

## Anex

## EVGA SuperNOVA 1600 T2

Lab ID#: 200

Receipt Date: -

Test Date: -

Report:

Report Date: Oct 20, 2018

### DUT INFORMATION

Brand	EVGA
Manufacturer (OEM)	Super Flower
Series	SuperNOVA
Model Number	SuperNOVA 1600 T2
Serial Number	1403441610800013
DUT Notes	

### DUT SPECIFICATIONS

Rated Voltage (Vrms)	115-240
Rated Current (Arms)	17-10
Rated Frequency (Hz)	50-60
Rated Power (W)	1600
Type	ATX12V
Cooling	140mm Double Ball-Bearing Fan (RL4Z B1402512EH)
Semi-Passive Operation	✓ (selectable)
Cable Design	Fully Modular

### POWER SPECIFICATIONS

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	24	24	133.3	3	0.5
	Watts	120		1599.6	15	6
Total Max. Power (W)		1600				

### CABLES AND CONNECTORS

Modular Cables					
Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors	
ATX connector 20+4 pin (600mm)	1	1	16-22AWG	Yes	
4+4 pin EPS12V (750mm)	2	2	16-22AWG	Yes	
6+2 pin PCIe (750mm+150mm)	5	10	16-22AWG	Yes	
6+2 pin PCIe (750mm)	4	4	16-22AWG	Yes	
SATA (550mm+100mm+100mm+100mm)	3	12	18-20AWG	No	
SATA (550mm+100mm) / 4 pin Molex (+100mm+100mm)	1	2 / 2	18AWG	No	
4 pin Molex (550mm+100mm+100mm)	1	3	18AWG	No	
FDD Adapter (+100mm)	2	2	20AWG	No	
AC Power Cord (1720mm) - C19 coupler	1	1	16AWG	No	

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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

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## EVGA SuperNOVA 1600 T2

### RESULTS

Temperature Range (°C /°F)	30-32 / 86-89.6
Average Efficiency	91.769
Efficiency With 10W (≤500W) or 2% (>500W) Load -115V	0.000
Average Efficiency 5VSB	78.664
Standby Power Consumption (W) -115V	0.1113630
Standby Power Consumption (W) -230V	0.2212740
Average PF	0.992
ErP Lot 3/6 Ready	✓
(EU) No 617/2013 Compliance	✓
Avg Noise Output	34.51
Efficiency Rating (ETA)	TITANIUM
Noise Rating (LAMBDA)	Standard++

### TEST EQUIPMENT

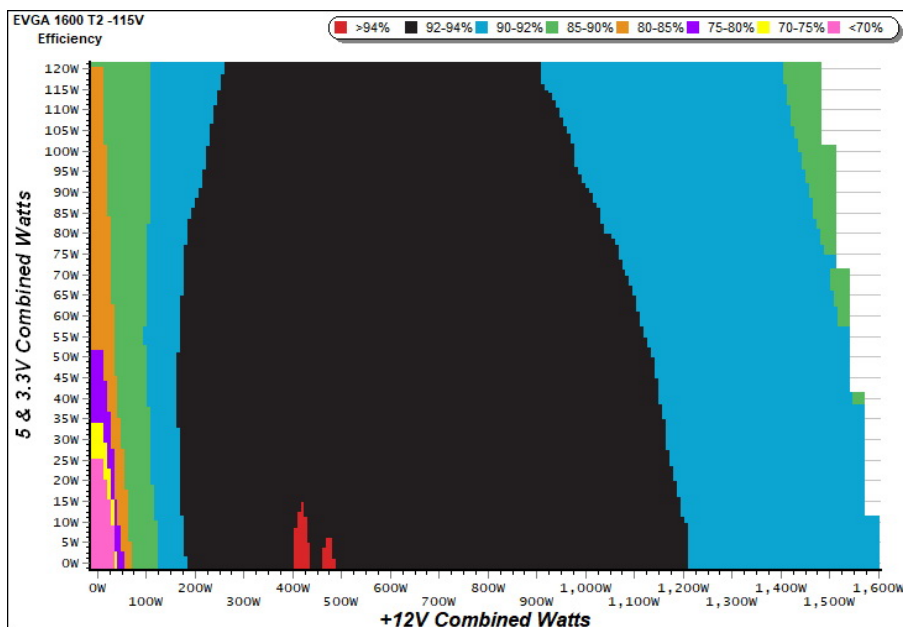
Electronic Loads	Chroma 6314A x2 63123A x6 63102A 63101A	Chroma 63601-5 x2 Chroma 63600-2 63640-80-80 x10 63610-80-20
AC Sources	Chroma 6530, Chroma 61604	
Power Analyzers	N4L PPA1530, N4L PPA5530	
Oscilloscopes	Picoscope 4444 & 3424, Keysight DSOX3024A, Rigol DS2072A	
Voltmeter	Keithley 2015 THD 6.5 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	

