

Lab ID#: SF16002220  
Receipt Date: Jul 31, 2023  
Test Date: Aug 18, 2023

Report: 23PS2220A  
Report Date: Aug 22, 2023

DUT INFORMATION	
Brand	Super Flower
Manufacturer (OEM)	Super Flower
Series	Leadex
Model Number	SF-1600
Serial Number	S2307199003
DUT Notes	

DUT SPECIFICATIONS	
Rated Voltage (Vrms)	115-240
Rated Current (Arms)	17
Rated Frequency (Hz)	60-50
Rated Power (W)	1600
Type	ATX12V
Cooling	140mm Fluid Dynamic Bearing Fan (ZFF142512D)
Semi-Passive Operation	✓
Cable Design	Fully Modular

TEST EQUIPMENT	
Electronic Loads	Chroma 63601-5 x2 Chroma 63600-2 63640-80-80 x10 63610-80-20
AC Sources	Chroma 6530, APM SP300VAC4000W-P
Power Analyzers	RS HMC8015, N4L PPA1530, N4L PPA5530
Oscilloscopes	Picoscope 4444, Rigol DS7014, 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, Keithley 2015 - THD
UPS	FSP Champ Tower 3kVA, CyberPower OLS3000E 3kVA
Isolation Transformer	4kVA

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## RESULTS

Temperature Range (°C /°F)	30-32 / 86-89.6 (+-2°C / +- 3.6°F)
ErP Lot 3/6 Ready	✓
(EU) No 617/2013 Compliance	✓
ALPM (Alternative Low Power Mode) compatible	✓
ATX v3.0 PSU Power Excursion	✓

### 115V

Average Efficiency	91.082%
Efficiency With 10W (≤500W) or 2% (>500W)	75.688
Average Efficiency 5VSB	79.481%
Standby Power Consumption (W)	0.1003000
Average PF	0.995
Avg Noise Output	39.79 dB(A)
Efficiency Rating (ETA)	TTANIUM
Noise Rating (LAMBDA)	Standard+

### 230V

Average Efficiency	92.647%
Average Efficiency 5VSB	77.434%
Standby Power Consumption (W)	0.2235000
Average PF	0.966
Avg Noise Output	39.94 dB(A)
Efficiency Rating (ETA)	SILVER
Noise Rating (LAMBDA)	Standard+

## 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				

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## CABLES AND CONNECTORS

### Modular Cables

Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors
ATX connector 24 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
12+2 pin PCIe (600mm) (600W)	1	1	16-24AWG	No
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 (1680mm) - C19 coupler	1	1	16AWG	-

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General Data	
Manufacturer (OEM)	Super Flower
PCB Type	Double-Sided
Primary Side	
Transient Filter	5x Y caps, 5x X caps, 2x CM chokes, 1x MOV (TVR14511)
Inrush Protection	NTC Thermistor SCK-254R7 (4.7 Ohm) & Relay
Bridge Rectifier(s)	Bridgeless Design - 1x US30K80R & 8x Infineon FETs
APFC MOSFETs	8x Infineon FETs
APFC Boost Diode	4x Infineon IDH08G65C5 (650V, 8A @ 145°C)
Bulk Cap(s)	4x Nippon Chemi-Con (400 V, 2x 330 uF, 2x 470 uF, 1600 uF combined, 105°C, KMW)
Main Switchers	4x Infineon IPB60R099C6 (650V, 24A @ 100°C, Rds(on): 0.099Ohm)
APFC Controller	SF29603
Resonant Controller	S9602
Topology	Primary side: Bridgeless PFC & Full-Bridge LLC & Resonant Converter Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	
+12V MOSFETs	8x Infineon BSC027N04LSG (40V, 88A @ 100°C, Rds(on): 2.7mOhm)
5V & 3.3V	DC-DC Converters: 8x Infineon BSC0906NS (30V, 40A @ 100°C, Rds(on): 4.5mOhm) PWM Controllers: 2x
Filtering Capacitors	Electrolytic: 10x Nippon Chemi-Con (105°C, W), 5x Nippon Chemi-Con (4-10,000 @ 105°C, KY), 20x Rubycon (3-5,000 @ 105°C, ML), 11x Rubycon (6-10000 @ 105°C, ZLH)  Polymer: 12x Chemi-Con
Supervisor IC	JTC113 & LM324ADG
Fan Model	ZIC ZFF142512D (140mm, 12V, 0.65A, Fluid Dynamic Bearing Fan)
5VSB Circuit	
Rectifier	1x PFR20L60CT SBR (60V, 20A)
Standby PWM Controller	29604

