Bitfenix Formula Gold 550W (#2)

Serial Number 735Q00356

Lab ID 203

Certification ID 25203

Test Result Report ID:

Certificate Issue Date: Oct 26, 2018

Scheme: ETA-EMI PSU

115V



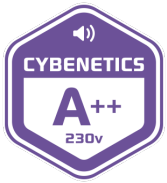
230V



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	Bitfenix
Model	Formula Gold 550W (#2)
OEM/ODM	Channel Well Technology
Serial Number	735Q00356
Product Specifications	
Manufacturer-Provided Information	
Rated Voltage (Vrms)	100-240
Rated Current (Arms)	8
Rated Frequency (Hz)	47-63

Rated Power (W)	550
Operating Temperature (Continuous Full Load) (°C)	
Type	ATX12V
Cable Design	Fixed cables
Warranty	-
Cybenetics Measurements	
Dimensions (W x H x D)	
Weight	
Cooling	120mm Rifle Bearing Fan (DF1202512SELN)
Semi-Passive Operation	✗
Cybenetics Testing Information	
Lab ID	203
Date of receipt	Oct 12, 2018
Testing Date	Oct 24, 2018
Report Issued Date	Oct 26, 2018
DUT Notes	Edited on 05/18/2018
Engineer Name	-
Authorized By the Laboratory Technical Manager	Aristeidis Bitziopoulos
Signature	

Cables and Connectors(Non-accredited measurements)

Captive Cables			
Description	Cable Count	Connector Count (Total)	Gauge
ATX connector 20+4 pin (660mm)	1	1	18-22AWG
4+4 pin EPS12V (660mm)	1	1	18AWG
6+2 pin PCIe (570mm+150mm)	1	2	18AWG
SATA (460mm+150mm+150mm)+4 pin Molex (+150mm)	2	6 / 2	18AWG

Power Specifications

Rail		3.3V	5V	12V1	12V2	12V3	5VSB	-12V
Max. Power	Amps	20	20	25	25	30	2.5	0.3
	Watts	100		550			12.5	3.6
Total Max. Power (W)		550						

Test Results

Temperature & Compliance Info

Temperature Range (°C /°F)	28-32 / 82.4-89.6
ErP Lot 3/6 Ready	✓
(EU) No 617/2013 Compliance	✓

Performance Summary

115V

Accredited	
Average Efficiency (>1450 load combinations)	89.576%
Average Noise Output (>1450 Load Combinations)	10.76dBA
Average PF (>1450 Load Combinations)	0.985
Efficiency With 10W (≤500W) or 2% (>500W) Load	-
Standby Power Consumption	0.0443W
Non-Accredited	
12V Ripple (Full Load)	31.35mV
5V Ripple (Full Load)	17.80mV
3.3V Ripple (Full Load)	17.17mV
5VSB Ripple (Full Load)	16.57mV
12V Load Regulation	0.46%
5V Load Regulation	0.39%
3.3V Load Regulation	0.45%

5VSB Load Regulation	2.49%
Inrush Current	27.744A

230V

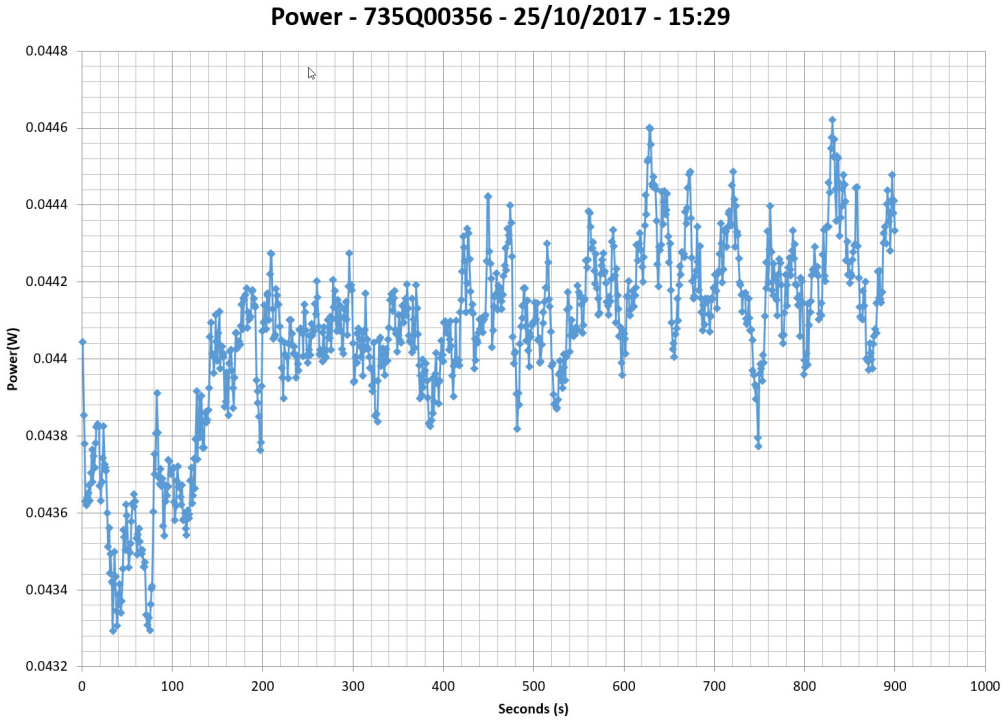
Accredited		
Average Efficiency (>1450 load combinations)	91.205%	
Average Noise Output (>1450 Load Combinations)	10.97dBA	
Average PF (>1450 Load Combinations)	0.936	
Efficiency With 10W (≤500W) or 2% (>500W) Load	-	
Standby Power Consumption	0.0627W	
Non-Accredited		
12V Ripple (Full Load)	24.90mV	
5V Ripple (Full Load)	17.67mV	
3.3V Ripple (Full Load)	18.11mV	
5VSB Ripple (Full Load)	14.38mV	
12V Load Regulation	0.55%	
5V Load Regulation	0.43%	
3.3V Load Regulation	0.57%	
5VSB Load Regulation	2.53%	
Inrush Current	55.489A	
Hold-Up Time & PWR_OK Signal	17.00ms	
AC Loss to PWR_OK Hold Up Time	15.00ms	
PWR_OK Inactive to DC Loss Delay	2.00ms	
OPP (0.00°C / 0.00°C)	-	-