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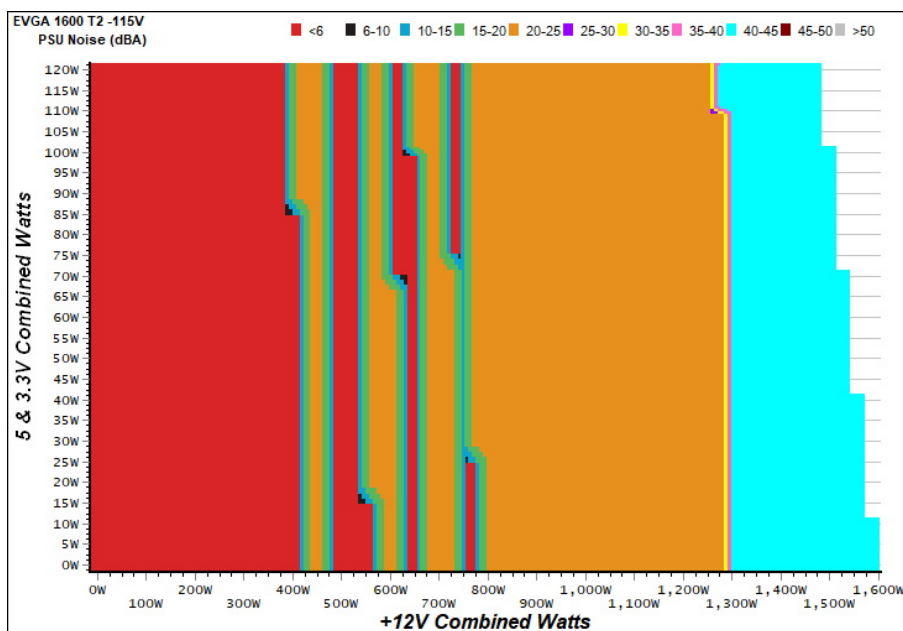
### EFFICIENCY GRAPH



#### 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



#### 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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## EVGA SuperNOVA 1600 T2

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

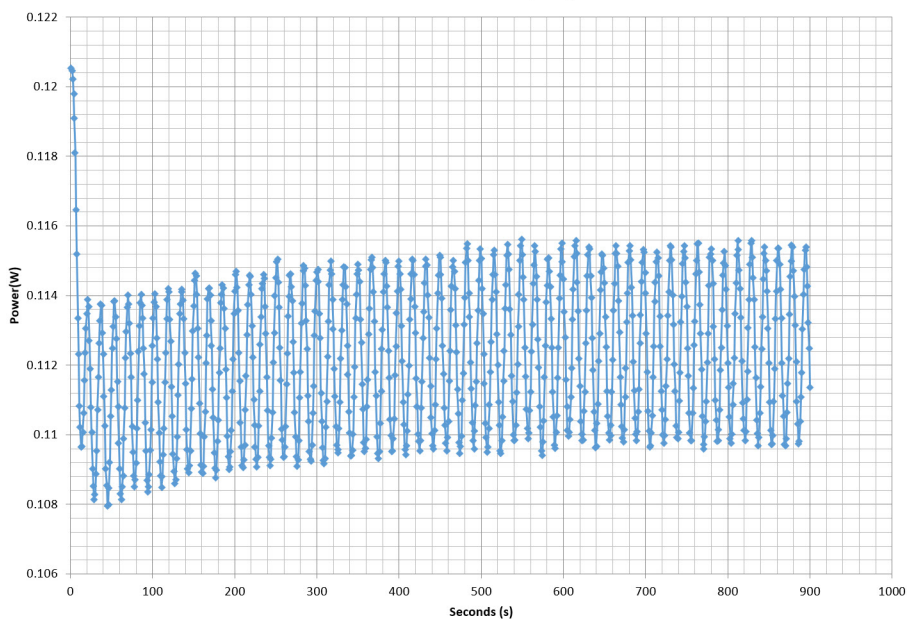
Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.229	59.021%	0.021
	5.078V	0.388		115.39V
2	0.090A	0.457	68.825%	0.036
	5.077V	0.664		115.38V
3	0.550A	2.788	78.779%	0.176
	5.068V	3.539		115.38V
4	1.000A	5.061	79.525%	0.276
	5.060V	6.364		115.38V
5	1.500A	7.578	79.852%	0.349
	5.051V	9.490		115.37V
6	3.000A	15.064	78.426%	0.461
	5.021V	19.208		115.36V