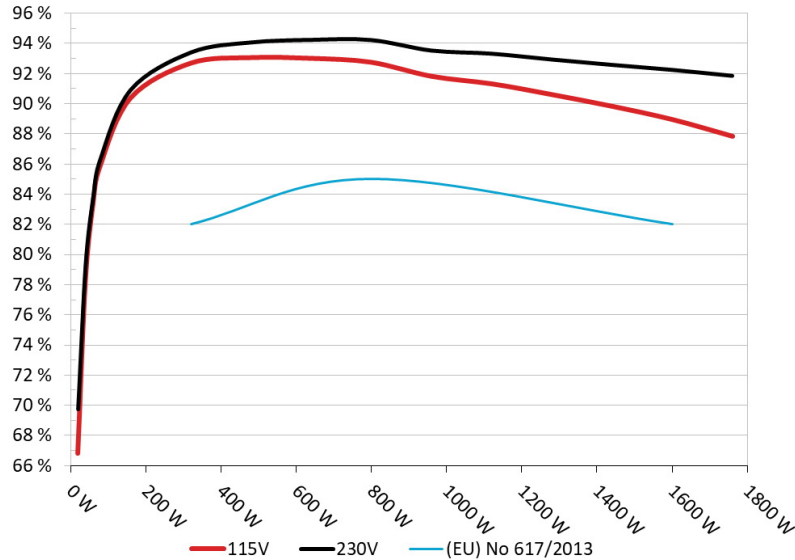
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**EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE**

**Efficiency: Super Flower Leadex Titanium 1600W**

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



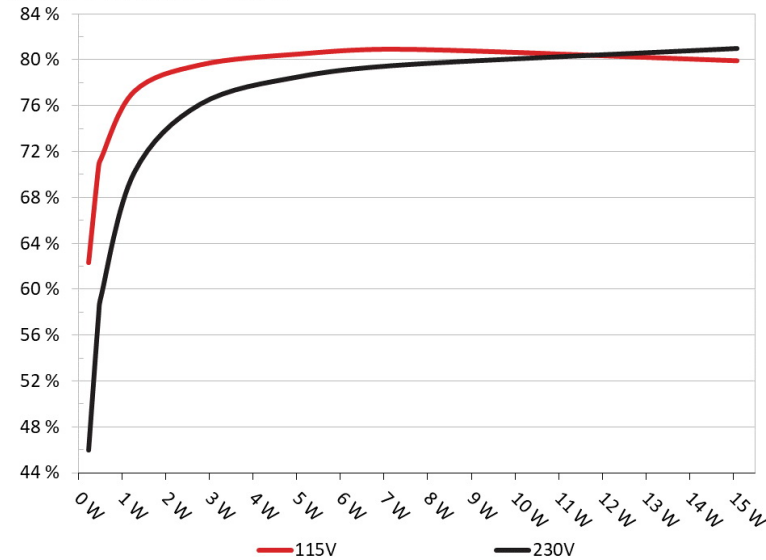
**INFO**

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**

**B Efficiency: Super Flower Leadex Titanium 1600W**

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.229W	61.837%	0.018
	5.09V	0.37W		114.85V
2	0.09A	0.458W	70.256%	0.031
	5.089V	0.652W		114.86V
3	0.55A	2.794W	79.042%	0.156
	5.079V	3.535W		114.86V
4	1A	5.07W	79.984%	0.25
	5.07V	6.339W		114.86V
5	1.5A	7.59W	80.382%	0.325
	5.06V	9.443W		114.85V
6	3A	15.083W	79.39%	0.444
	5.028V	18.999W		114.85V

