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Anex

EVGA SuperNOVA 650 G3

Lab ID#: 222
Receipt Date: Nov 7, 2018
Test Date: Nov 20, 2018

Report:
Report Date: Nov 22, 2018

DUT INFORMATION

Brand	EVGA
Manufacturer (OEM)	Super Flower
Series	SuperNOVA G3
Model Number	
Serial Number	1703470615890001
DUT Notes	

DUT SPECIFICATIONS

Rated Voltage (Vrms)	100-240
Rated Current (Arms)	10
Rated Frequency (Hz)	50-60
Rated Power (W)	650
Type	ATX12V
Cooling	130mm Hydraulic Dynamic Bearing Fan (H1282412L)
Semi-Passive Operation	✓ (selectable)
Cable Design	Fully Modular

POWER SPECIFICATIONS

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	24	22	54.1	3	0.5
	Watts	110		649.2	15	6
Total Max. Power (W)		650				

CABLES AND CONNECTORS

Modular Cables

Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors
ATX connector 20+4 pin (600mm)	1	1	18-22AWG	Yes
4+4 pin EPS12V (700mm)	1	1	18-22AWG	Yes
6+2 pin PCIe (700mm)	1	1	18-22AWG	Yes
6+2 pin PCIe (600mm+150mm)	1	2	18-22AWG	Yes
SATA (500mm+100mm+100mm)	2	6	18-20AWG	No
4 pin Molex (500mm+100mm+100mm+100mm)	1	4	18AWG	No
FDD Adapter (+100mm)	1	1	20AWG	No
AC Power Cord (1370mm) - C13 coupler	1	1	18AWG	No

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General Data	
Manufacturer (OEM)	Super Flower
Platform Model	Leadex II
Primary Side	
Transient Filter	4x Y caps, 3x X caps, 2x CM chokes, 1x MOV
Inrush Protection	NTC Thermistor & Diode
Bridge Rectifier(s)	1x
APFC MOSFETS	2x Infineon IPA50R199CP (550V, 15A @ 100°C, 0.14Ohm)
APFC Boost Diode	1x CREE C3D04060A (600V, 8A @ 152°C)
Hold-up Cap(s)	1x Nippon Chemi-Con (400V, 390uF, 2000h @ 105°C, KMR)
Main Switchers	2x Infineon IPA50R199CP (550V, 15A @ 100°C, 0.14Ohm)
APFC Controller	SF29603
PWM Controller	SF201T
Topology	Primary side: Half-Bridge & LLC Resonant Controller Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	
+12V MOSFETS	4x Infineon IPP041N04N G (40V, 90A @ 100°C, 4.1mOhm)
5V & 3.3V	DC-DC Converters: 8x Infineon BSC0906NS (30V, 40A @ 100°C, 4.5mOhm) PWM Controller: no info
Filtering Capacitors	Electrolytics: Chemi-Con (4-10,000 @ 105°C, KY), Chemi-Con (105°C, W), Chemi-Con (1-2,000 @ 105°C, KMG), Chemi-Con (1,000 @ 105°C, KRG),Chemi-Con (105°C, W) Polymers: Chemi-Con
Supervisor IC	SF201T (probably) & LM324ADG & LM339A
Fan Model	EVGA H1282412L (130mm, 12V, 0.18A, 1730 RPM, Hydro Dynamic Bearing)
5VSB Circuit	
Rectifier	Mospec S10C60C
Standby PWM Controller	29604

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RESULTS

Temperature Range (°C /°F)	30-32 / 86-89.6
ErP Lot 3/6 Ready	ErP Lot 3/6 2010: ✓ ErP Lot 3/6 2013: ✓ ErP Lot 3/6 2014, CEC: Partially
(EU) No 617/2013 Compliance	✓

115V

Average Efficiency	89.478%
Efficiency With 10W (≤500W) or 2% (>500W)	0.000
Average Efficiency 5VSB	77.176%
Standby Power Consumption (W)	0.0695748
Average PF	0.982
Avg Noise Output	27.31 dB(A)
Efficiency Rating (ETA)	PLATINUM
Noise Rating (LAMBDA)	A-