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.229	46.263%	0.009
	5.078V	0.495		230.87V
2	0.090A	0.457	58.968%	0.013
	5.077V	0.775		230.88V
3	0.550A	2.788	75.926%	0.061
	5.068V	3.672		230.87V
4	1.000A	5.061	77.909%	0.106
	5.060V	6.496		230.86V
5	1.500A	7.579	78.964%	0.151
	5.052V	9.598		230.87V
6	3.001A	15.072	79.708%	0.256
	5.023V	18.909		230.86V

### VAMPIRE POWER -115V

Power - 1403441610800013 - 19/10/2017 - 10:43



#### 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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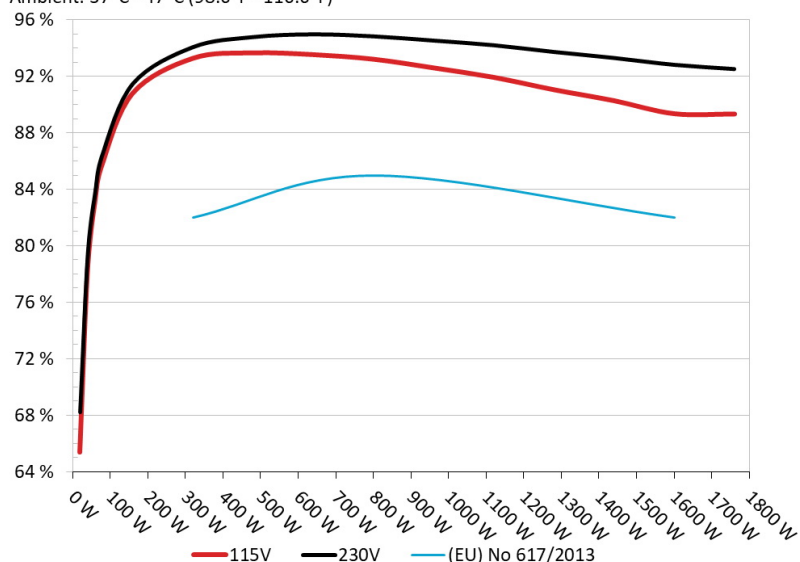
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### EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE

#### Efficiency: EVGA 1600 T2

Ambient: 37°C - 47°C (98.6°F - 116.6°F)



