EVGA SuperNOVA 1600 T2 (#2)

1703441610899001

Lab ID EV16001656

Certification ID 251656

Test Result Report ID: 20PS1656A

Certificate Issue Date: Jun 12, 2020

Scheme: ETA-EMI PSU

115V



230V



Scheme: LAMBDA PSU

115V



230V





Aristeidis Bitziopoulos, Certification Body General Manager

General Information

Test Equipment

Electronic Loads	Chroma 63601-5 x2 Chroma 63600-2 Chroma 63640-80-80 x10 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	EVGA
Model	SuperNOVA 1600 T2 (#2)
OEM/ODM	Super Flower
Serial Number	1703441610899001
Product Specifications	
Manufacturer-Provided Information	
□□□□ (Vrms)	115-240
□□□□ (Arms)	17-10
□□□□ (Hz)	50-60

□□□□ (W)	1600
Operating Temperature (Continuous Full Load) (°C)	
□□	ATX12V
□□□□	Fully Modular
Warranty	-
Cybenetics Measurements	
Dimensions (W x H x D)	
Weight	
□□	140mm Double Ball-Bearing Fan (RL4Z B1402512EH)
□□□□□	✓ (selectable)
Cybenetics Testing Information	
Lab ID	EV16001656
Date of receipt	-
Testing Date	May 19, 2020
Report Issued Date	Jun 12, 2020
Engineer Name	-
Authorized By the Laboratory Technical Manager	Aristeidis Bitziopoulos
Signature	

□□□□ (Non-accredited measurements)

□□□□				
□□	□□□	□□□□□	Gauge	In Cable Capacitors
ATX □□ 20+4 pin (600mm)	1	1	16-22AWG	□
4+4 pin EPS 12V □□ (750mm)	2	2	16-22AWG	□
6+2pin PCIe□□ (750mm+150mm)	5	10	16-22AWG	□
6+2pin PCIe□□ (750mm)	4	4	16-22AWG	□
SATA□□ (550mm+100mm+100mm+100mm)	3	12	18-20AWG	□
SATA□□ (550mm+100mm) / □ 4pin Molex□□ (+100mm+100mm)	1	2 / 2	18AWG	□
□ 4pin Molex□□ (550mm+100mm+100mm)	1	3	18AWG	□
□ 4pin □□ (+100mm)	2	2	20AWG	□

AC Power Cord (1720mm) - C19 coupler	1	1	16AWG	-

□□□□

□		3.3V	5V	12V	5VSB	-12V
□□□□	□□	24	24	133.3	3	0.5
	□	120		1599.6	15	6
□□□□□ (W)		1600				

Parts Description

General Data	
Manufacturer (OEM)	Super Flower
Platform Model	Leadex Titanium
Primary Side	
Transient Filter	6x Y caps, 2x X caps, 2x MC chokes, 1x MOV, NTC Thermistor
Inrush Protection	NTC Thermistor & Relay
Bridge Rectifier(s)	Bridgeless Design - 1x US30K80R & 8x Infineon MOSFETs
APFC MOSFETS	8x Infineon MOSFETs
APFC Boost Diodes	4x Infineon IDL10G65C5 (650V, 10A @ 125°C)
Hold-up Cap(s)	4x Nippon Chemi-Con (400V, 390uF each. 1560uF combined, 2000h @ 105°C, KMW)
Main Switchers	4x Infineon IPP50R140CP (550V, 15A @ 100°C, 0.14Ohm)
APFC Controller	SF29603
LLC Resonant Controller	SFAA9013
Topology	Primary side: Bridgeless PFC, Full-Bridge & LLC Resonant Controller Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	
+12V MOSFETS	12x Infineon BSC027N04LS G (40V, 88A @ 100°C, 2.7mOhm)
5V & 3.3V	DC-DC Converters: 8x Infineon IPD060N03B (30V, 47A @ 100°C, 9.5mOhm) PWM Controller: APW7159C
Filtering Capacitors	Electrolytics: Nippon Chemi-Con (1-5,000 @ 105°C, KZE), Nippon Chemi-Con (4-10,000 @ 105°C, KY), Nippon Chemi-Con (W, 105°C), Nippon Chemi-Con (1,000 @ 105°C, KRG) Polymers: Nippon Chemi-Con
Supervisor IC	AA9013 & LM324ADG

Fan Model	Globe Fan RL4Z-B1402512EH (140mm, 12V, 0.6A, 2000 RPM, 153.47 CFM, 39.5 dB(A), 70,000-hour MTBF)
5VSB Circuit	
Rectifier	1x Mospec S10C60C SBR (60V, 10A)
Standby PWM Controller	29604

Test Results

Temperature & Compliance Info

□□□□ (°C /°F)	28-32 / 82.4-89.6
□□ ErP Lot3/6□□	ErP Lot 6 2010: ✓ ErP Lot 6 2013: Partially ErP Lot 3 2014 & CEC: ✓
□□ (EU) No 617/2013□□	✓

Performance Summary

115V

Accredited	
□□□□ (>1450 load combinations)	91.353%
Average Noise Output (>1450 Load Combinations)	38.16dBA
PF□□□ (>1450 Load Combinations)	0.981
Efficiency With 10W (≤500W) or 2% (>500W) Load	75.009%
□□□□□□	0.1158W
Non-Accredited	
12V Ripple (Full Load)	17.51mV
5V Ripple (Full Load)	28.06mV
3.3V Ripple (Full Load)	36.13mV
5VSB Ripple (Full Load)	22.35mV
12V Load Regulation	0.52%
5V Load Regulation	1.09%
3.3V Load Regulation	2.56%