230V

Average Efficiency	91.302%
Average Efficiency 5VSB	75.690%
Standby Power Consumption (W)	0.1447010
Average PF	0.921
Avg Noise Output	27.61 dB(A)
Efficiency Rating (ETA)	SILVER
Noise Rating (LAMBDA)	A-

TEST EQUIPMENT

Electronic Loads	Chroma 6314A x2 63123A x6 63102A 63101A	Chroma 63601-5 x2 Chroma 63600-2 63640-80-80 x10 63610-80-20
AC Sources	Chroma 6530, Chroma 61604	
Power Analyzers	N4L PPA1530, N4L PPA5530	
Oscilloscopes	Picoscope 4444 & 3424, Keysight DSOX3024A, Rigol DS2072A	
Voltmeter	Keithley 2015 THD 6.5 Digit	
Sound Analyzer	Bruel & Kjaer 2250-L G4	
Microphone	Bruel & Kjaer Type 4955-A, Bruel & Kjaer Type 4189	
Data Loggers	Picoscope TC-08 x2, Labjack U3-HV x2	

HOLD-UP TIME & POWER OK SIGNAL (230V)

Hold-Up Time (ms)	17.90
AC Loss to PWR_OK Hold Up Time (ms)	16.70
PWR_OK Inactive to DC Loss Delay (ms)	1.20

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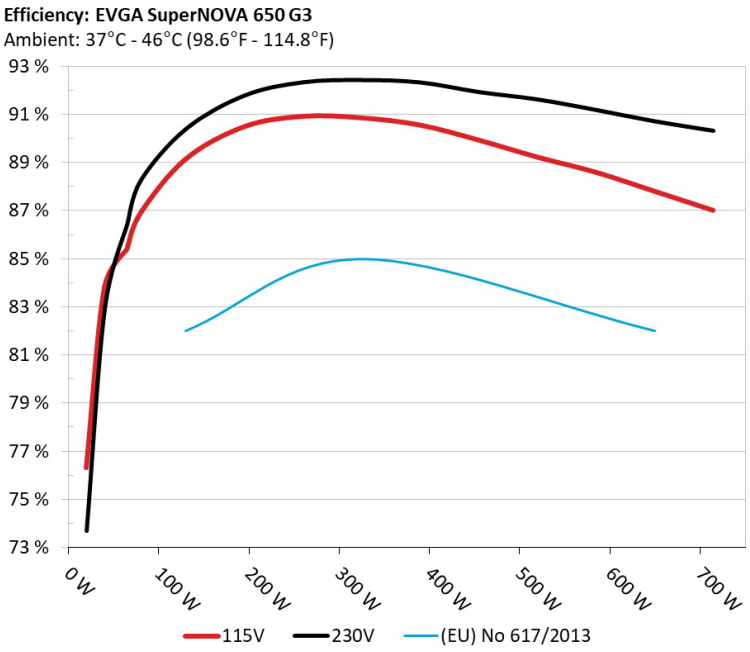
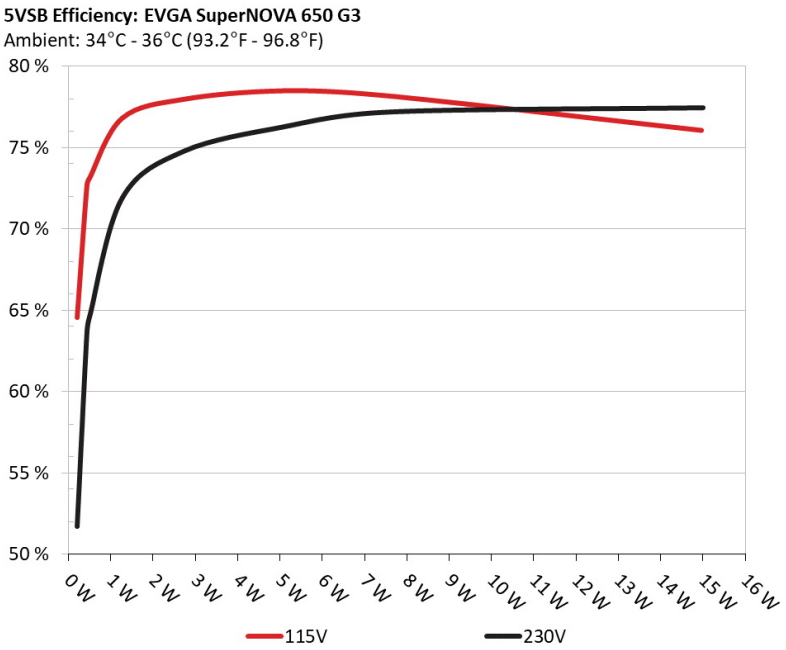
EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE



INFO

The PSU`s efficiency under high ambient temperatures with 115V and 230V input. For this graph the results of the 10-110% load regulation table are used

5VSB EFFICIENCY



INFO

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

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5VSB EFFICIENCY -115V (ERP LOT 3/6 & CEC)

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.042A	0.213	64.545%	0.024
	5.071V	0.330		115.07V
2	0.088A	0.444	72.668%	0.044
	5.070V	0.611		115.07V
3	0.543A	2.744	77.955%	0.212
	5.058V	3.520		115.05V
4	1.003A	5.058	78.467%	0.311
	5.046V	6.446		115.05V
5	1.502A	7.560	78.156%	0.374
	5.034V	9.673		115.06V
6	3.002A	14.957	76.040%	0.457
	4.983V	19.670		115.05V

5VSB EFFICIENCY -230V (ERP LOT 3/6 & CEC)

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.042A	0.212	51.707%	0.009
	5.071V	0.410		230.23V
2	0.087A	0.443	63.649%	0.015
	5.070V	0.696		230.24V
3	0.542A	2.744	74.789%	0.077
	5.059V	3.669		230.20V
4	1.002A	5.059	76.259%	0.133
	5.047V	6.634		230.21V
5	1.502A	7.561	77.185%	0.183
	5.034V	9.796		230.22V
6	3.001A	14.998	77.449%	0.289
	4.997V	19.365		230.22V