Hold-Up Time & PWR_OK Signal

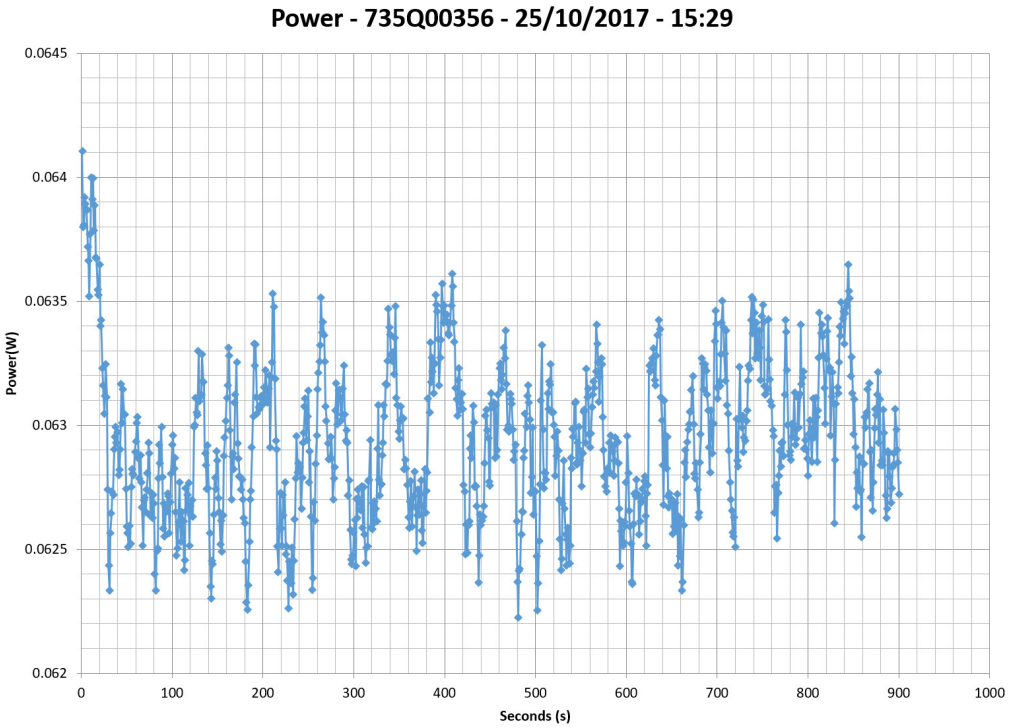
Hold-Up Time (ms)	17
AC Loss to PWR_OK Hold Up Time (ms)	15
PWR_OK Inactive to DC Loss Delay (ms)	2