5VSB Load Regulation	2.05%
Inrush Current	26.000A

230V

Accredited		
□□□□ (>1450 load combinations)		93.130%
Average Noise Output (>1450 Load Combinations)		37.67dBA
PF□□□ (>1450 Load Combinations)		0.955
Efficiency With 10W (≤500W) or 2% (>500W) Load		-
□□□□□□		0.2194W
Non-Accredited		
12V Ripple (Full Load)		11.02mV
5V Ripple (Full Load)		19.32mV
3.3V Ripple (Full Load)		27.22mV
5VSB Ripple (Full Load)		15.76mV
12V Load Regulation		0.53%
5V Load Regulation		1.13%
3.3V Load Regulation		2.77%
5VSB Load Regulation		2.05%
Inrush Current		54.460A
□□□□ & PG□□		21.00ms
AC Loss to PWR_OK Hold Up Time		19.20ms
PWR_OK Inactive to DC Loss Delay		1.80ms
PSU Timings: T1 (20% / 100%)	200.0ms	202.0ms
PSU Timings: T3 (20% / 100%)	298.0ms	288.0ms
OPP (0.00°C / 0.00°C)	133.03%	-

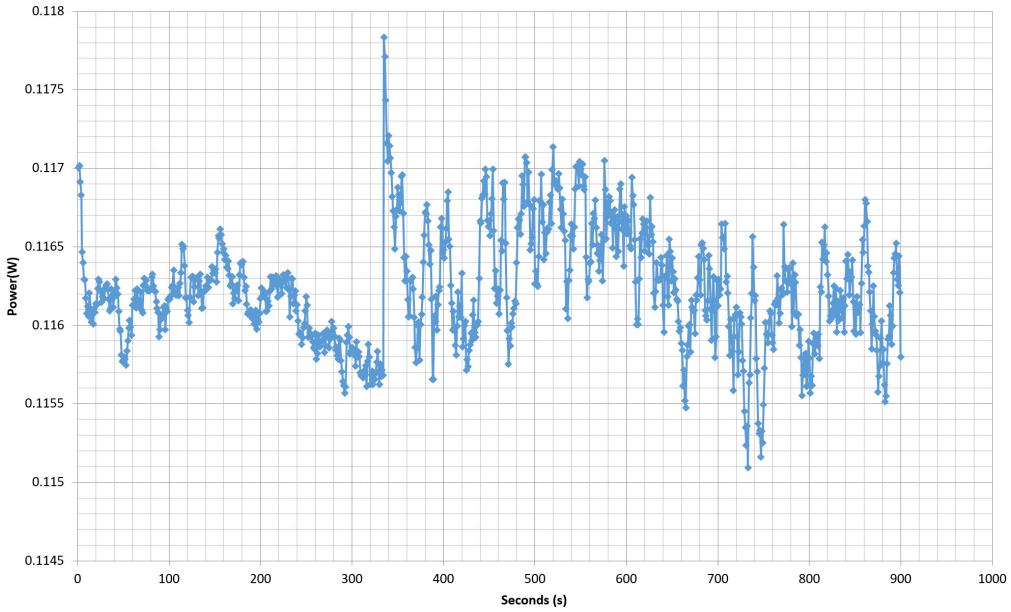
□□□□ & PG□□

Hold-Up Time (ms)	21
AC Loss to PWR_OK Hold Up Time (ms)	19.2

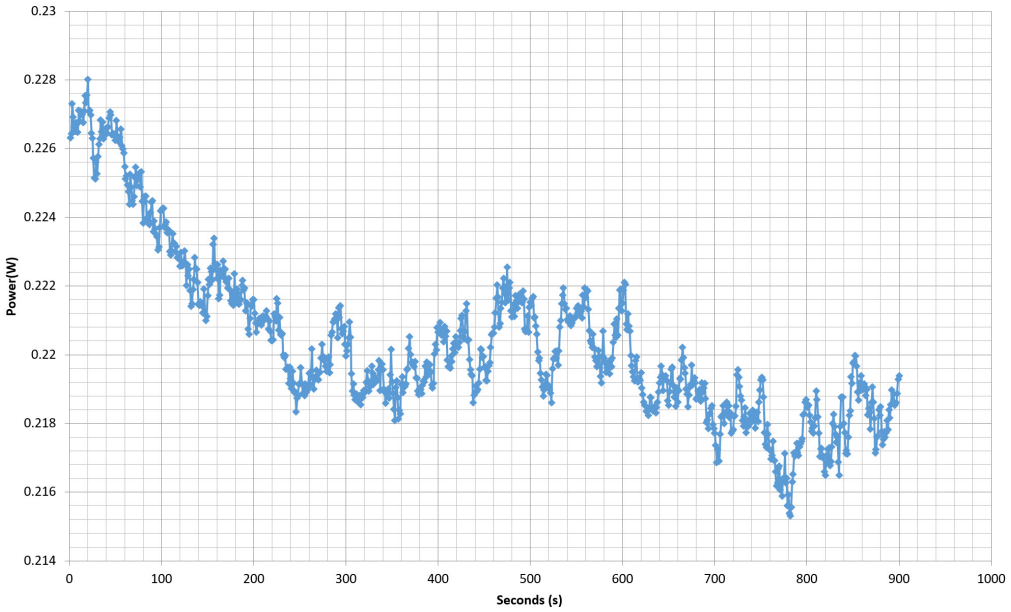
PWR_OK Inactive to DC Loss Delay (ms)	1.8