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115V

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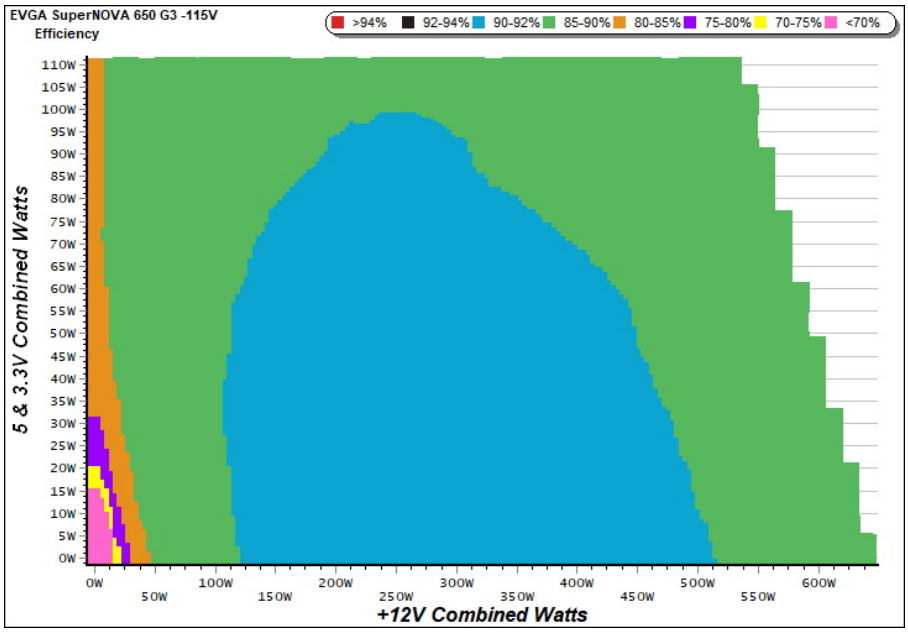
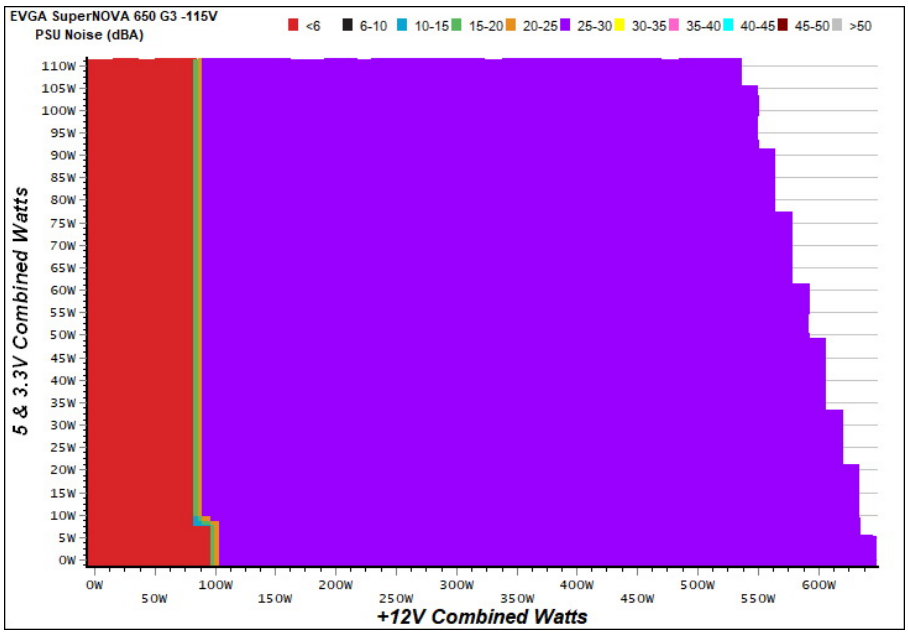
EFFICIENCY GRAPH 115V



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

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

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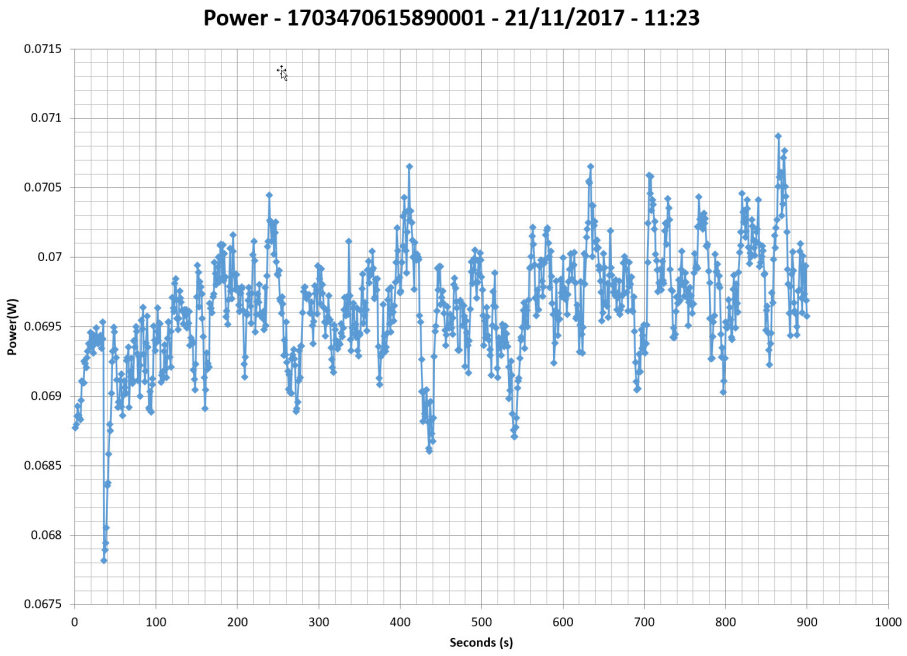
VAMPIRE POWER -115V