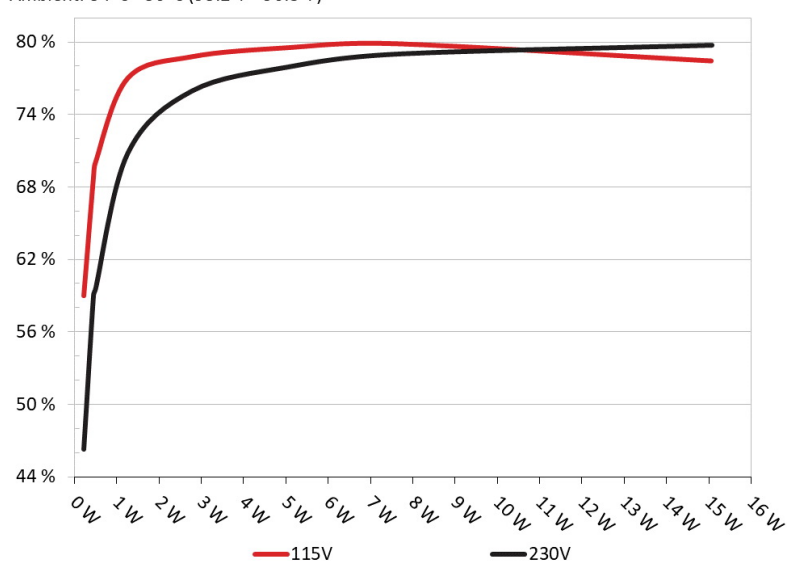
#### INFO

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: EVGA 1600 T2

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

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### 10-110% LOAD TESTS

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
1	11.414A	1.985A	1.998A	0.988A	160.092	90.819%	0	<6.0	47.34°C	0.974
	12.133V	5.041V	3.303V	5.061V	176.276				38.29°C	115.58V
2	23.815A	2.976A	3.000A	1.187A	319.772	93.294%	0	<6.0	47.88°C	0.991
	12.130V	5.039V	3.300V	5.055V	342.759				38.49°C	115.48V
3	36.551A	3.476A	3.488A	1.387A	479.302	93.680%	0	<6.0	49.71°C	0.994
	12.128V	5.037V	3.297V	5.050V	511.636				38.76°C	115.35V
4	49.359A	3.974A	4.007A	1.586A	639.786	93.559%	947	26.7	41.12°C	0.997
	12.127V	5.035V	3.294V	5.044V	683.830				52.84°C	115.12V
5	61.801A	4.969A	5.012A	1.787A	799.905	93.231%	947	26.7	41.36°C	0.998
	12.126V	5.033V	3.291V	5.038V	857.985				53.56°C	114.99V
6	74.258A	5.966A	6.021A	1.988A	960.039	92.618%	947	26.7	41.80°C	0.998
	12.123V	5.030V	3.288V	5.032V	1036.557				55.86°C	114.85V
7	86.686A	6.964A	7.030A	2.189A	1119.748	91.946%	980	30.7	42.91°C	0.998
	12.120V	5.028V	3.285V	5.027V	1217.833				58.43°C	114.61V
8	99.191A	7.962A	8.043A	2.391A	1280.309	91.062%	1515	43.3	44.37°C	0.998
	12.117V	5.025V	3.282V	5.021V	1405.974				60.22°C	114.45V
9	112.022A	8.464A	8.539A	2.392A	1439.664	90.289%	1977	50.2	45.86°C	0.998
	12.115V	5.023V	3.279V	5.018V	1594.513				61.82°C	114.28V
10	124.704A	8.966A	9.065A	2.998A	1600.008	89.364%	1977	50.2	46.63°C	0.997
	12.111V	5.021V	3.276V	5.004V	1790.430				62.84°C	114.11V
11	137.930A	8.968A	9.072A	2.999A	1759.901	89.346%	1977	50.2	46.90°C	0.997
	12.109V	5.019V	3.273V	5.003V	1969.754				63.50°C	114.05V
CL1	0.742A	14.004A	13.998A	0.000A	125.667	85.442%	980	30.7	43.21°C	0.967
	12.137V	5.033V	3.299V	5.077V	147.078				53.57°C	115.60V
CL2	133.351A	1.004A	1.001A	1.000A	1628.387	89.541%	1977	50.2	46.53°C	0.997
	12.111V	5.027V	3.279V	5.044V	1818.591				62.77°C	114.10V

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### 20-80W LOAD TESTS

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	PF/AC Volts
1	1.191A	0.496A	0.483A	0.197A	19.554	65.361%	0	<6.0	0.797
	12.137V	5.045V	3.307V	5.078V	29.917				115.76V
2	2.443A	0.992A	0.996A	0.394A	39.944	78.182%	0	<6.0	0.895
	12.136V	5.044V	3.306V	5.074V	51.091				115.73V
3	3.628A	1.487A	1.481A	0.592A	59.424	83.076%	0	<6.0	0.931
	12.136V	5.043V	3.305V	5.070V	71.530				115.70V
4	4.883A	1.983A	1.999A	0.790A	79.860	85.842%	0	<6.0	0.946
	12.135V	5.042V	3.304V	5.066V	93.031				115.68V

### RIPPLE MEASUREMENTS

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	2.8 mV	4.9 mV	4.8 mV	4.9 mV	Pass
20% Load	4.5 mV	7.6 mV	6.5 mV	5.9 mV	Pass
30% Load	6.2 mV	10.5 mV	8.3 mV	6.5 mV	Pass
40% Load	7.5 mV	12.3 mV	9.9 mV	7.1 mV	Pass
50% Load	8.6 mV	15.2 mV	13.2 mV	8.8 mV	Pass
60% Load	9.3 mV	17.1 mV	13.5 mV	9.7 mV	Pass
70% Load	9.9 mV	19.3 mV	14.5 mV	10.3 mV	Pass
80% Load	10.0 mV	21.2 mV	17.0 mV	11.3 mV	Pass
90% Load	11.0 mV	24.9 mV	18.7 mV	14.2 mV	Pass
100% Load	12.1 mV	29.4 mV	20.4 mV	19.7 mV	Pass
110% Load	13.1 mV	31.4 mV	22.8 mV	19.6 mV	Pass
Crossload 1	2.5 mV	7.2 mV	7.7 mV	11.5 mV	Pass
Crossload 2	12.2 mV	28.7 mV	19.0 mV	18.4 mV	Pass

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EVGA SuperNOVA 1600 T2

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

Hold-Up Time (ms)	21.4
AC Loss to PWR_OK Hold Up Time (ms)	17.7
PWR_OK Inactive to DC Loss Delay (ms)	3.7



Top side



Power specifications label

## CERTIFICATIONS



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