Graphs

115V

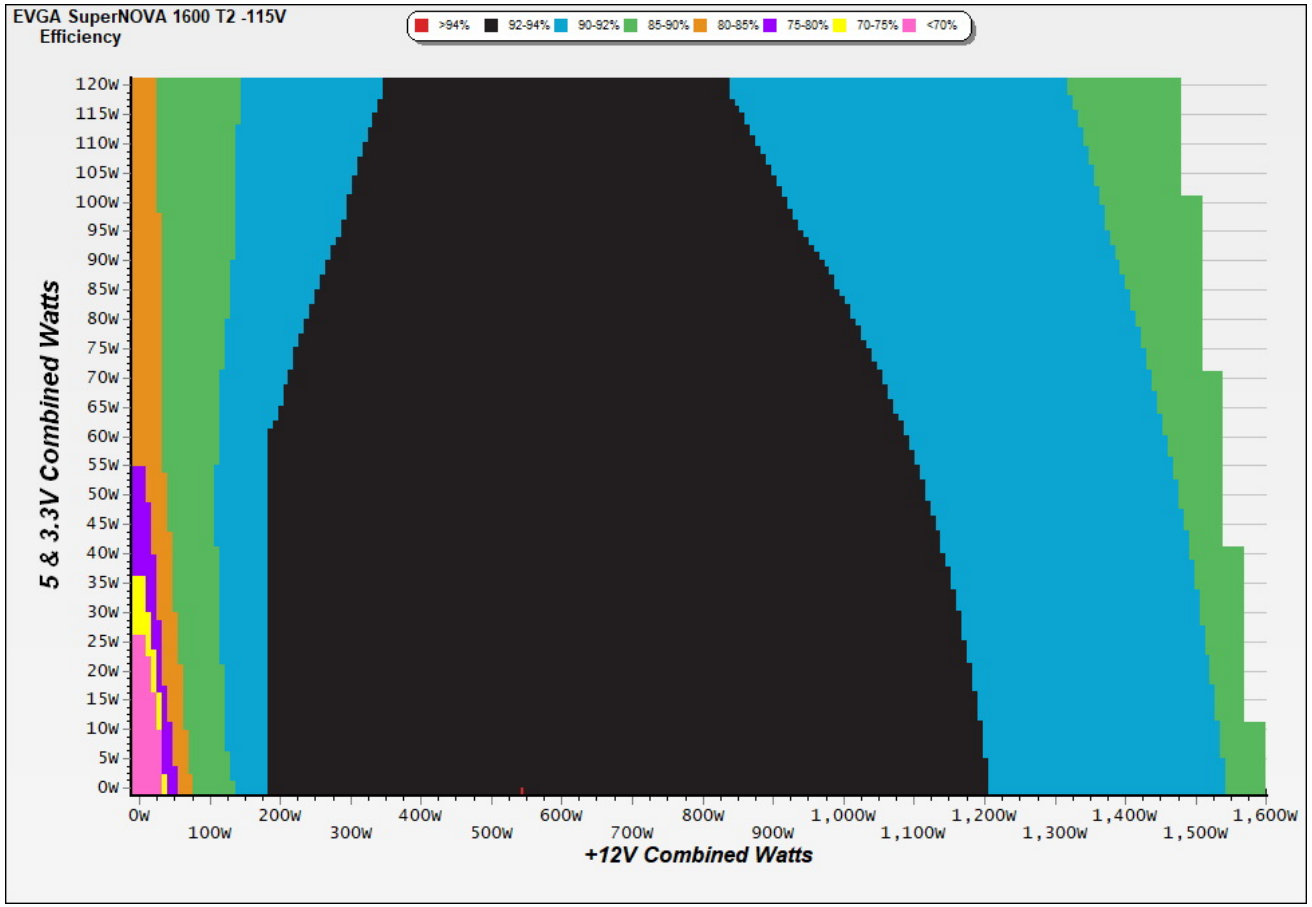


230V



□□□□□□

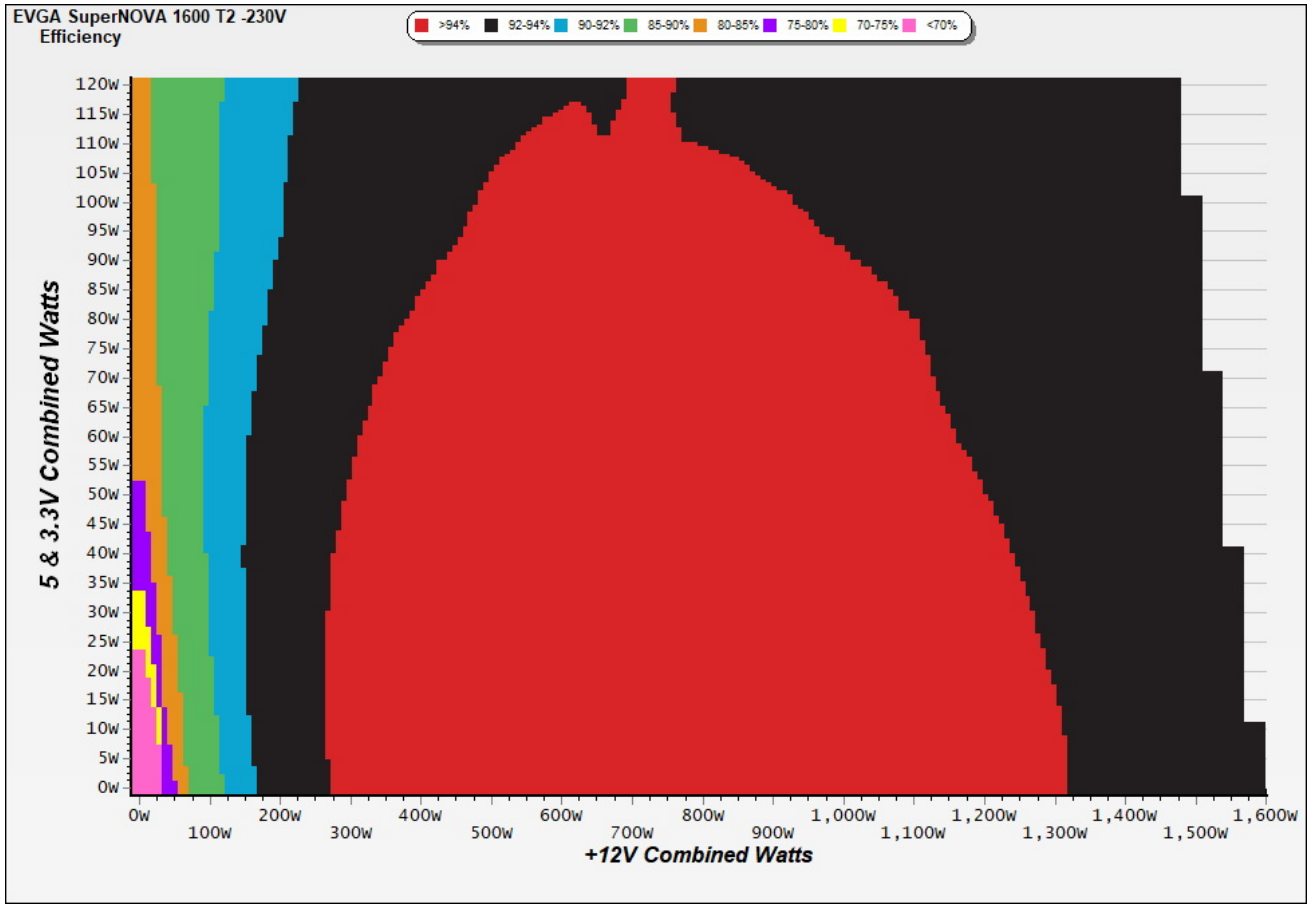
115V



□□

This graph depicts the PSU`s efficiency throughout its entire operational range. For the generation of the efficiency and noise graphs we set our loaders to auto mode through our custom-made software before trying thousands of possible load combinations

