Gamemax GM600 rev.2 (#2)

Lab ID GM19600017

Certification ID 25670

Test Result Report ID:

Certificate Issue Date: Nov 4, 2019

115V 230V

Scheme: ETA-EMI PSU



115V 230V





Scheme: LAMBDA PSU



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	Gamemax
Model	GM600 rev.2 (#2)
OEM/ODM	Gamemax
Serial Number	
Product Specifications	
Manufacturer-Provided Information	
□□□□ (Vrms)	100-240
□□□□ (Arms)	12-6
□□□□ (Hz)	50-60

□□□□ (W)	600
Operating Temperature (Continuous Full Load) (°C)	
□□	ATX12V
□□□□	Semi Modular
Warranty	-
Cybenetics Measurements	
Dimensions (W x H x D)	
Weight	
□□	140mm Sleeve Bearing Fan (DF1402512SEM)
□□□□□	✗
Cybenetics Testing Information	
Lab ID	GM19600017
Date of receipt	Mar 28, 2019
Testing Date	Nov 4, 2019
Report Issued Date	Nov 4, 2019
Engineer Name	-
Authorized By the Laboratory Technical Manager	Aristeidis Bitziopoulos
Signature	

□□□□□ (Non-accredited measurements)

Native Cables				
□□	□□□□	□□□□□□	Gauge	In Cable Caps
ATX □□ 20+4 pin (490mm)	1	1	18-22AWG	□
4+4 pin EPS 12V □□ (500mm)	1	1	18AWG	□
SATA□□ (500mm+150mm)	1	2	18AWG	□
□□□□□				
□□	□□□□	□□□□□□	Gauge	Gauge
6+2pin PCIe□□ (500mm)	2	2	18AWG	□
SATA□□ (500mm+150mm+150mm)	1	3	18AWG	□
4-pin Molex (500mm+150mm)	1	2	18AWG	□

4-pin Molex (500mm) / FDD (+150mm)	1	1 / 1	18AWG	□
AC Power Cord (1370mm) - C13 coupler	1	1	18AWG	-

□□□□

□		3.3V	5V	12V	5VSB	-12V
□□□□	□□	15	20	42	2.5	0.5
	□	100		504	12.5	6
□□□□□ (W)		600				

Parts Description

General Data	
Manufacturer (OEM)	Gamemax
PCB Type	Single Sided
Primary Side	
Transient Filter	4x Y caps, 2x X caps, 2x CM chokes, 1x MOV
Inrush Protection	NTC Thermistor
Bridge Rectifier(s)	2x SEP GBU1510 (1000V, 15A @ 100°C)
APFC MOSFETS	2x Champion GP47S60X (600V, 47A @ 150°C, 0.081Ohm)
APFC Boost Diode	1x CREE C3D06060A (600V, 6A @ 154°C)
Hold-up Cap(s)	1x CapXon (400V, 330uF, 2000h @ 105°C, HP)
Main Switchers	2x Champion GP47S60X (600V, 47A @ 150°C, 0.081Ohm)
Combo APFC/PWM Controller	Champion CM6800G
Topology	Primary side: Double Forward Secondary side: Passive Rectification & Independent Regulation
Secondary Side	
+12V	2x MOSPEC S60M60C SBR (60V, 60A @ 100°C)
5V & 3.3V	2x MOSPEC S40M45C SBR (45V, 40A @ 125°C)
Filtering Capacitors	Electrolytics: 5x Rubycon (6-10,000h @ 105°C, ZLH), 1x Rubycon (1-2,000h @ 105°C, PX), 2x Rubycon (4-10,000h @ 105°C, YXJ), 1x CapXon (2-5,000h @ 105°C, KF), 1x Chengx (2-4,000h @ 105°C, GR)
Supervisor IC	Grenergy GR8313 (OVP, UVP, PG)
Fan Model	Xin Zheng Heng Electronic DF1402512SEM (140mm, 12V, 0.20A, 2.4W, Sleeve Bearing Fan)

5VSB Circuit	
Standby PWM Controller	Excelliance EM8569A

Test Results

Temperature & Compliance Info

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

Performance Summary

115V

Accredited	
□□□□ (>1450 load combinations)	84.732%
Average Noise Output (>1450 Load Combinations)	37.16dBA
PF□□□ (>1450 Load Combinations)	0.991
Efficiency With 10W (≤500W) or 2% (>500W) Load	51.780%
□□□□□□	0.1726W
Non-Accredited	
12V Ripple (Full Load)	47.68mV
5V Ripple (Full Load)	19.66mV
3.3V Ripple (Full Load)	17.83mV
5VSB Ripple (Full Load)	25.00mV
12V Load Regulation	1.30%
5V Load Regulation	1.93%
3.3V Load Regulation	0.21%
5VSB Load Regulation	2.41%
Inrush Current	113.849A