Graphs

115V

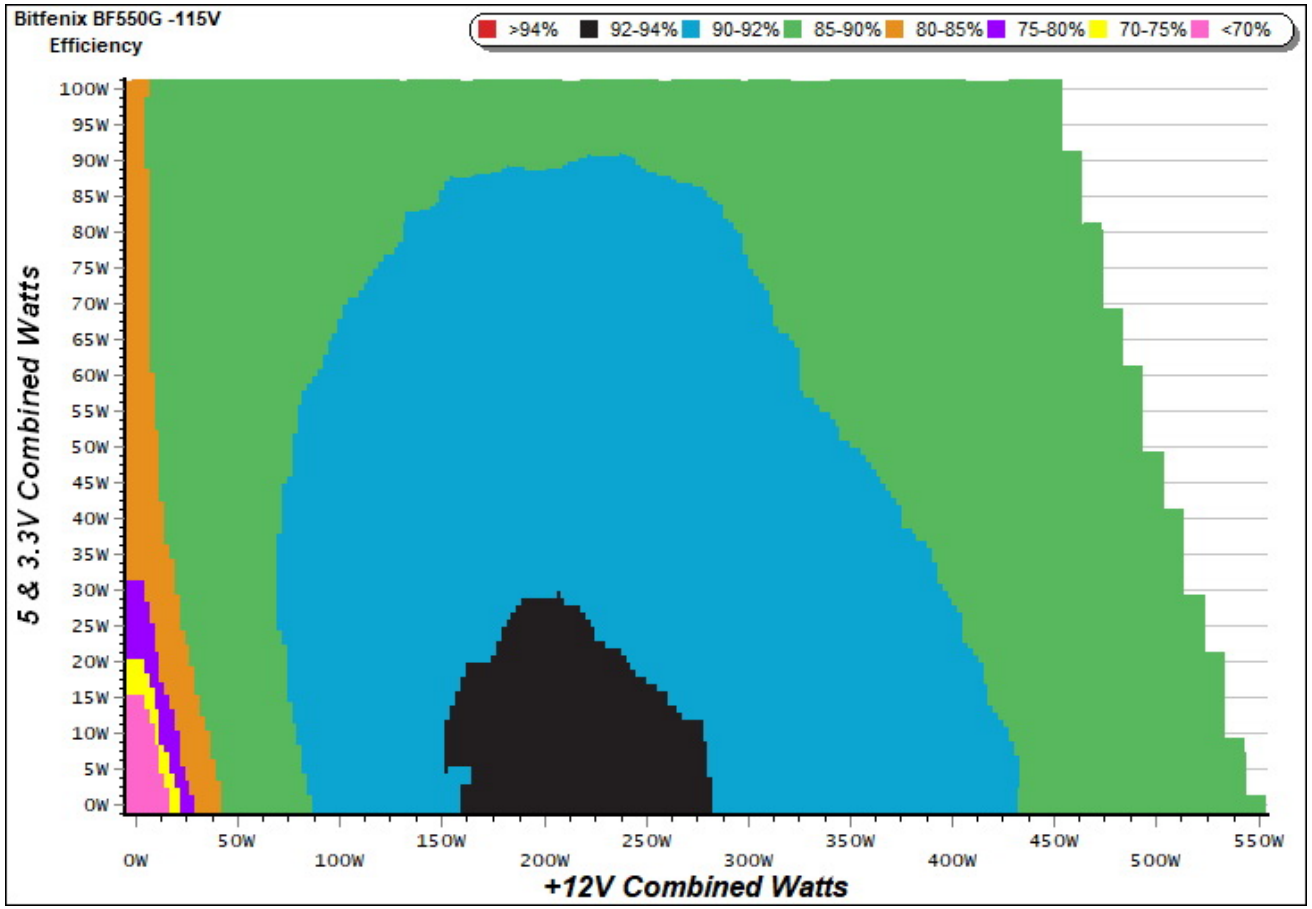


230V



Efficiency Graph