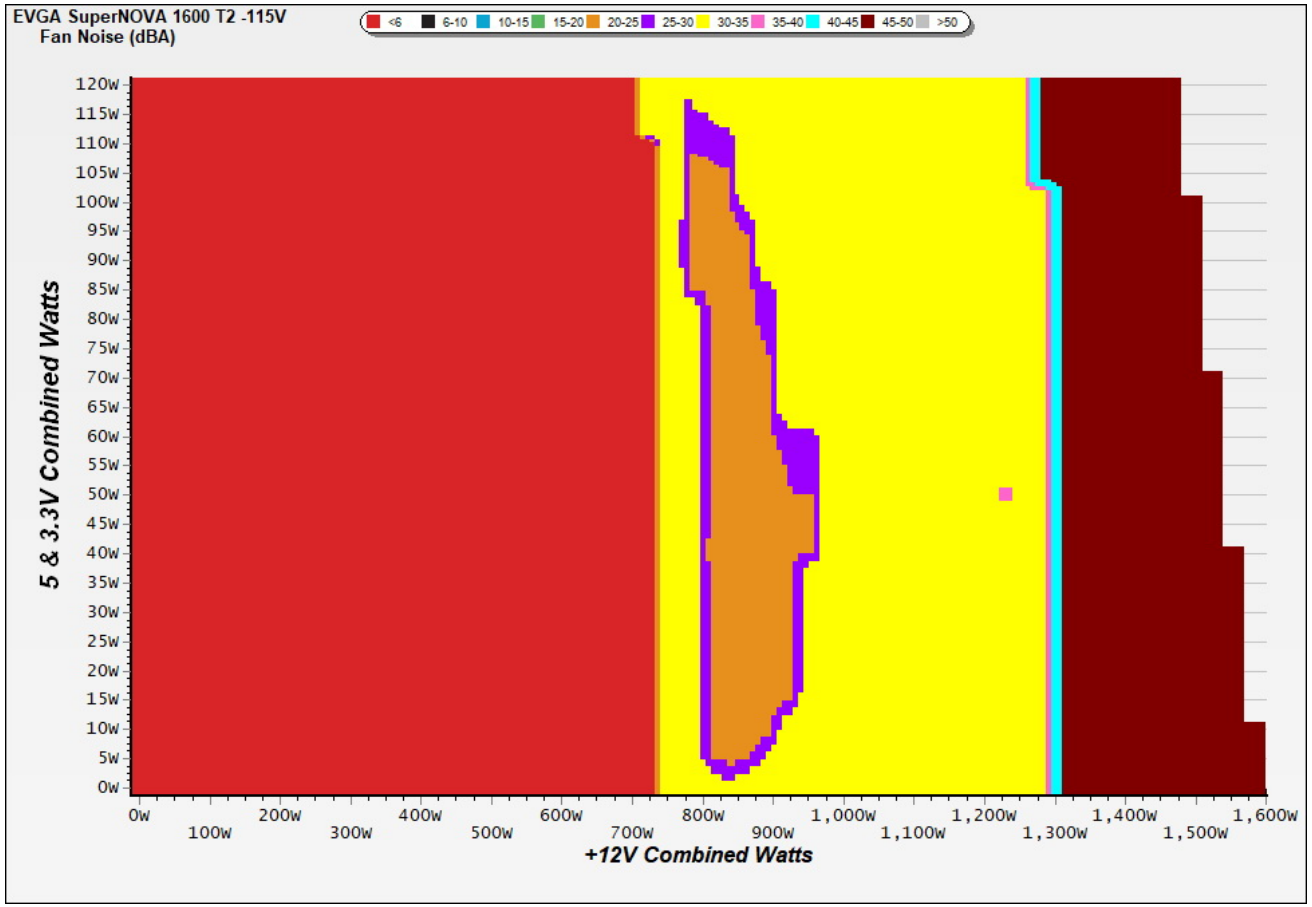
230V



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

□□□□□

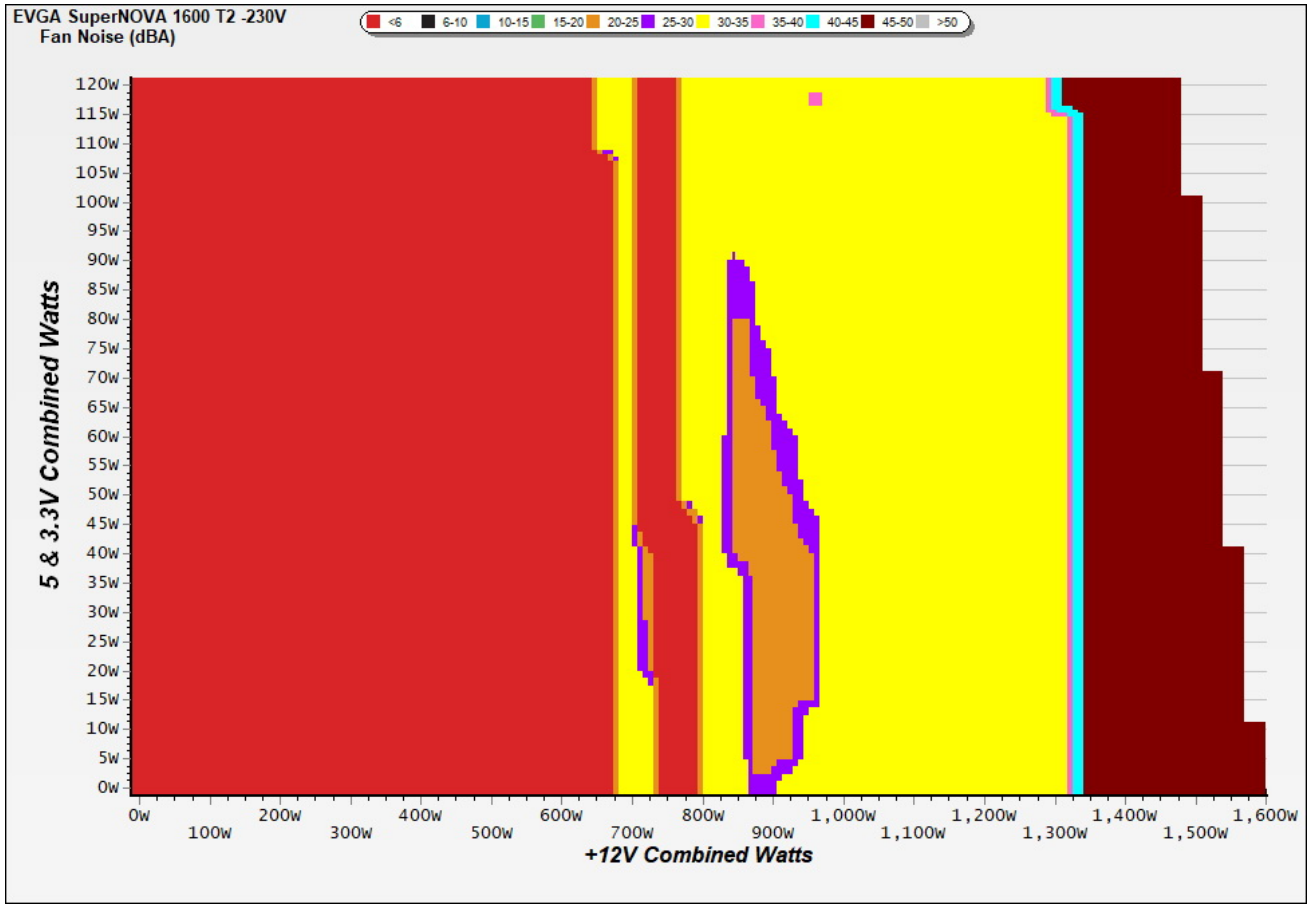
115V



□□

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

230V



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

Noise under high ambient temperature (indicative)

115V

Load	Normal ambient fan · noise · intake	High ambient fan · noise · intake	Noise change
10%	0 RPM · <6.0 dB(A) · 45.6 °C	0 RPM · <6.0 dB(A) · 45.6 °C	fan off in both
20%	0 RPM · <6.0 dB(A) · 47.4 °C	0 RPM · <6.0 dB(A) · 47.4 °C	fan off in both
50%	1017 RPM · 34.0 dB(A) · 42.7 °C	1017 RPM · 34.0 dB(A) · 42.7 °C	**+0.0 dB(A)**
100%	2065 RPM · 53.1 dB(A) · 45.8 °C	2065 RPM · 53.1 dB(A) · 45.8 °C	**+0.0 dB(A)**