230V

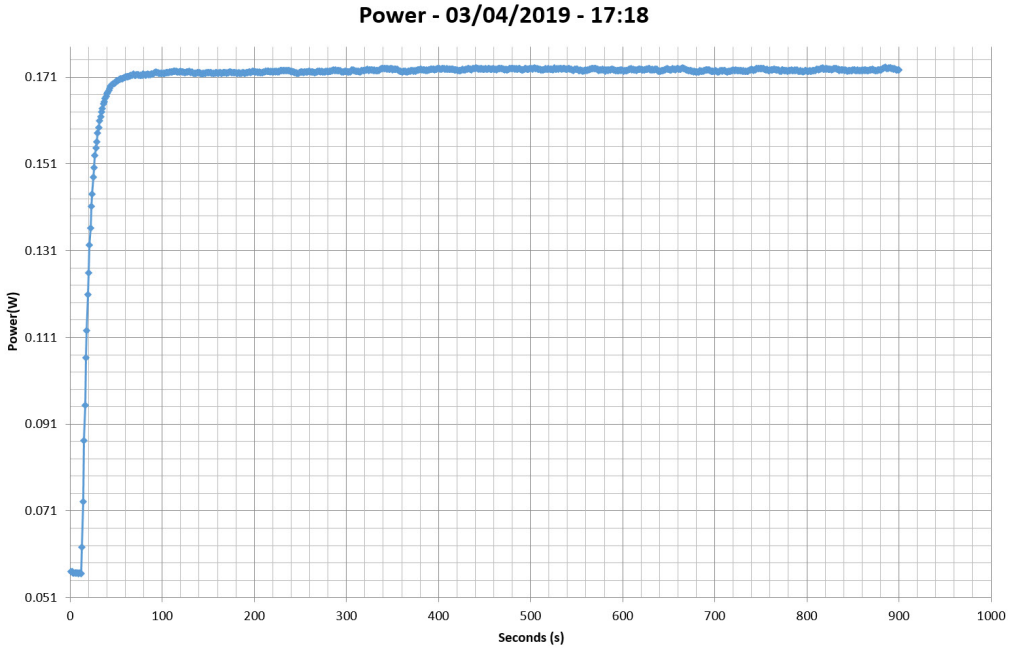
Accredited		
□□□□ (>1450 load combinations)		86.707%
Average Noise Output (>1450 Load Combinations)		37.24dBA
PF□□□ (>1450 Load Combinations)		0.953
Efficiency With 10W (≤500W) or 2% (>500W) Load		-
□□□□□□		0.4126W
Non-Accredited		
12V Ripple (Full Load)		56.59mV
5V Ripple (Full Load)		19.07mV
3.3V Ripple (Full Load)		19.47mV
5VSB Ripple (Full Load)		26.22mV
12V Load Regulation		1.25%
5V Load Regulation		1.87%
3.3V Load Regulation		0.15%
5VSB Load Regulation		2.37%
Inrush Current		106.366A
□□□□ & PG□□		0.00ms
AC Loss to PWR_OK Hold Up Time		0.00ms
PWR_OK Inactive to DC Loss Delay		0.00ms
OPP (0.00°C / 0.00°C)	-	-

□□□□ & PG□□

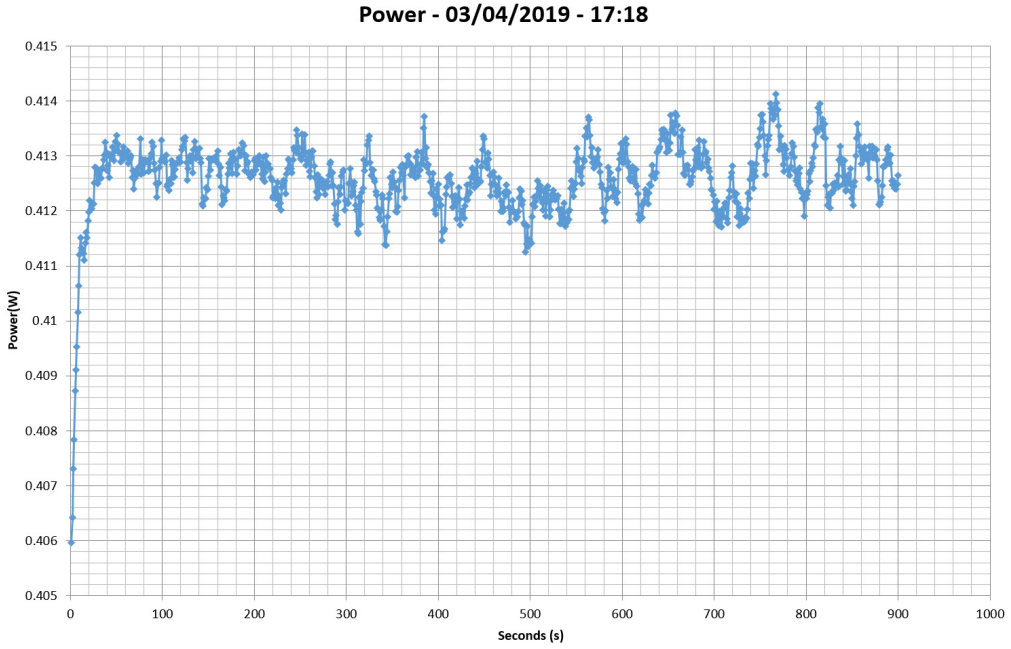
Hold-Up Time (ms)	12.5
AC Loss to PWR_OK Hold Up Time (ms)	69.5
PWR_OK Inactive to DC Loss Delay (ms)	-57.0