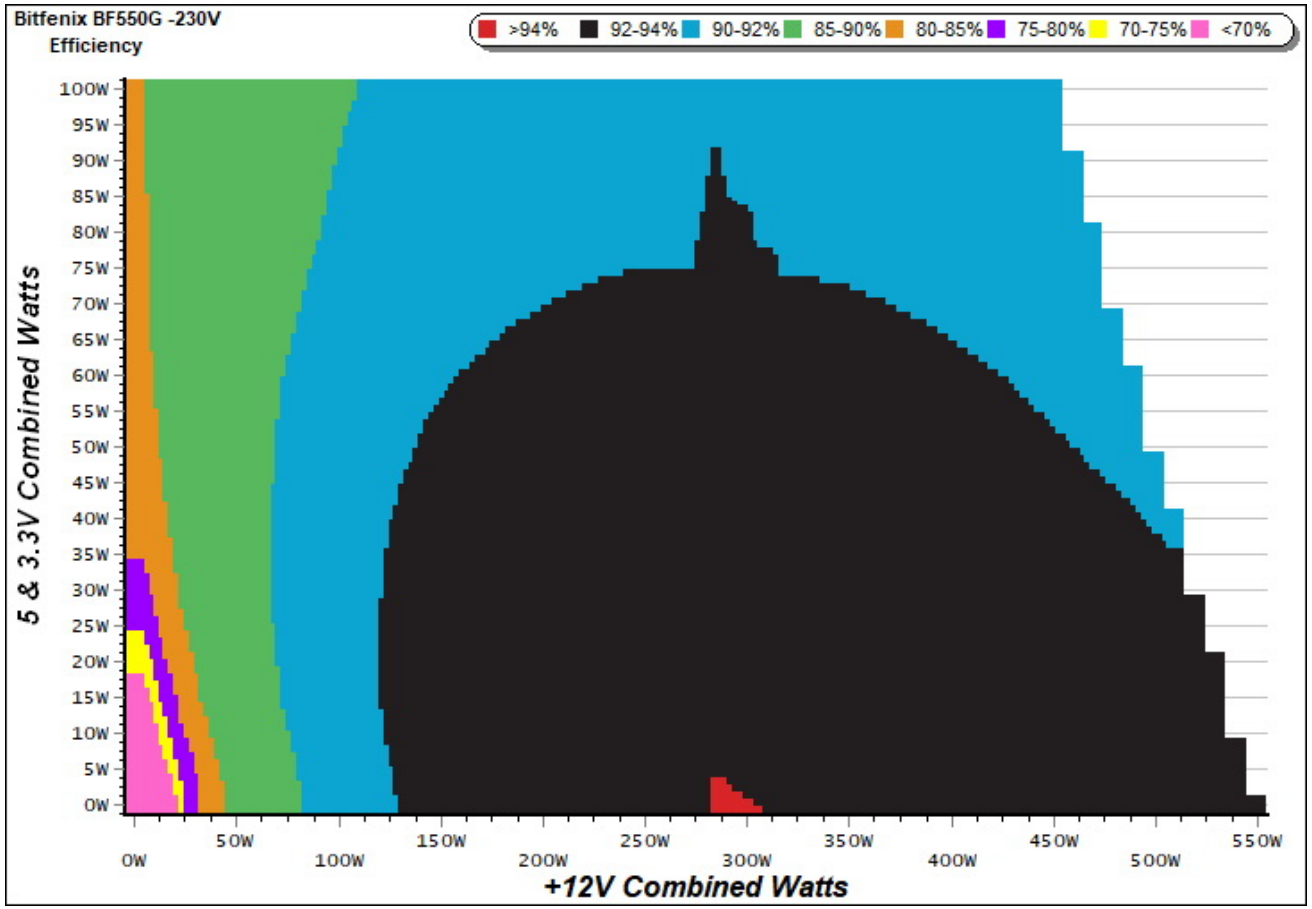
115V



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.