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.229W	45.48%	0.007
	5.09V	0.505W		229.85V
2	0.09A	0.458W	57.278%	0.011
	5.089V	0.801W		229.86V
3	0.55A	2.794W	75.652%	0.052
	5.079V	3.694W		229.85V
4	1A	5.07W	78.045%	0.09
	5.07V	6.496W		229.84V
5	1.5A	7.589W	79.103%	0.129
	5.059V	9.595W		229.84V
6	3A	15.089W	80.495%	0.226
	5.029V	18.746W		229.85V

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# 115V

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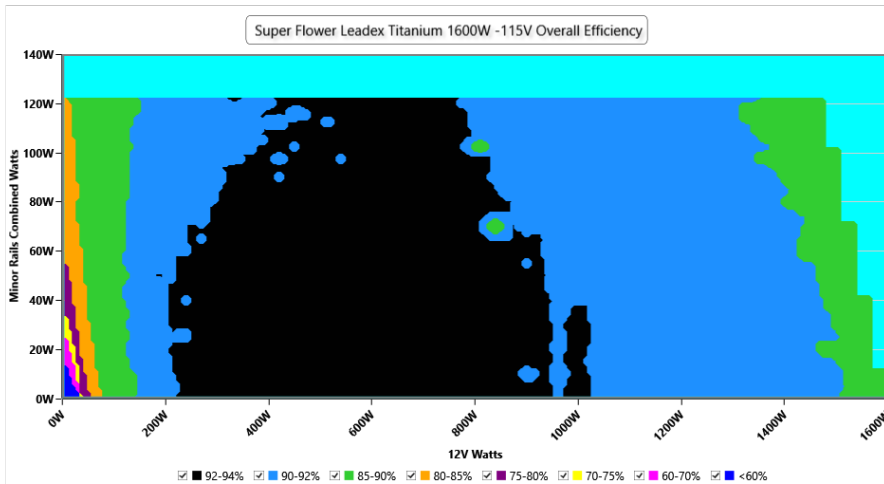
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### EFFICIENCY GRAPH 115V

#### INFO

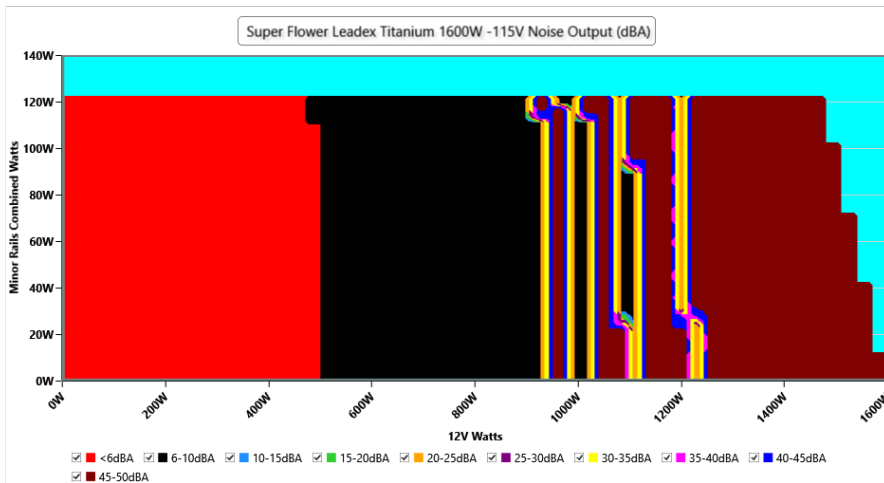
This graph depicts the PSU's efficiency throughout its entire operational range. For the generation of the efficiency and noise graphs we set our loaders to auto mode through our custom-made software before trying thousands of possible load combinations