Graphs

115V



230V



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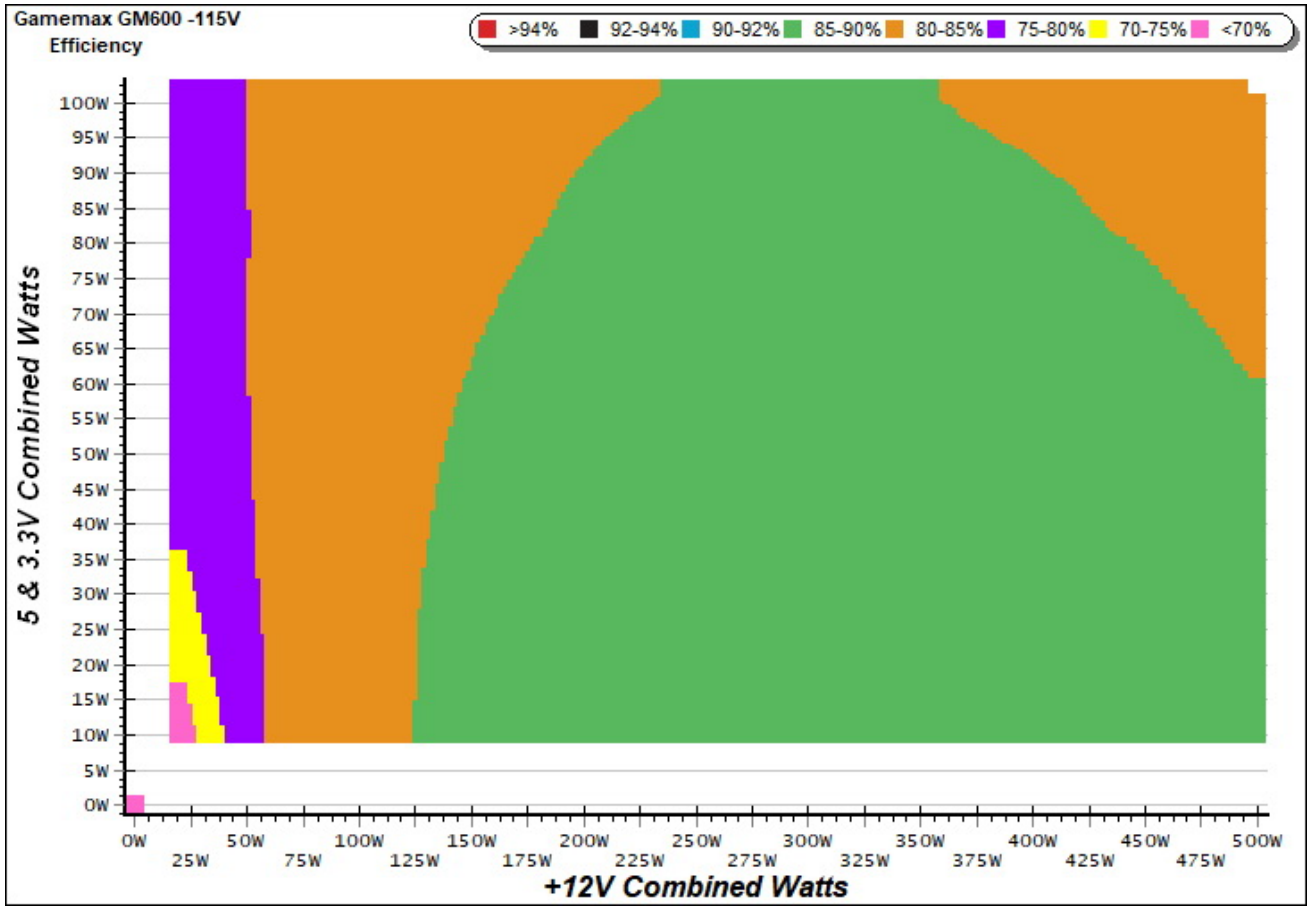
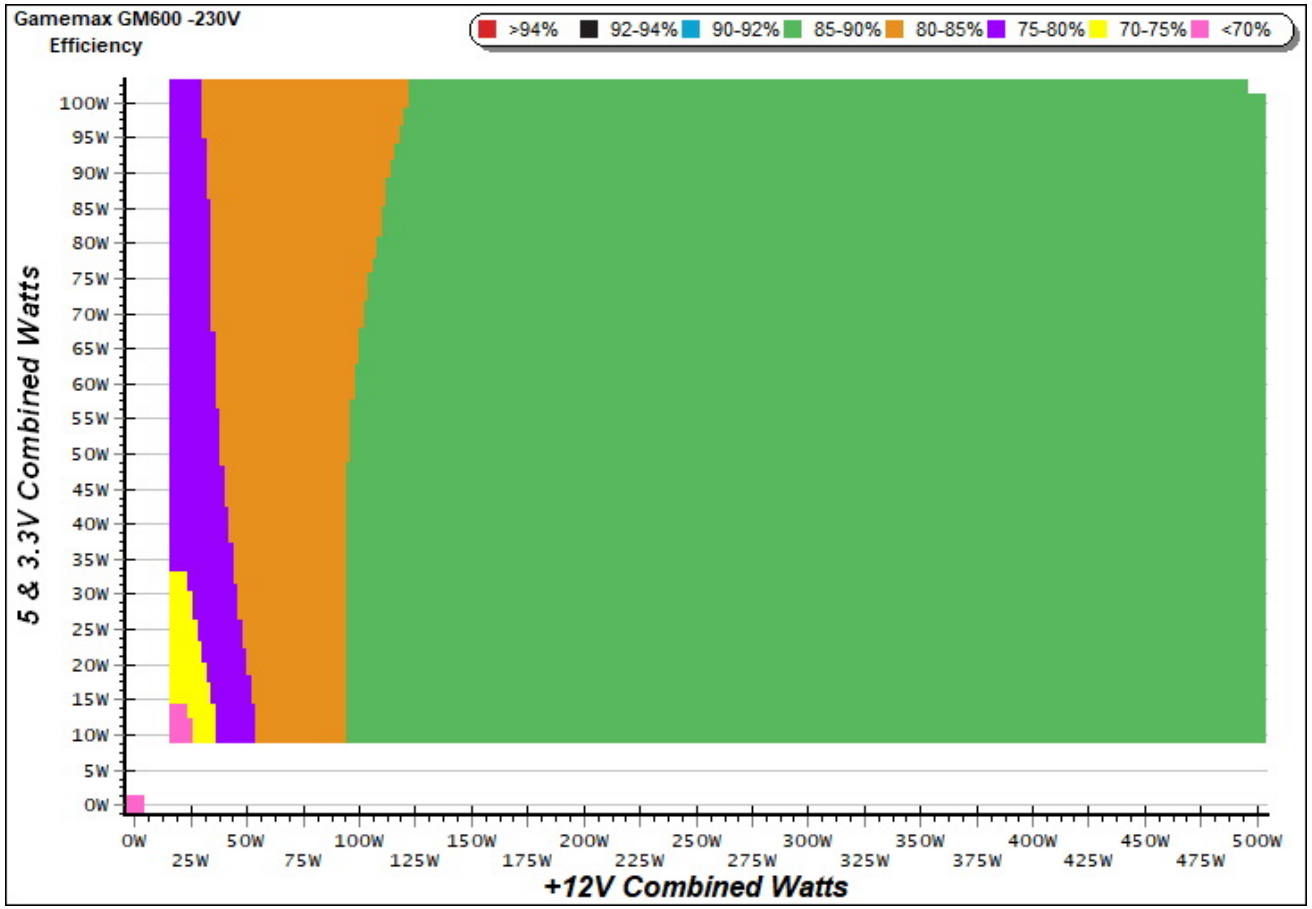
115V