INFO

This graph is generated by the PPA Standby Power Analysis software which takes full control of the power analyzer during the whole procedure. This application features all of the EN50564 & IEC62301 test limits for standby power software testing

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EVGA SuperNOVA 650 G3

10-110% 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
1	3.532A	1.995A	1.989A	0.991A	64.804	85.234%	1355	33.5	38.04°C	0.944
	12.233V	5.018V	3.312V	5.045V	76.031				43.21°C	115.10V
2	8.090A	2.980A	2.984A	1.191A	129.781	89.126%	1368	33.9	38.23°C	0.965
	12.230V	5.019V	3.312V	5.038V	145.616				43.68°C	115.10V
3	12.990A	3.487A	3.498A	1.391A	194.928	90.474%	1392	34.4	38.57°C	0.980
	12.228V	5.020V	3.312V	5.030V	215.451				44.27°C	115.10V
4	17.882A	3.984A	3.982A	1.591A	259.801	90.904%	1406	34.4	38.89°C	0.986
	12.226V	5.019V	3.312V	5.023V	285.796				44.74°C	115.10V
5	22.440A	4.976A	4.979A	1.791A	324.747	90.839%	1443	36.8	39.55°C	0.990
	12.223V	5.021V	3.313V	5.015V	357.496				45.77°C	115.10V
6	27.006A	5.973A	5.975A	1.996A	389.784	90.540%	1496	37.8	40.85°C	0.992
	12.219V	5.023V	3.314V	5.007V	430.512				47.43°C	115.10V
7	31.567A	6.969A	6.968A	2.199A	454.702	89.917%	1527	37.0	41.60°C	0.994
	12.215V	5.025V	3.315V	4.999V	505.693				48.72°C	115.10V
8	36.135A	7.955A	7.959A	2.401A	519.649	89.211%	1585	38.1	42.76°C	0.995
	12.212V	5.027V	3.316V	4.992V	582.497				50.36°C	115.10V
9	41.133A	8.461A	8.472A	2.403A	584.753	88.580%	1641	39.0	43.91°C	0.995
	12.208V	5.026V	3.315V	4.990V	660.141				51.85°C	115.09V
10	45.885A	8.956A	8.957A	3.015A	649.631	87.793%	1716	39.8	45.34°C	0.995
	12.203V	5.026V	3.315V	4.972V	739.954				53.87°C	115.09V
11	51.221A	8.960A	8.963A	3.016A	714.552	87.002%	1728	39.9	46.49°C	0.996
	12.199V	5.025V	3.313V	4.970V	821.309				55.68°C	115.09V
CL1	0.098A	13.018A	13.003A	0.005A	110.615	83.854%	1605	38.4	42.72°C	0.960
	12.220V	5.061V	3.346V	5.067V	131.914				47.95°C	115.10V
CL2	54.120A	1.002A	1.003A	1.002A	674.042	88.307%	1496	37.8	43.25°C	0.995
	12.208V	4.995V	3.291V	5.028V	763.296				49.65°C	115.09V

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20-80W LOAD TESTS 115V

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	PF/AC Volts
1	1.194A	0.492A	0.484A	0.196A	19.662	76.319%	0	<6.0	0.729
	12.229V	5.013V	3.308V	5.068V	25.763				115.10V
2	2.412A	0.990A	0.994A	0.396A	39.745	83.797%	0	<6.0	0.872
	12.225V	5.015V	3.309V	5.061V	47.430				157.55V
3	3.632A	1.487A	1.508A	0.590A	59.864	85.388%	1462	37.8	0.945
	12.233V	5.016V	3.310V	5.056V	70.108				115.10V
4	4.841A	1.995A	1.990A	0.791A	79.818	86.888%	1355	33.5	0.941
	12.234V	5.017V	3.311V	5.050V	91.863				115.10V