230V

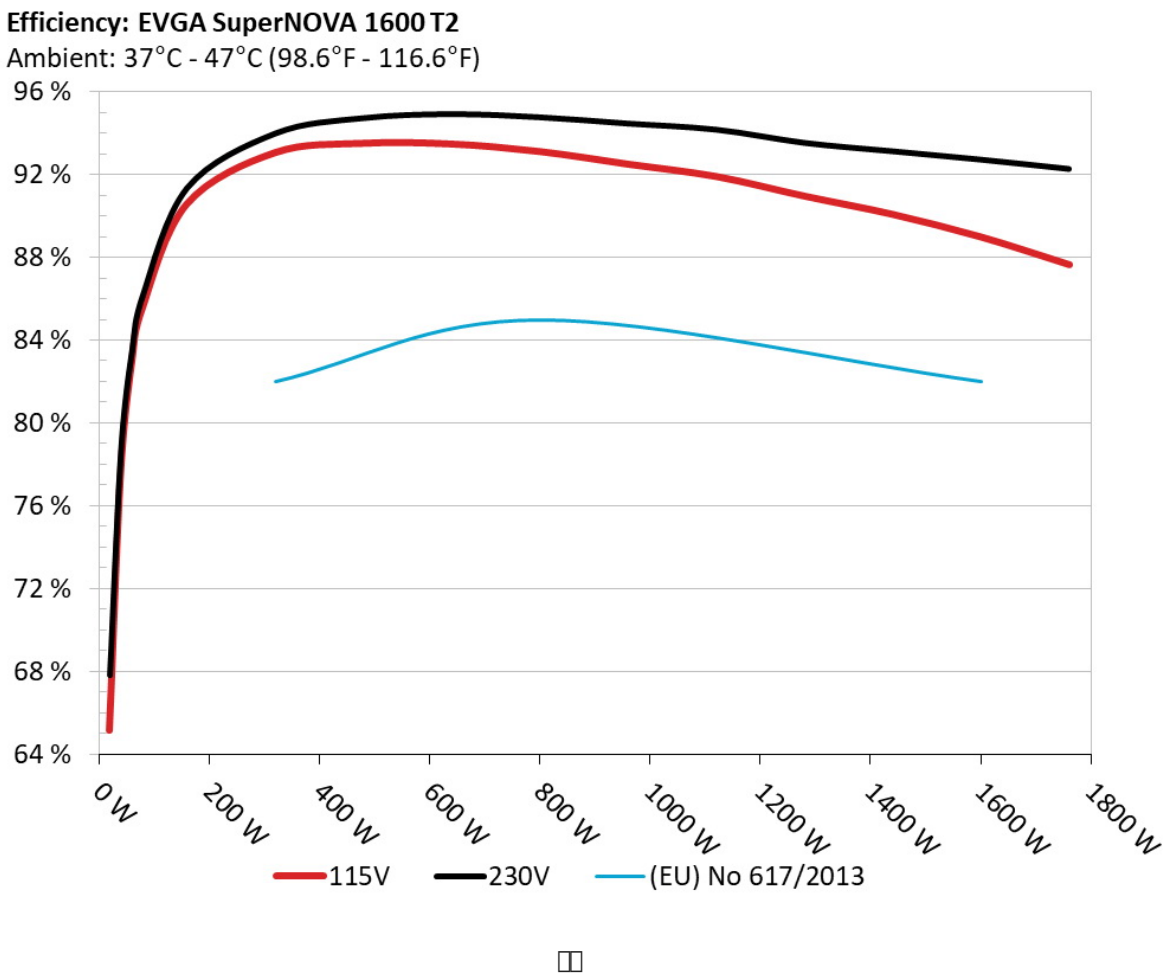
Load	Normal ambient fan · noise · intake	High ambient fan · noise · intake	Noise change
10%	0 RPM · <6.0 dB(A) · 45.4 °C	0 RPM · <6.0 dB(A) · 45.4 °C	fan off in both
20%	0 RPM · <6.0 dB(A) · 46.2 °C	0 RPM · <6.0 dB(A) · 46.2 °C	fan off in both
50%	1018 RPM · 34.0 dB(A) · 42.3 °C	1018 RPM · 34.0 dB(A) · 42.3 °C	**+0.0 dB(A)**
100%	2061 RPM · 53.1 dB(A) · 45.7 °C	2061 RPM · 53.1 dB(A) · 45.7 °C	**+0.0 dB(A)**

INFO

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

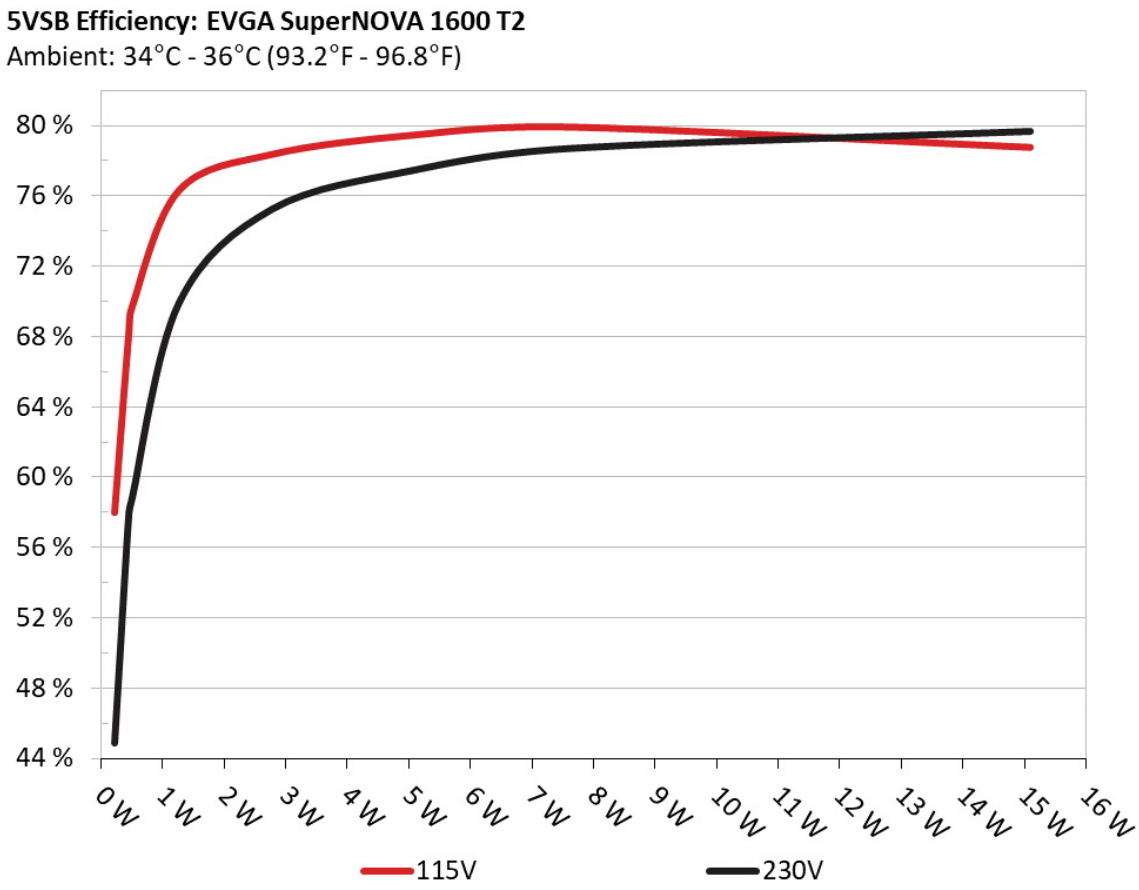
Informational. Not part of the ETA or LAMBDA rating.