□□

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



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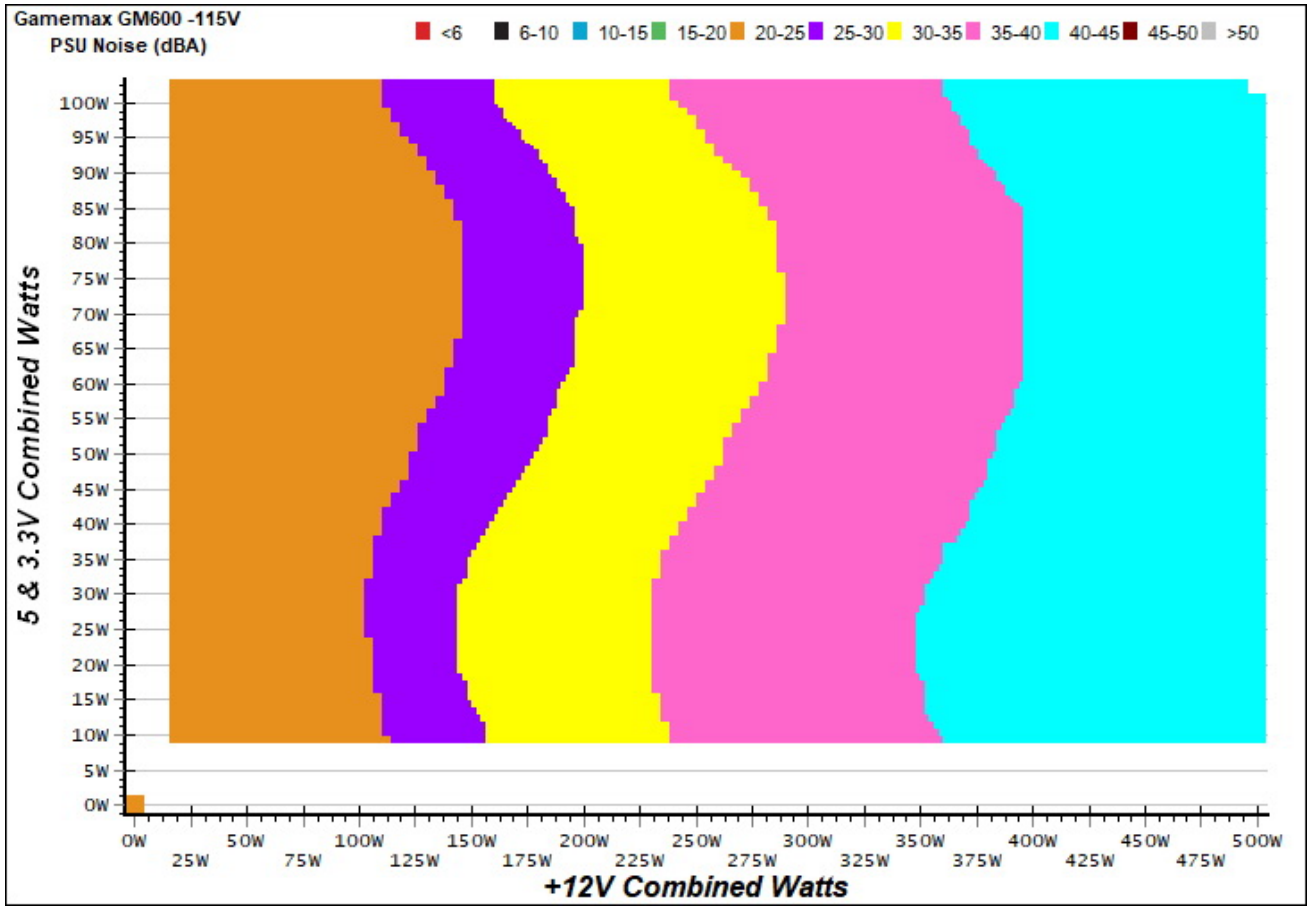
□□□□□