230V

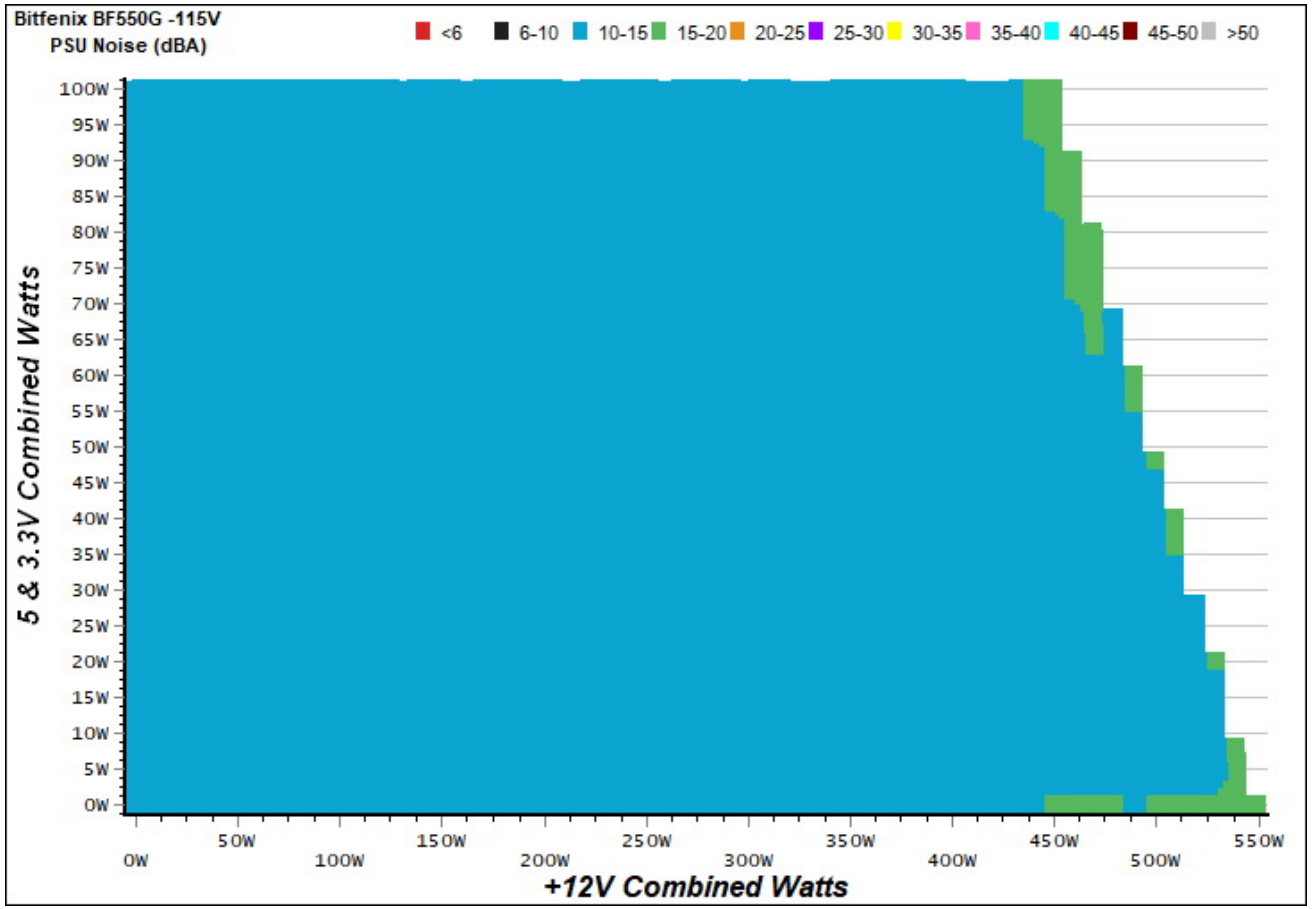


INFO

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Noise Graph

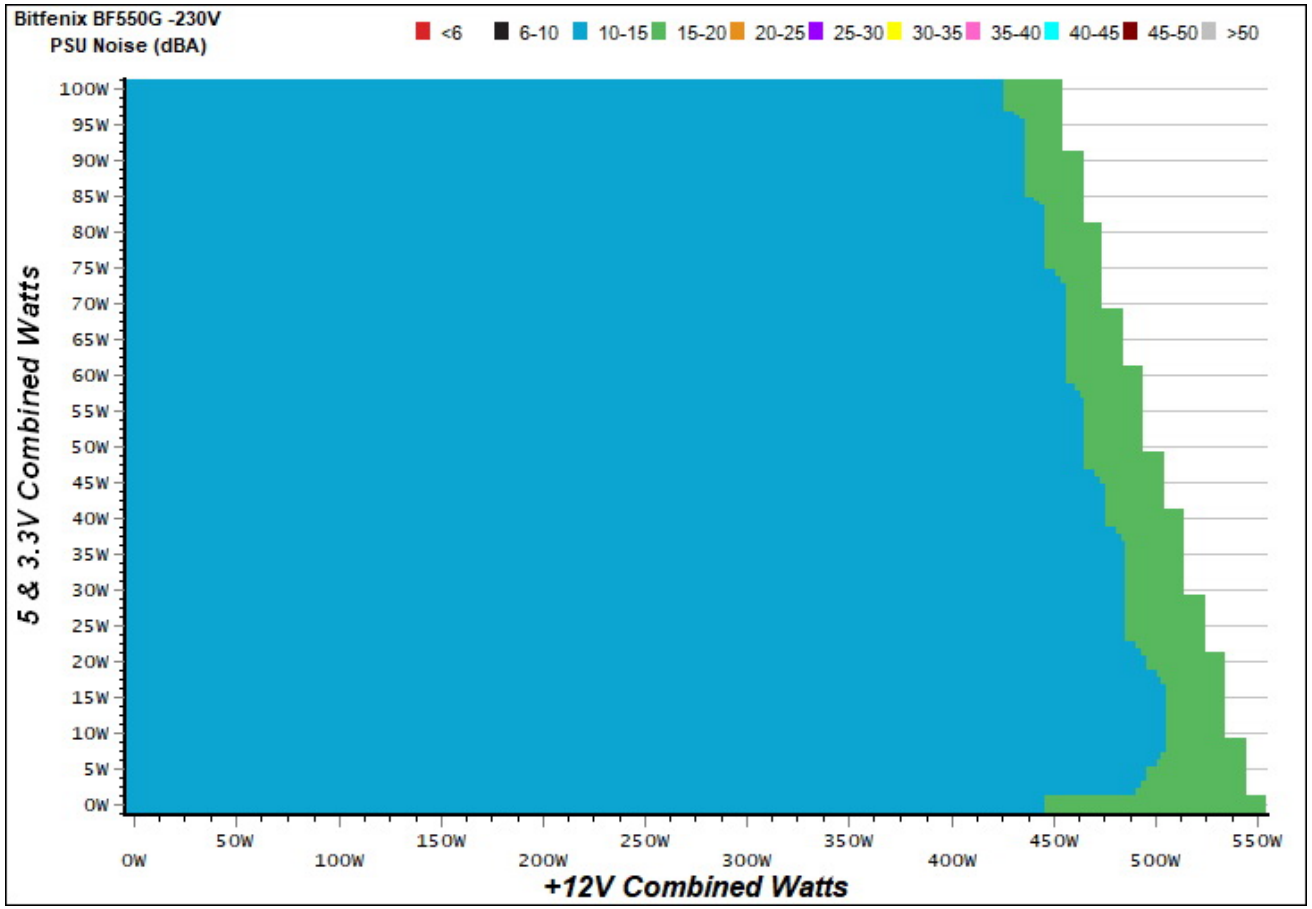
115V



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.