RIPPLE MEASUREMENTS 115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	5.5 mV	4.0 mV	4.5 mV	6.5 mV	Pass
20% Load	8.0 mV	5.6 mV	5.4 mV	8.2 mV	Pass
30% Load	8.7 mV	5.8 mV	5.7 mV	9.2 mV	Pass
40% Load	9.3 mV	6.9 mV	6.6 mV	10.7 mV	Pass
50% Load	10.5 mV	7.5 mV	7.0 mV	12.2 mV	Pass
60% Load	10.5 mV	8.8 mV	7.9 mV	13.8 mV	Pass
70% Load	11.1 mV	9.8 mV	9.0 mV	17.0 mV	Pass
80% Load	11.3 mV	11.1 mV	9.5 mV	18.8 mV	Pass
90% Load	12.3 mV	11.9 mV	10.6 mV	20.5 mV	Pass
100% Load	13.1 mV	13.4 mV	12.0 mV	27.5 mV	Pass
110% Load	14.3 mV	14.5 mV	13.3 mV	30.1 mV	Pass
Crossload 1	7.5 mV	6.0 mV	7.6 mV	20.2 mV	Pass
Crossload 2	12.8 mV	12.7 mV	10.6 mV	20.3 mV	Pass

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230V

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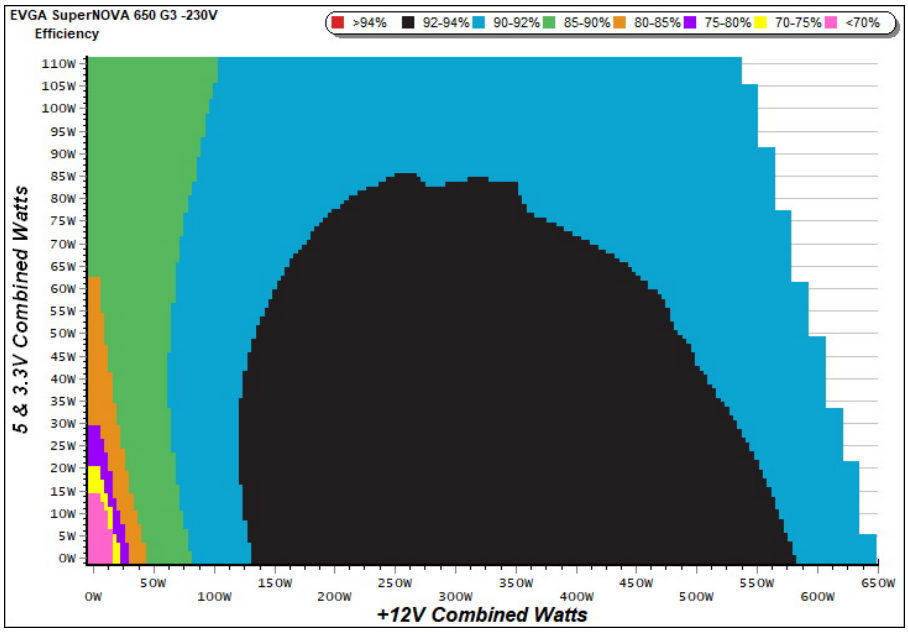

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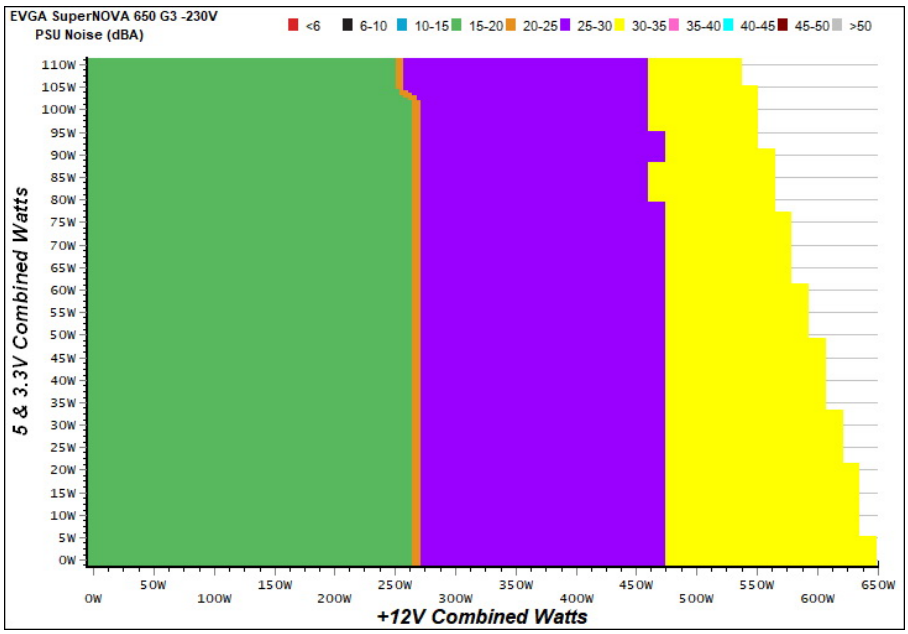
NOISE GRAPH 230V