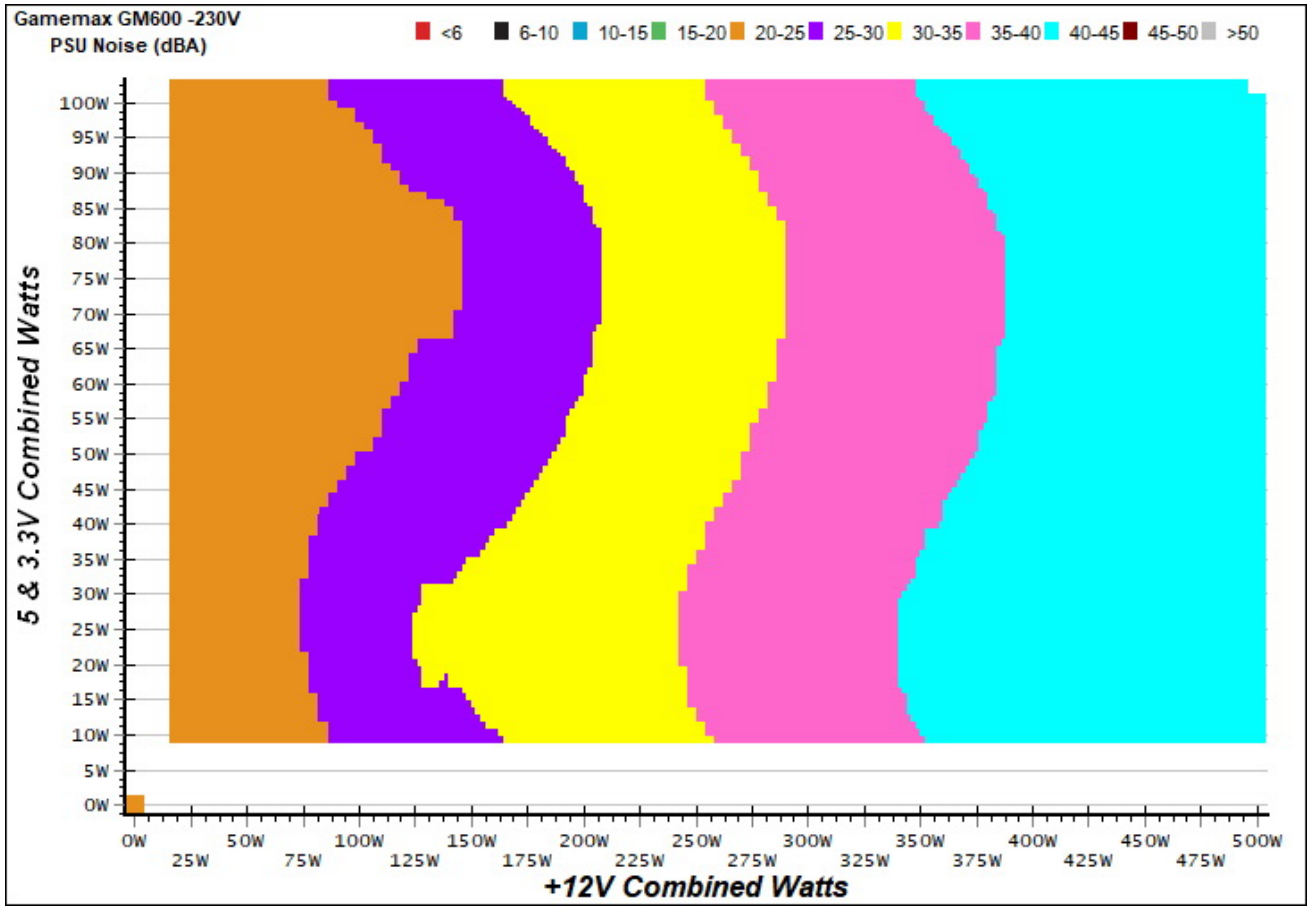
115V



□□

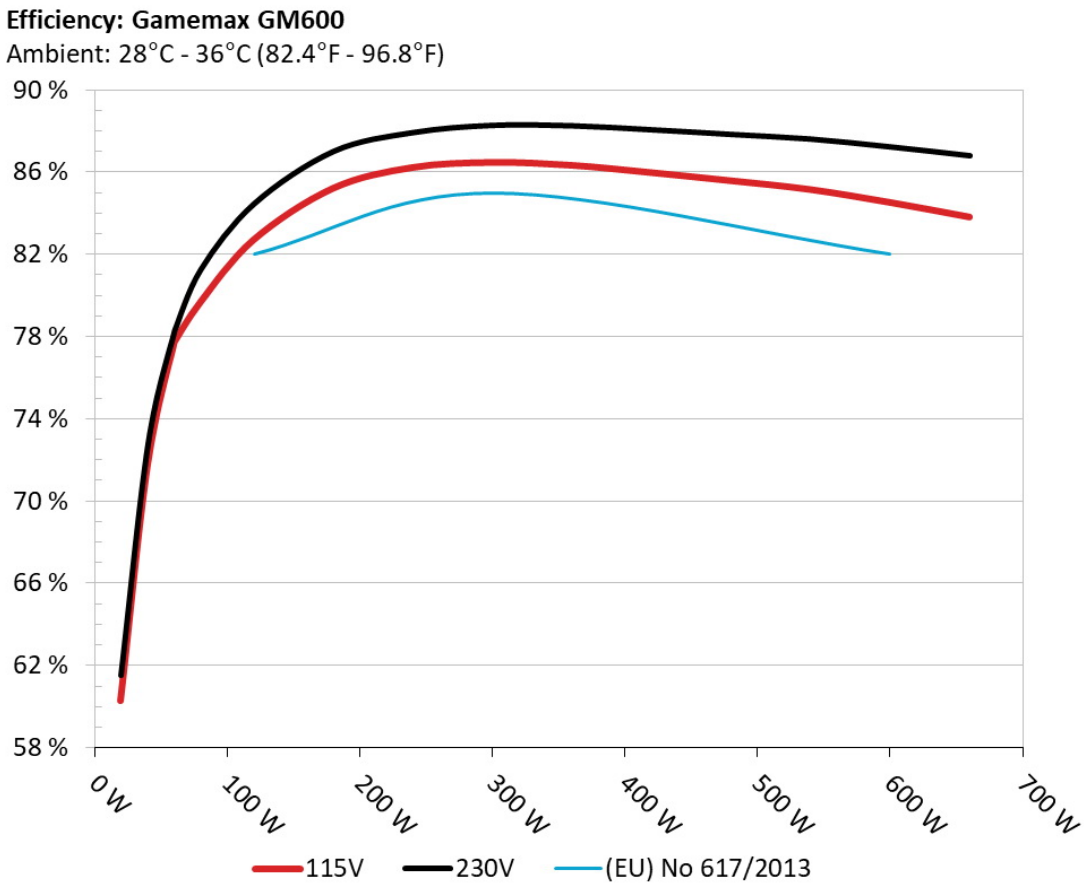
The PSU`s noise in its entire operational range and under 30-32 °C ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails.