230V

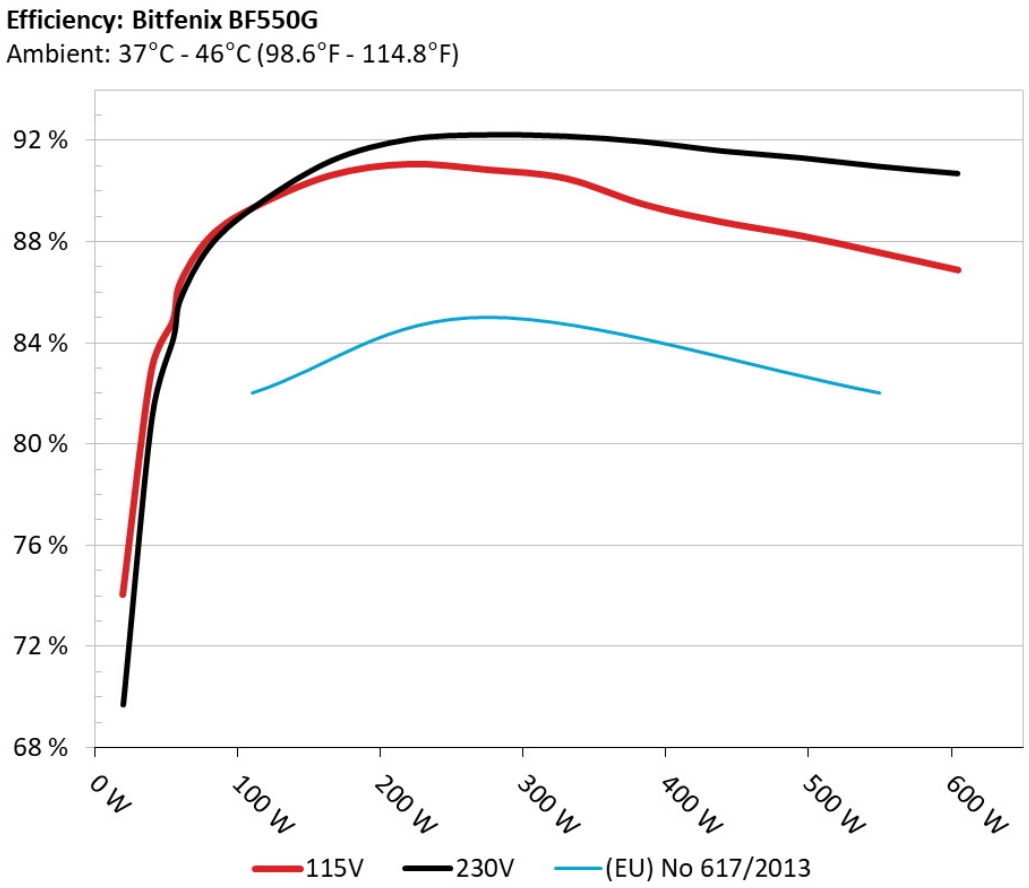


INFO

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.

Indicative Performance

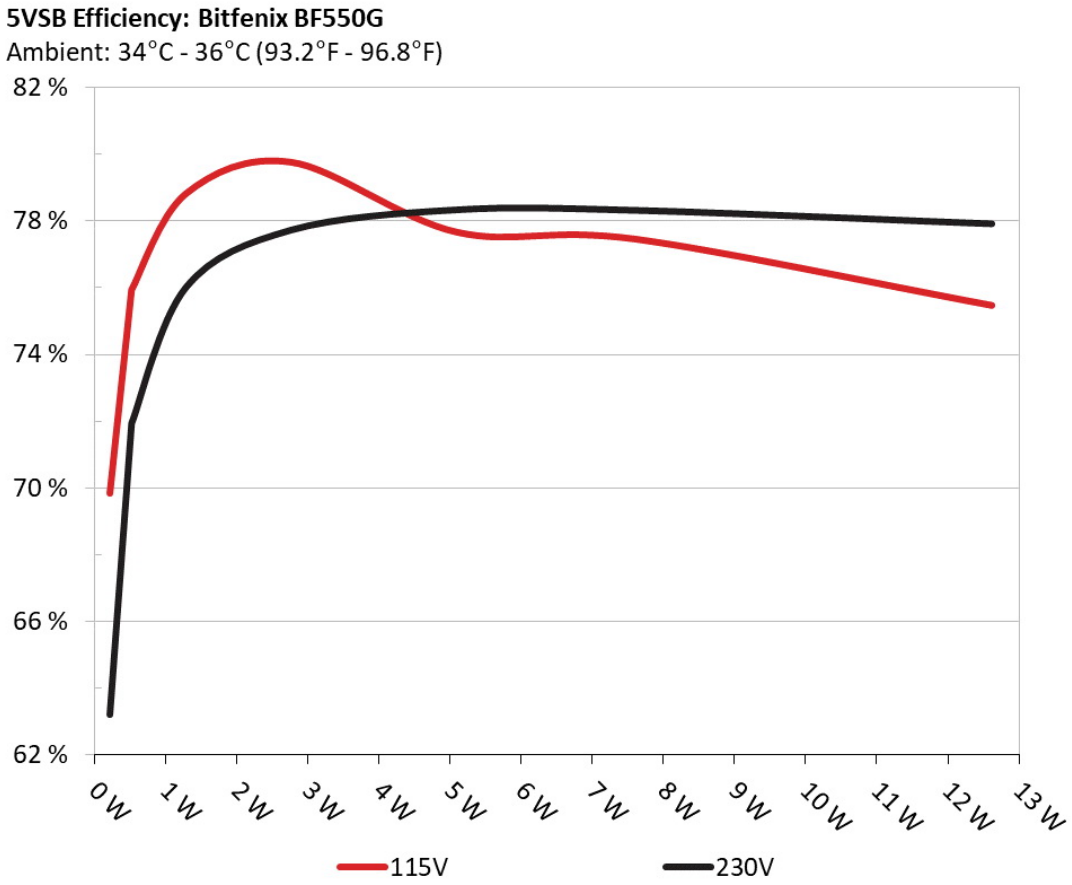
Efficiency under high ambient temperature



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.