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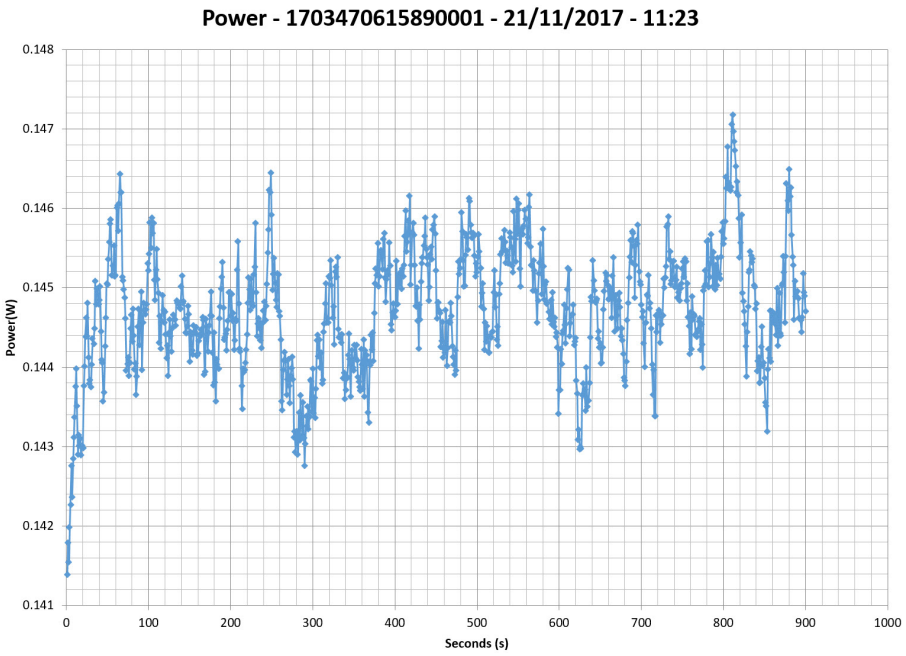