230V



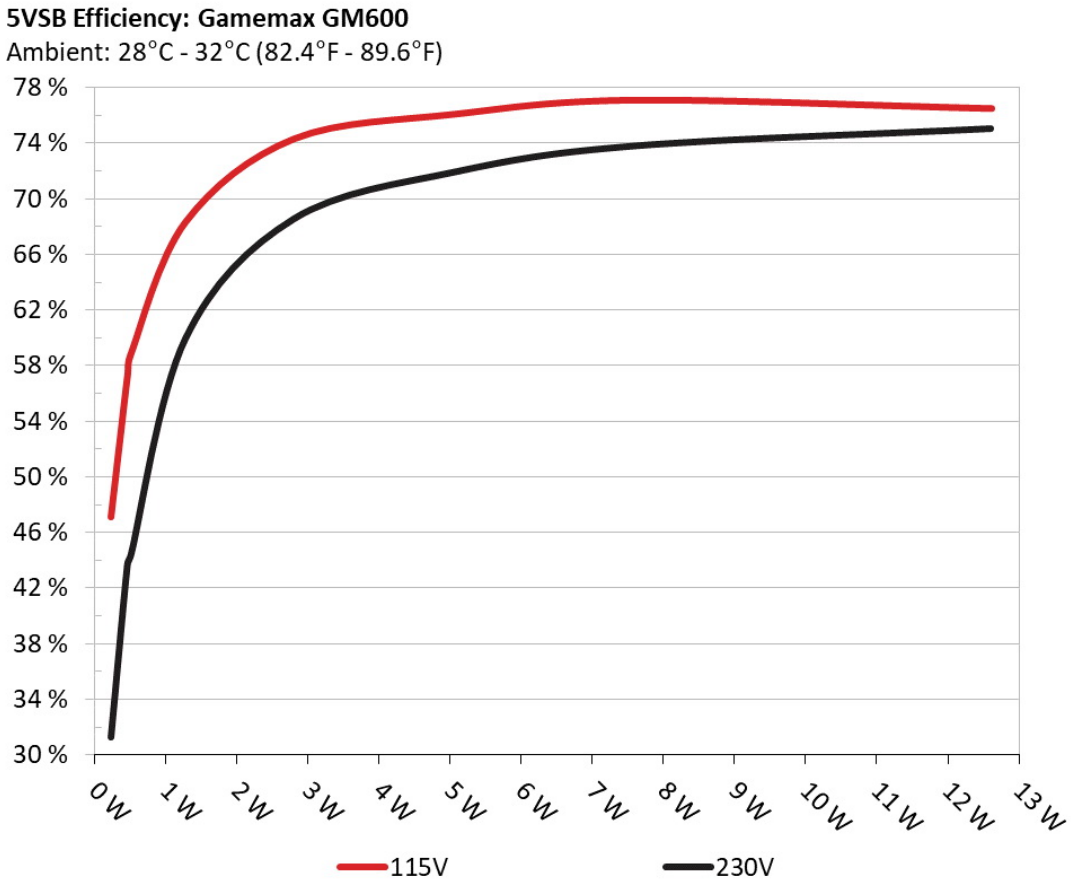
The PSU`s noise in its entire operational range and under 30-32 °C ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails.