5VSB Efficiency (ERP LOT 3/6 & CEC)

115V

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.042A	0.213	69.836%	0.031
	5.107V	0.305		115.11V
2	0.087A	0.445	75.939%	0.058
	5.107V	0.586		115.13V
3	0.542A	2.763	79.763%	0.271
	5.096V	3.464		115.11V
4	1.002A	5.094	77.664%	0.380
	5.085V	6.559		115.12V
5	1.501A	7.613	77.454%	0.437
	5.071V	9.829		115.12V
6	2.501A	12.614	75.470%	0.491
	5.044V	16.714		115.12V

230V

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.042A	0.213	63.205%	0.010
	5.107V	0.337		230.31V
2	0.087A	0.446	71.935%	0.019
	5.106V	0.620		230.31V
3	0.542A	2.762	77.737%	0.102
	5.096V	3.553		230.31V
4	1.002A	5.094	78.345%	0.173
	5.084V	6.502		230.31V
5	1.501A	7.612	78.329%	0.234
	5.070V	9.718		230.31V
6	2.501A	12.614	77.927%	0.317
	5.044V	16.187		230.31V

Supplementary Tests (For Reference)

Typical 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	2.745A	1.975A	1.968A	0.986A	54.791	84.881%	537	10.3	38.14°C	0.958
	12.095V	5.065V	3.348V	5.070V	64.550				45.38°C	115.11V
2	6.529A	2.959A	2.955A	1.185A	109.790	89.329%	537	10.3	38.47°C	0.981
	12.089V	5.063V	3.345V	5.059V	122.905				46.74°C	115.11V
3	10.660A	3.456A	3.465A	1.386A	164.878	90.638%	537	10.3	39.14°C	0.986
	12.083V	5.061V	3.344V	5.048V	181.908				48.51°C	115.11V
4	14.788A	3.953A	3.945A	1.586A	219.784	91.088%	537	10.3	39.40°C	0.989
	12.078V	5.059V	3.343V	5.036V	241.288				50.71°C	115.10V
5	18.578A	4.947A	4.936A	1.791A	274.785	90.869%	537	10.3	39.79°C	0.989
	12.072V	5.058V	3.341V	5.025V	302.398				53.38°C	115.10V
6	22.374A	5.933A	5.923A	1.995A	329.739	90.523%	537	10.3	40.41°C	0.991
	12.066V	5.056V	3.340V	5.010V	364.259				56.47°C	115.09V
7	26.167A	6.928A	6.915A	2.200A	384.721	89.490%	612	12.7	41.95°C	0.991
	12.062V	5.054V	3.339V	4.996V	429.904				59.15°C	115.08V
8	29.966A	7.916A	7.906A	2.406A	439.613	88.789%	854	21.2	43.49°C	0.991
	12.055V	5.052V	3.338V	4.984V	495.123				60.86°C	115.08V
9	34.208A	8.422A	8.421A	2.410A	494.774	88.251%	1182	31.1	43.99°C	0.991
	12.049V	5.049V	3.335V	4.977V	560.641				61.73°C	115.08V
10	38.399A	8.918A	8.907A	2.514A	549.568	87.586%	1317	33.9	45.25°C	0.991
	12.041V	5.048V	3.334V	4.969V	627.462				63.38°C	115.07V
11	42.978A	8.920A	8.911A	2.515A	604.523	86.898%	1630	39.4	46.30°C	0.992
	12.037V	5.047V	3.332V	4.965V	695.667				64.58°C	115.07V
CL1	0.102A	12.012A	12.004A	0.004A	102.126	84.663%	537	10.3	44.07°C	0.981
	12.084V	5.054V	3.346V	5.074V	120.627				60.40°C	115.10V

CL2	45.788A	1.001A	1.003A	1.002A	565.273	88.313%	1360	34.7	46.01°C	0.991
	12.052V	5.053V	3.338V	5.020V	640.078				62.59°C	115.07V

