 6.20mV  | 10.50mV | Pass      |
| 40% Load   | 14.32mV | 11.12mV | 7.38mV  | 12.84mV | Pass      |
| 50% Load   | 14.89mV | 11.43mV | 8.04mV  | 13.14mV | Pass      |
| 60% Load   | 14.94mV | 12.04mV | 8.60mV  | 13.86mV | Pass      |
| 70% Load   | 17.27mV | 13.21mV | 9.51mV  | 15.08mV | Pass      |
| 80% Load   | 18.64mV | 14.28mV | 12.61mV | 16.05mV | Pass      |
| 90% Load   | 17.26mV | 15.05mV | 13.32mV | 16.66mV | Pass      |
| 100% Load  | 29.52mV | 16.98mV | 16.67mV | 19.15mV | Pass      |
| 110% Load  | 33.30mV | 18.14mV | 16.77mV | 18.99mV | Pass      |
| Crossload1 | 14.52mV | 10.06mV | 11.19mV | 10.62mV | Pass      |
| Crossload2 | 11.50mV | 10.66mV | 8.39mV  | 9.99mV  | Pass      |
| Crossload3 | 10.53mV | 6.63mV  | 10.22mV | 9.53mV  | Pass      |
| Crossload4 | 26.97mV | 10.56mV | 11.68mV | 15.30mV | Pass      |

The results above are not used in the certification process

### 230V

| Test     | 12V     | 5V      | 3.3V   | 5VSB    | Pass/Fail |
|----------|---------|---------|--------|---------|-----------|
| 10% Load | 7.22mV  | 9.03mV  | 5.49mV | 8.71mV  | Pass      |
| 20% Load | 8.29mV  | 11.37mV | 7.17mV | 9.53mV  | Pass      |
| 30% Load | 11.48mV | 10.35mV | 6.51mV | 10.45mV | Pass      |
| 40% Load | 14.08mV | 11.07mV | 7.22mV | 12.33mV | Pass      |
| 50% Load | 14.28mV | 11.32mV | 7.88mV | 12.79mV | Pass      |
| 60% Load | 15.33mV | 13.93mV | 8.90mV | 13.96mV | Pass      |

| Test       | 12V     | 5V      | 3.3V    | 5VSB    | Pass/Fail |
|------------|---------|---------|---------|---------|-----------|
| 70% Load   | 16.96mV | 13.26mV | 9.00mV  | 13.81mV | Pass      |
| 80% Load   | 19.25mV | 14.13mV | 12.16mV | 15.23mV | Pass      |
| 90% Load   | 17.77mV | 14.79mV | 12.66mV | 15.74mV | Pass      |
| 100% Load  | 30.63mV | 16.41mV | 15.52mV | 18.46mV | Pass      |
| 110% Load  | 34.16mV | 18.32mV | 17.71mV | 18.63mV | Pass      |
| Crossload1 | 14.24mV | 10.07mV | 11.00mV | 10.50mV | Pass      |
| Crossload2 | 10.58mV | 11.22mV | 8.09mV  | 9.83mV  | Pass      |
| Crossload3 | 10.82mV | 6.63mV  | 9.92mV  | 9.32mV  | Pass      |
| Crossload4 | 27.32mV | 11.45mV | 11.94mV | 15.68mV | Pass      |

The results above are not used in the certification process

## SAMA GT650W



Top side

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                            |       |        |      |       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-------|--------|------|-------|
| SAMA 先马                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                            |       |        |      |       |
| GT650                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |       |        |      |       |
| Power Supply<br>交流式电源供应器<br>Model/型号 MAT-650yeB1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                            |       |        |      |       |
| AC INPUT<br>交流输入                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 100-240VAC / 50-60Hz / 10A |       |        |      |       |
| DC OUTPUT<br>直流输出                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | +5V                        | +3.3V | +12V   | -12V | +5VSB |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 20A                        | 20A   | 54.1A  | 0.4A | 2.5A  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 100W                       |       | 649.2W | 4.8W | 12.5W |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 额定功率 650W                  |       |        |      |       |
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Power specifications label

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