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	0.230	47.131%	0.069
	5.111V	0.488		115.11V
2	0.090A	0.460	57.214%	0.108
	5.110V	0.804		115.11V
3	0.550A	2.804	74.318%	0.283
	5.098V	3.773		115.11V
4	1.000A	5.086	76.104%	0.329
	5.085V	6.683		115.11V
5	1.500A	7.608	77.098%	0.352
	5.072V	9.868		115.11V
6	2.500A	12.611	76.495%	0.380
	5.044V	16.486		115.11V

230V

□□ #	5VSB	DC/AC (□)	□□	PF/AC □□
1	0.045A	0.230	31.250%	0.031
	5.112V	0.736		230.26V
2	0.090A	0.460	43.643%	0.044
	5.110V	1.054		230.26V
3	0.550A	2.804	68.574%	0.149
	5.097V	4.089		230.26V
4	1.000A	5.086	71.968%	0.212
	5.085V	7.067		230.25V
5	1.500A	7.608	73.828%	0.252
	5.071V	10.305		230.26V
6	2.500A	12.609	75.071%	0.295
	5.043V	16.796		230.26V

Supplementary Tests (For Reference)

10-110%□□□□

115V

□□ #	12V	5V	3.3V	5VSB	DC/AC (□)	□□	□□□□ (RPM)	□□□□□□□□ (dB[A])	□□ (□□ /□□)	PF/AC □□
1	3.096A	1.954A	1.953A	0.985A	60.075	76.977%	912	22.3	30.24°C	0.971
	12.428V	5.119V	3.376V	5.079V	78.043				36.68°C	115.12V
2	7.160A	2.937A	2.930A	1.184A	119.777	82.721%	916	22.4	30.87°C	0.974
	12.413V	5.109V	3.377V	5.068V	144.796				38.40°C	115.12V
3	11.589A	3.433A	3.405A	1.385A	179.668	85.232%	924	22.6	31.32°C	0.986
	12.396V	5.101V	3.376V	5.057V	210.799				39.57°C	115.12V
4	16.034A	3.928A	3.910A	1.586A	239.690	86.250%	1104	28.2	31.57°C	0.991
	12.379V	5.092V	3.376V	5.046V	277.900				40.67°C	115.12V
5	20.166A	4.921A	4.887A	1.788A	299.799	86.497%	1335	33.5	32.45°C	0.993
	12.362V	5.082V	3.376V	5.034V	346.601				42.22°C	115.12V
6	24.306A	5.918A	5.863A	1.992A	359.889	86.359%	1540	37.3	32.96°C	0.994
	12.346V	5.071V	3.376V	5.022V	416.737				43.23°C	115.12V
7	28.430A	6.917A	6.843A	2.196A	419.611	86.006%	1744	41.2	33.48°C	0.995
	12.329V	5.059V	3.376V	5.010V	487.887				44.56°C	115.11V
8	32.631A	7.928A	7.822A	2.402A	480.134	85.608%	1745	41.2	33.75°C	0.996
	12.311V	5.047V	3.375V	4.997V	560.852				46.41°C	115.12V
9	37.170A	8.441A	8.303A	2.405A	539.457	85.184%	1747	41.3	34.84°C	0.997
	12.293V	5.037V	3.373V	4.991V	633.288				49.11°C	115.12V
10	41.800A	8.954A	8.810A	2.510A	600.176	84.551%	1747	41.3	35.96°C	0.997
	12.272V	5.027V	3.370V	4.982V	709.839				51.53°C	115.11V
11	46.763A	8.968A	8.818A	2.513A	660.209	83.841%	1750	41.3	36.41°C	0.997
	12.253V	5.020V	3.368V	4.976V	787.450				53.70°C	115.11V
CL2	42.014A	1.002A	1.000A	1.000A	529.839	85.965%	1746	41.2	35.99°C	0.997
	12.290V	5.074V	3.361V	5.042V	616.345				51.51°C	115.11V

The results above are not used in the certification process

230V

□□ #	12V	5V	3.3V	5VSB	DC/AC (□)	□□	□□□□ (RPM)	□□□□□□□□ (dB[A])	□□ (□□ /□□)	PF/AC □□
1	3.099A	1.953A	1.958A	0.985A	60.121	77.564%	914	22.3	30.05°C	0.804
	12.428V	5.119V	3.374V	5.079V	77.511				36.76°C	230.26V
2	7.164A	2.937A	2.932A	1.184A	119.818	84.449%	918	22.4	30.78°C	0.901
	12.412V	5.109V	3.374V	5.068V	141.882				38.20°C	230.26V
3	11.591A	3.434A	3.409A	1.385A	179.701	87.003%	923	22.6	31.32°C	0.933
	12.396V	5.101V	3.373V	5.057V	206.546				39.50°C	230.25V
4	16.037A	3.928A	3.914A	1.586A	239.724	87.927%	1086	27.9	31.74°C	0.951
	12.379V	5.092V	3.372V	5.046V	272.639				40.58°C	230.26V
5	20.168A	4.922A	4.892A	1.788A	299.827	88.282%	1322	33.2	32.47°C	0.963
	12.362V	5.082V	3.372V	5.034V	339.626				41.73°C	230.26V
6	24.307A	5.918A	5.873A	1.992A	359.912	88.262%	1536	37.3	32.97°C	0.967
	12.346V	5.071V	3.372V	5.022V	407.775				42.85°C	230.25V
7	28.430A	6.919A	6.852A	2.196A	419.625	88.068%	1736	41.1	33.14°C	0.971
	12.329V	5.060V	3.371V	5.010V	476.478				44.57°C	230.26V
8	32.631A	7.927A	7.833A	2.402A	480.136	87.841%	1743	41.2	33.74°C	0.975
	12.311V	5.047V	3.371V	4.997V	546.595				46.57°C	230.26V
9	37.170A	8.441A	8.310A	2.405A	539.456	87.617%	1744	41.2	34.56°C	0.979
	12.293V	5.037V	3.370V	4.991V	615.698				48.62°C	230.26V
10	41.795A	8.953A	8.815A	2.510A	600.169	87.234%	1746	41.2	35.32°C	0.982
	12.273V	5.028V	3.369V	4.982V	687.998				51.73°C	230.26V
11	46.761A	8.967A	8.823A	2.513A	660.198	86.803%	1748	41.3	36.20°C	0.985
	12.253V	5.021V	3.367V	4.976V	760.573				53.98°C	230.25V
CL2	42.017A	1.002A	0.999A	1.000A	529.831	88.322%	1744	41.2	35.39°C	0.978
	12.289V	5.074V	3.361V	5.042V	599.885				51.60°C	230.26V