Indicative Performance



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□□□□



□□

This graph depicts the efficiency levels of the 5VSB rail with 115V and 230V input

□□□□ □□ 5Vsb □□ (ErP Lot3/6 & CEC)

115V

□□ #	5VSB	DC/AC (□)	□□	PF/AC □□
1	0.045A	0.229	57.975%	0.024
	5.085V	0.395		115.13V
2	0.090A	0.458	68.155%	0.040
	5.084V	0.672		115.13V
3	0.550A	2.792	78.361%	0.191
	5.076V	3.563		115.12V
4	1.000A	5.069	79.451%	0.292
	5.068V	6.380		115.13V
5	1.500A	7.589	79.909%	0.364
	5.059V	9.497		115.13V
6	3.001A	15.085	78.756%	0.469
	5.027V	19.154		115.13V

230V

□□ #	5VSB	DC/AC (□)	□□	PF/AC □□
1	0.045A	0.229	44.902%	0.134
	5.058V	0.510		230.28V
2	0.090A	0.458	57.828%	0.014
	5.084V	0.792		230.28V
3	0.550A	2.793	75.283%	0.065
	5.076V	3.710		230.27V
4	1.000A	5.068	77.469%	0.111
	5.067V	6.542		230.28V
5	1.500A	7.589	78.716%	0.157
	5.058V	9.641		230.27V
6	3.001A	15.093	79.693%	0.264
	5.030V	18.939		230.28V

Supplementary Tests (For Reference)

10-110%□□□□

115V

□□ #	12V	5V	3.3V	5VSB	DC/AC (□)	□□	□□□□ (RPM)	□□□□□□□□ (dB[A])	□□ (□□ /□□)	PF/AC □□
1	11.336A	1.988A	1.995A	0.988A	160.027	90.572%	0	<6.0	45.57°C	0.922
	12.211V	5.027V	3.312V	5.062V	176.685				40.48°C	115.13V
2	23.694A	2.989A	2.997A	1.188A	320.098	93.057%	0	<6.0	47.43°C	0.971
	12.205V	5.021V	3.304V	5.053V	343.979				41.30°C	115.12V
3	36.345A	3.489A	3.503A	1.388A	479.428	93.508%	0	<6.0	48.77°C	0.985
	12.199V	5.017V	3.297V	5.044V	512.711				41.89°C	115.12V
4	49.090A	3.992A	4.011A	1.589A	639.814	93.474%	0	<6.0	50.15°C	0.991
	12.194V	5.012V	3.291V	5.036V	684.481				42.49°C	115.11V
5	61.507A	4.998A	5.028A	1.791A	799.990	93.112%	1017	34.0	42.65°C	0.994
	12.185V	5.006V	3.282V	5.028V	859.168				50.83°C	115.11V
6	73.924A	6.001A	6.050A	1.993A	960.064	92.501%	1022	34.3	42.71°C	0.996
	12.178V	5.001V	3.273V	5.020V	1037.891				51.49°C	115.10V
7	86.311A	7.010A	7.083A	2.196A	1119.795	91.907%	1022	34.3	43.28°C	0.997
	12.173V	4.995V	3.263V	5.011V	1218.395				52.38°C	115.09V
8	98.785A	8.003A	8.119A	2.400A	1280.249	90.956%	1582	46.4	43.96°C	0.997
	12.167V	4.989V	3.252V	5.001V	1407.544				53.55°C	115.08V
9	111.616A	8.532A	8.631A	2.403A	1439.668	90.077%	2073	53.2	44.92°C	0.996
	12.159V	4.983V	3.245V	4.996V	1598.259				55.22°C	115.08V
10	124.282A	9.044A	9.179A	3.014A	1600.006	88.986%	2065	53.1	45.79°C	0.993
	12.152V	4.978V	3.236V	4.979V	1798.039				56.67°C	115.08V
11	137.524A	9.051A	9.196A	3.017A	1760.102	87.648%	2064	53.1	46.83°C	0.990
	12.146V	4.974V	3.231V	4.973V	2008.158				58.41°C	115.07V
CL1	0.101A	14.005A	13.999A	0.000A	116.642	81.945%	1556	45.8	42.94°C	0.908
	12.212V	4.996V	3.246V	5.076V	142.342				51.17°C	115.15V

CL2	133.355A	1.001A	1.001A	1.000A	1633.837	89.202%	2068	53.1	45.66°C	0.993
	12.152V	4.998V	3.278V	5.022V	1831.623				56.07°C	115.08V

The results above are not used in the certification process

230V

□□ #	12V	5V	3.3V	5VSB	DC/AC (□)	□□	□□□□ (RPM)	□□□□□□□ (dB[A])	□□ (□□ /□□)	PF/AC □□
1	11.339A	1.990A	1.995A	0.988A	160.033	91.341%	0	<6.0	45.44°C	0.865
	12.208V	5.026V	3.310V	5.062V	175.204				39.51°C	230.28V
2	23.701A	2.987A	3.001A	1.188A	320.101	93.981%	0	<6.0	46.22°C	0.922
	12.202V	5.020V	3.300V	5.053V	340.603				40.01°C	230.28V
3	36.355A	3.490A	3.507A	1.388A	479.433	94.724%	0	<6.0	47.75°C	0.957
	12.196V	5.015V	3.292V	5.044V	506.139				40.78°C	230.27V
4	49.100A	3.995A	4.019A	1.589A	639.796	94.914%	0	<6.0	49.15°C	0.974
	12.191V	5.010V	3.285V	5.035V	674.082				41.57°C	230.26V
5	61.511A	4.997A	5.042A	1.791A	799.971	94.767%	1018	34.0	42.25°C	0.982
	12.184V	5.004V	3.275V	5.027V	844.143				50.64°C	230.26V
6	73.941A	6.005A	6.068A	1.993A	960.058	94.461%	1019	34.1	42.69°C	0.987
	12.175V	4.998V	3.265V	5.018V	1016.351				51.86°C	230.26V
7	86.344A	7.014A	7.101A	2.196A	1119.756	94.169%	1022	34.3	43.28°C	0.990
	12.168V	4.992V	3.254V	5.010V	1189.088				52.82°C	230.26V
8	98.824A	8.005A	8.142A	2.401A	1280.213	93.528%	1584	46.4	44.13°C	0.992
	12.162V	4.985V	3.243V	5.000V	1368.807				54.24°C	230.25V
9	111.651A	8.536A	8.656A	2.403A	1439.632	93.123%	2077	53.2	44.88°C	0.993
	12.155V	4.980V	3.235V	4.995V	1545.945				55.64°C	230.25V
10	124.317A	9.047A	9.204A	3.014A	1600.044	92.721%	2061	53.1	45.71°C	0.995
	12.149V	4.975V	3.227V	4.979V	1725.648				57.04°C	230.25V
11	137.560A	9.055A	9.217A	3.017A	1760.106	92.269%	2059	53.0	46.95°C	0.995
	12.143V	4.971V	3.222V	4.974V	1907.571				58.72°C	230.26V
CL1	0.102A	14.005A	14.002A	0.000A	116.497	82.445%	1556	45.8	42.65°C	0.822
	12.210V	4.993V	3.237V	5.076V	141.302				50.92°C	230.28V