### NOISE GRAPH 115V

#### INFO

The PSU's noise in its entire operational range and under 30-32 °C (+2 °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**

**Detailed Results**

	Average	Min	Limit Min	Max	Limit Max	Result
Mains Voltage RMS:	114.84 V	114.79 V	113.85 V	114.90 V	116.15 V	PASS
Mains Frequency:	60.01 Hz	60.00 Hz	59.40 Hz	60.02 Hz	60.60 Hz	PASS
Mains Voltage CF:	1.419	1.417	1.340	1.421	1.490	PASS
Mains Voltage THD:	0.15 %	0.09 %	N/A	0.31 %	2.00 %	PASS
Real Power:	0.100 W	0.078 W	N/A	0.126 W	N/A	N/A
Apparent Power:	20.964 W	20.926 W	N/A	21.012 W	N/A	N/A
Power Factor:	0.005	N/A	N/A	N/A	N/A	N/A

**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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**COMMISSION REGULATION (EU) NO 617/2013 TESTING 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%	11.441A	1.976A	1.963A	0.987A	159.99	90.387%	0	<6.0	44.26°C	0.981
	12.097V	5.061V	3.362V	5.068V	177.012				40°C	114.79V
20%	23.912A	2.963A	2.946A	1.187A	319.951	92.697%	0	<6.0	45.29°C	0.995
	12.088V	5.063V	3.361V	5.057V	345.16				40.66°C	114.74V
50%	62.074A	4.931A	4.91A	1.792A	799.374	92.759%	444	6.5	42.22°C	0.999
	12.065V	5.07V	3.36V	5.023V	861.801				48.26°C	114.59V
100%	125.541A	8.876A	8.844A	3.024A	1599.451	88.966%	2002	54.0	45.42°C	0.998
	12.026V	5.07V	3.358V	4.961V	1797.771				55.46°C	114.28V

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# 230V

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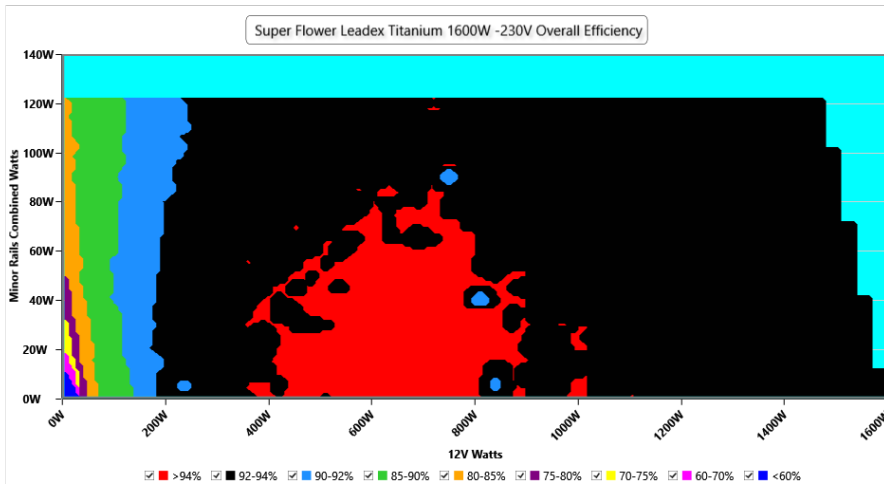
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### EFFICIENCY GRAPH 230V