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10-110% LOAD TESTS 230V

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1	3.537A	1.993A	1.993A	0.991A	64.848	86.330%	1406	34.4	39.93°C	0.672
	12.228V	5.017V	3.311V	5.046V	75.116				42.90°C	230.65V
2	8.052A	2.989A	2.986A	1.191A	129.333	90.199%	1443	36.8	40.45°C	0.841
	12.225V	5.019V	3.313V	5.040V	143.387				43.62°C	230.78V
3	12.964A	3.487A	3.469A	1.391A	194.431	91.637%	1462	37.8	41.13°C	0.909
	12.221V	5.020V	3.313V	5.033V	212.176				44.84°C	230.84V
4	17.881A	3.985A	3.984A	1.592A	259.654	92.182%	1505	37.9	41.80°C	0.937
	12.217V	5.020V	3.312V	5.026V	281.674				45.67°C	230.78V
5	22.472A	4.978A	4.977A	1.794A	324.953	92.288%	1535	37.3	42.06°C	0.950
	12.213V	5.023V	3.314V	5.019V	352.107				46.39°C	230.75V
6	27.000A	5.973A	5.972A	1.996A	389.456	92.185%	1585	38.1	42.69°C	0.960
	12.209V	5.025V	3.315V	5.011V	422.474				47.53°C	230.69V
7	31.604A	6.963A	6.963A	2.199A	454.806	91.772%	1605	38.7	43.23°C	0.967
	12.204V	5.028V	3.317V	5.004V	495.584				48.81°C	230.64V
8	36.204A	7.954A	7.958A	2.402A	520.104	91.433%	1625	39.2	43.83°C	0.973
	12.200V	5.030V	3.318V	4.997V	568.836				49.70°C	230.69V
9	41.203A	8.450A	8.439A	2.403A	585.027	91.021%	1640	39.3	44.45°C	0.976
	12.196V	5.031V	3.318V	4.995V	642.741				50.68°C	230.64V
10	45.947A	8.948A	8.950A	3.014A	649.854	90.536%	1728	39.9	45.50°C	0.979
	12.191V	5.031V	3.318V	4.977V	717.786				52.34°C	230.59V
11	51.288A	8.944A	8.949A	3.014A	715.066	90.336%	1728	39.9	46.14°C	0.978
	12.193V	5.032V	3.319V	4.978V	791.563				53.31°C	230.62V
CL1	0.141A	13.003A	13.000A	0.000A	111.002	84.918%	1605	38.4	42.77°C	0.820
	12.221V	5.059V	3.346V	5.069V	130.716				48.63°C	230.97V
CL2	54.171A	1.003A	1.000A	1.000A	673.901	91.202%	1593	38.3	45.18°C	0.980
	12.194V	5.000V	3.291V	5.033V	738.907				51.54°C	230.59V

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Anex

EVGA SuperNOVA 650 G3

20-80W LOAD TESTS 230V

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	PF/AC Volts
1	1.181A	0.499A	0.483A	0.197A	19.542	75.370%	805	16.5	0.368
	12.231V	5.012V	3.308V	5.069V	25.928				230.85V
2	2.420A	0.998A	0.998A	0.395A	39.903	84.143%	805	16.5	0.532
	12.230V	5.014V	3.309V	5.063V	47.423				230.83V
3	3.602A	1.495A	1.477A	0.593A	59.434	86.149%	1355	33.5	0.648
	12.229V	5.015V	3.310V	5.057V	68.990				230.83V
4	4.842A	1.994A	1.993A	0.792A	79.814	88.094%	1368	33.9	0.726
	12.229V	5.016V	3.311V	5.051V	90.601				230.81V

RIPPLE MEASUREMENTS 230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	4.5 mV	4.5 mV	3.8 mV	5.6 mV	Pass
20% Load	7.0 mV	5.8 mV	4.4 mV	6.7 mV	Pass
30% Load	7.7 mV	6.3 mV	5.2 mV	7.5 mV	Pass
40% Load	8.3 mV	7.3 mV	5.9 mV	8.3 mV	Pass
50% Load	8.6 mV	8.8 mV	6.7 mV	9.5 mV	Pass
60% Load	9.0 mV	9.9 mV	7.3 mV	10.6 mV	Pass
70% Load	8.9 mV	11.1 mV	8.1 mV	12.9 mV	Pass
80% Load	9.5 mV	12.1 mV	9.5 mV	14.6 mV	Pass
90% Load	9.6 mV	13.2 mV	10.2 mV	15.7 mV	Pass
100% Load	10.7 mV	16.6 mV	11.3 mV	19.1 mV	Pass
110% Load	10.2 mV	15.8 mV	10.7 mV	17.9 mV	Pass
Crossload 1	5.5 mV	10.7 mV	9.0 mV	18.1 mV	Pass
Crossload 2	10.3 mV	15.2 mV	8.2 mV	16.6 mV	Pass

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Cybenetics offers the ETA and Lambda voluntary certification programs, through which the efficient and silent power supplies are promoted

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Anex

EVGA SuperNOVA 650 G3

Top side

Power specifications label

CERTIFICATIONS 115V

CERTIFICATIONS 230V

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