CL2	133.358A	1.000A	0.999A	1.000A	1633.458	92.978%	2065	53.1	45.63°C	0.995
	12.149V	4.997V	3.276V	5.023V	1756.824				57.37°C	230.24V

The results above are not used in the certification process

20-80□□□□□

115V

□□ #	12V	5V	3.3V	5VSB	DC/AC (□)	□□	□□□□ (RPM)	□□□□□□□ (dB[A])	PF/AC □□
1	1.215A	0.498A	0.495A	0.197A	19.997	65.167%	0	<6.0	0.756
	12.216V	5.035V	3.324V	5.083V	30.686				115.13V
2	2.430A	0.994A	0.994A	0.394A	39.987	77.499%	0	<6.0	0.826
	12.215V	5.033V	3.321V	5.078V	51.597				115.13V
3	3.649A	1.490A	1.492A	0.592A	60.018	82.876%	0	<6.0	0.857
	12.214V	5.031V	3.317V	5.074V	72.419				115.13V
4	4.861A	1.988A	1.991A	0.789A	79.969	85.581%	0	<6.0	0.876
	12.214V	5.029V	3.314V	5.069V	93.442				115.13V

The results above are not used in the certification process

230V

□□ #	12V	5V	3.3V	5VSB	DC/AC (□)	□□	□□□□ (RPM)	□□□□□□□ (dB[A])	PF/AC □□
1	1.216A	0.497A	0.497A	0.197A	20.004	67.794%	0	<6.0	0.370
	12.212V	5.034V	3.323V	5.083V	29.507				230.30V
2	2.432A	0.994A	0.992A	0.394A	39.993	78.603%	0	<6.0	0.531
	12.211V	5.032V	3.319V	5.078V	50.880				230.30V
3	3.650A	1.491A	1.493A	0.592A	60.023	83.458%	0	<6.0	0.665
	12.211V	5.030V	3.316V	5.073V	71.920				230.29V
4	4.862A	1.990A	1.992A	0.789A	79.972	86.166%	0	<6.0	0.743
	12.211V	5.028V	3.312V	5.068V	92.812				230.28V

The results above are not used in the certification process

□□□□

115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	7.40mV	8.60mV	14.20mV	6.20mV	Pass
20% Load	8.00mV	10.50mV	15.80mV	6.60mV	Pass
30% Load	8.10mV	12.10mV	17.00mV	7.20mV	Pass
40% Load	8.40mV	12.70mV	18.60mV	8.60mV	Pass
50% Load	8.60mV	15.00mV	19.10mV	9.30mV	Pass
60% Load	9.20mV	15.00mV	19.80mV	9.70mV	Pass
70% Load	9.10mV	16.50mV	21.20mV	10.70mV	Pass
80% Load	9.70mV	17.80mV	25.00mV	13.30mV	Pass
90% Load	13.20mV	23.30mV	29.30mV	17.20mV	Pass
100% Load	17.50mV	28.10mV	36.10mV	22.40mV	Pass
110% Load	20.80mV	31.40mV	40.80mV	24.70mV	Pass
Crossload1	7.00mV	8.70mV	17.00mV	10.30mV	Pass
Crossload2	17.10mV	27.80mV	34.70mV	21.50mV	Pass

The results above are not used in the certification process

230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	5.80mV	7.10mV	12.40mV	5.80mV	Pass
20% Load	6.90mV	9.00mV	15.20mV	6.90mV	Pass
30% Load	7.30mV	10.70mV	15.40mV	7.90mV	Pass
40% Load	7.90mV	11.50mV	17.60mV	8.40mV	Pass
50% Load	8.10mV	13.50mV	18.80mV	9.40mV	Pass
60% Load	8.50mV	15.00mV	19.30mV	9.50mV	Pass
70% Load	8.40mV	15.10mV	20.70mV	10.40mV	Pass
80% Load	8.50mV	17.60mV	22.60mV	11.30mV	Pass





Test	12V	5V	3.3V	5VSB	Pass/Fail
90% Load	9.10mV	17.70mV	24.20mV	13.00mV	Pass
100% Load	11.00mV	19.30mV	27.20mV	15.80mV	Pass
110% Load	11.20mV	21.80mV	28.60mV	17.30mV	Pass
Crossload1	6.10mV	7.40mV	14.60mV	10.10mV	Pass
Crossload2	10.80mV	20.20mV	26.60mV	15.40mV	Pass

The results above are not used in the certification process

EVGA SuperNOVA 1600 T2 (#2)

Top side

Power specifications label

本测试报告中包含的所有数据和图表均可在以下条件下由任何人使用：使用过程需提及测试结果由Cybenetics提供。
在任何情况下都应提供原始测试结果文档的网站链接

Cybenetics 提供自愿性认证计划：电源方面有 ETA（效率）、LAMBDA（噪声）与 SAFE（安全与正确运行）；散热产品方面有 DELTA（机箱隔音）与 PHI（风扇风量与静压）

CYBENETICS LTD Syrou 6, Latsia, 2231, Nicosia Cyprus

www.cybenetics.com - info@cybenetics.com