#### INFO

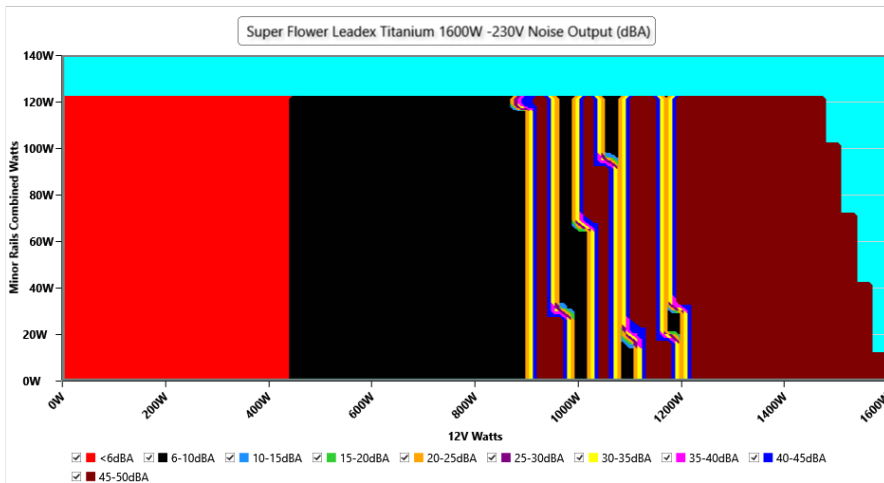
This graph depicts the PSU's efficiency throughout its entire operational range. For the generation of the efficiency and noise graphs we set our loaders to auto mode through our custom-made software before trying thousands of possible load combinations



### NOISE GRAPH 230V

#### INFO

The PSU's noise in its entire operational range and under 30-32 °C (+2 °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 -230V**

**Detailed Results**

	Average	Min	Limit Min	Max	Limit Max	Result
Mains Voltage RMS:	229.86 V	229.79 V	227.70 V	229.92 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	1.418	1.490	PASS
Mains Voltage THD:	0.13 %	0.09 %	N/A	0.19 %	2.00 %	PASS
Real Power:	0.224 W	0.167 W	N/A	0.288 W	N/A	N/A
Apparent Power:	70.094 W	70.046 W	N/A	70.156 W	N/A	N/A
Power Factor:	0.003	N/A	N/A	N/A	N/A	N/A

**INFO**

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**COMMISSION REGULATION (EU) NO 617/2013 TESTING 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%	11.441A	1.973A	1.962A	0.987A	159.992	90.947%	0	<6.0	44.66°C	0.883
	12.097V	5.067V	3.363V	5.068V	175.959				40.38°C	229.83V
20%	23.912A	2.96A	2.945A	1.187A	319.951	93.425%	0	<6.0	45.38°C	0.936
	12.088V	5.067V	3.362V	5.057V	342.458				40.76°C	229.8V
50%	62.071A	4.931A	4.911A	1.792A	799.335	94.253%	446	6.7	42.44°C	0.992
	12.064V	5.07V	3.36V	5.023V	848.079				48.53°C	229.72V
100%	125.553A	8.879A	8.845A	3.024A	1599.456	92.273%	2017	54.4	45.41°C	0.997
	12.025V	5.068V	3.358V	4.961V	1733.342				55.49°C	229.6V

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EFFICIENCY AND NOISE REPORT IN ACCORDANCE WITH  
CYBENETICS ETA AND CYBENETICS LAMBDA PROCEDURE

## Super Flower Leadex Titanium 1600W

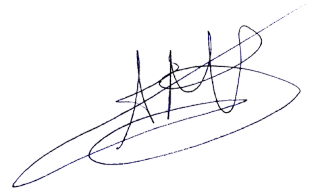


Top side

MODEL NO : SF-1600 Series					
AC INPUT	115Vac~ 240Vac 17A 60HZ/50Hz				
DC OUTPUT	+3.3V	+5V	+12V	-12V	+5VSB
1600W	Max output Current	24A	24A	133.3A	0.5A 3.0A
	Max combined	120W		1599.6W	6W 15W
	Wattage	1600W			

Power specifications label

### CERTIFICATIONS 115V

**Aristeidis Bitziopoulos**  
Lab Director

### CERTIFICATIONS 230V



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