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	1.161A	0.487A	0.472A	0.196A	19.540	60.299%	904	22.1	0.876
	12.444V	5.131V	3.374V	5.105V	32.405				115.12V
2	2.387A	0.976A	0.978A	0.392A	39.980	71.795%	908	22.2	0.939
	12.434V	5.126V	3.374V	5.097V	55.686				115.12V
3	3.547A	1.464A	1.450A	0.590A	59.476	77.758%	909	22.2	0.972
	12.428V	5.121V	3.375V	5.090V	76.489				115.12V
4	4.769A	1.954A	1.956A	0.787A	79.845	79.699%	911	22.3	0.963
	12.423V	5.117V	3.375V	5.082V	100.183				115.12V

The results above are not used in the certification process

230V

□□ #	12V	5V	3.3V	5VSB	DC/AC (□)	□□	□□□□ (RPM)	□□□□□□□ (dB[A])	PF/AC □□
1	1.167A	0.488A	0.472A	0.196A	19.619	61.503%	909	22.2	0.570
	12.444V	5.132V	3.373V	5.105V	31.899				230.25V
2	2.392A	0.976A	0.977A	0.393A	40.042	72.757%	911	22.3	0.723
	12.433V	5.126V	3.374V	5.097V	55.035				230.26V
3	3.552A	1.465A	1.450A	0.590A	59.539	78.294%	912	22.3	0.801
	12.427V	5.121V	3.374V	5.090V	76.045				230.26V
4	4.774A	1.954A	1.955A	0.787A	79.896	81.266%	912	22.3	0.844
	12.422V	5.117V	3.374V	5.082V	98.314				230.26V

The results above are not used in the certification process

□□□

115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	21.6 mV	30.0 mV	19.7 mV	16.9 mV	Pass
20% Load	25.0 mV	25.2 mV	17.6 mV	18.4 mV	Pass
30% Load	23.3 mV	23.8 mV	16.6 mV	17.8 mV	Pass
40% Load	24.6 mV	22.1 mV	16.0 mV	15.7 mV	Pass
50% Load	26.9 mV	22.0 mV	16.9 mV	16.8 mV	Pass
60% Load	28.0 mV	21.1 mV	15.9 mV	18.3 mV	Pass
70% Load	35.8 mV	17.0 mV	14.6 mV	20.7 mV	Pass
80% Load	41.4 mV	18.3 mV	15.4 mV	22.1 mV	Pass
90% Load	44.6 mV	17.8 mV	15.9 mV	23.0 mV	Pass
100% Load	47.7 mV	19.7 mV	17.8 mV	25.0 mV	Pass
110% Load	54.8 mV	22.7 mV	20.5 mV	26.6 mV	Pass
Crossload 2	58.3 mV	21.0 mV	22.7 mV	24.8 mV	Pass

The results above are not used in the certification process

230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	20.5 mV	31.4 mV	20.3 mV	18.0 mV	Pass
20% Load	24.0 mV	24.9 mV	18.5 mV	20.2 mV	Pass
30% Load	24.4 mV	24.7 mV	18.0 mV	18.8 mV	Pass
40% Load	24.0 mV	23.0 mV	16.8 mV	16.1 mV	Pass
50% Load	26.8 mV	22.6 mV	17.0 mV	17.4 mV	Pass
60% Load	28.3 mV	20.4 mV	18.0 mV	18.4 mV	Pass
70% Load	34.4 mV	16.5 mV	15.1 mV	21.1 mV	Pass
80% Load	40.0 mV	17.1 mV	16.4 mV	21.7 mV	Pass
90% Load	46.4 mV	17.2 mV	17.1 mV	23.2 mV	Pass





Test	12V	5V	3.3V	5VSB	Pass/Fail
100% Load	56.6 mV	19.1 mV	19.5 mV	26.2 mV	Pass
110% Load	67.9 mV	20.3 mV	19.1 mV	27.7 mV	Pass
Crossload 2	56.1 mV	17.7 mV	18.7 mV	24.2 mV	Pass

The results above are not used in the certification process

Gamemax GM600 rev.2 (#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

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