The results above are not used in the certification process

230V

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
1	2.722A	1.974A	1.972A	0.987A	54.500	84.012%	537	10.3	40.16°C	0.739
	12.086V	5.065V	3.348V	5.067V	64.872				48.74°C	230.91V
2	6.502A	2.962A	2.960A	1.187A	109.438	89.296%	537	10.3	40.81°C	0.879
	12.079V	5.063V	3.346V	5.054V	122.557				49.95°C	230.70V
3	10.670A	3.459A	3.440A	1.389A	164.929	91.281%	537	10.3	41.23°C	0.926
	12.082V	5.061V	3.344V	5.043V	180.682				50.75°C	230.67V
4	14.789A	3.956A	3.949A	1.591A	219.758	92.006%	537	10.3	41.95°C	0.947
	12.073V	5.058V	3.342V	5.030V	238.853				52.39°C	230.64V
5	18.578A	4.947A	4.940A	1.794A	274.658	92.172%	537	10.3	42.13°C	0.959
	12.065V	5.056V	3.340V	5.018V	297.985				54.02°C	230.77V
6	22.376A	5.937A	5.934A	1.998A	329.562	92.111%	537	10.3	42.72°C	0.966
	12.055V	5.054V	3.338V	5.008V	357.786				55.25°C	230.73V
7	26.209A	6.931A	6.926A	2.204A	384.884	91.789%	710	16.6	43.06°C	0.971
	12.048V	5.051V	3.336V	4.993V	419.315				56.91°C	230.78V
8	30.055A	7.926A	7.921A	2.412A	440.217	91.463%	923	24.0	43.86°C	0.974
	12.038V	5.048V	3.333V	4.977V	481.304				58.24°C	230.73V
9	34.265A	8.426A	8.408A	2.416A	494.742	91.196%	1100	30.1	44.98°C	0.976
	12.030V	5.046V	3.331V	4.971V	542.504				59.74°C	230.70V
10	38.482A	8.925A	8.923A	2.520A	549.822	90.890%	1395	35.1	45.73°C	0.978
	12.021V	5.044V	3.329V	4.963V	604.929				61.26°C	230.54V
11	43.096A	8.928A	8.927A	2.523A	604.974	90.606%	1493	37.0	46.22°C	0.980
	12.014V	5.042V	3.327V	4.956V	667.697				62.63°C	230.63V
CL1	0.141A	12.002A	11.999A	0.000A	102.473	84.573%	545	10.9	42.69°C	0.877
	12.071V	5.052V	3.345V	5.068V	121.165				56.71°C	230.98V

CL2	45.838A	1.002A	1.002A	1.000A	564.891	91.870%	1182	31.1	44.21°C	0.979
	12.031V	5.051V	3.333V	5.013V	614.880				58.95°C	230.67V

The results above are not used in the certification process

Light Load Tests

115V

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	PF/AC Volts
1	1.207A	0.491A	0.476A	0.196A	19.688	74.051%	537	10.3	0.848
	12.101V	5.069V	3.350V	5.096V	26.587				115.12V
2	2.440A	0.980A	0.984A	0.391A	39.768	82.933%	537	10.3	0.934
	12.097V	5.068V	3.349V	5.090V	47.952				115.12V
3	3.672A	1.475A	1.489A	0.591A	59.870	86.381%	537	10.3	0.961
	12.094V	5.066V	3.348V	5.081V	69.309				115.12V
4	4.895A	1.975A	1.969A	0.785A	79.767	88.150%	537	10.3	0.973
	12.092V	5.065V	3.347V	5.074V	90.490				115.11V

The results above are not used in the certification process

230V

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	PF/AC Volts
1	1.197A	0.493A	0.477A	0.196A	19.569	69.426%	537	10.3	0.463
	12.091V	5.069V	3.350V	5.096V	28.187				230.93V
2	2.458A	0.987A	0.984A	0.393A	40.011	81.112%	537	10.3	0.653
	12.089V	5.067V	3.349V	5.088V	49.328				230.92V
3	3.650A	1.480A	1.463A	0.591A	59.512	85.629%	537	10.3	0.757
	12.086V	5.066V	3.348V	5.079V	69.500				230.91V
4	4.910A	1.974A	1.971A	0.789A	79.924	87.734%	537	10.3	0.824
	12.083V	5.065V	3.347V	5.071V	91.098				230.89V

The results above are not used in the certification process

Ripple Measurements

115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	13.3 mV	5.4 mV	4.4 mV	11.5 mV	Pass
20% Load	20.2 mV	6.3 mV	5.0 mV	11.9 mV	Pass
30% Load	22.2 mV	7.0 mV	5.8 mV	13.6 mV	Pass
40% Load	22.6 mV	7.8 mV	7.9 mV	12.5 mV	Pass
50% Load	23.7 mV	9.0 mV	10.4 mV	13.0 mV	Pass
60% Load	24.9 mV	9.9 mV	8.4 mV	14.0 mV	Pass
70% Load	26.9 mV	11.4 mV	10.5 mV	25.0 mV	Pass
80% Load	28.8 mV	12.6 mV	10.7 mV	18.5 mV	Pass
90% Load	30.5 mV	13.9 mV	11.0 mV	19.4 mV	Pass
100% Load	31.4 mV	17.8 mV	17.2 mV	16.6 mV	Pass
110% Load	32.2 mV	16.8 mV	18.7 mV	17.6 mV	Pass
Crossload 1	29.1 mV	12.1 mV	8.9 mV	8.2 mV	Pass
Crossload 2	23.3 mV	12.1 mV	17.7 mV	22.1 mV	Pass

The results above are not used in the certification process

230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	4.5 mV	5.4 mV	4.6 mV	10.3 mV	Pass
20% Load	6.1 mV	6.4 mV	6.1 mV	12.6 mV	Pass
30% Load	29.6 mV	7.6 mV	7.4 mV	11.3 mV	Pass
40% Load	24.1 mV	11.0 mV	11.1 mV	11.7 mV	Pass
50% Load	22.9 mV	9.8 mV	9.4 mV	12.8 mV	Pass
60% Load	23.2 mV	11.1 mV	11.2 mV	13.4 mV	Pass
70% Load	22.5 mV	12.4 mV	12.0 mV	23.8 mV	Pass
80% Load	22.9 mV	14.0 mV	12.3 mV	17.2 mV	Pass

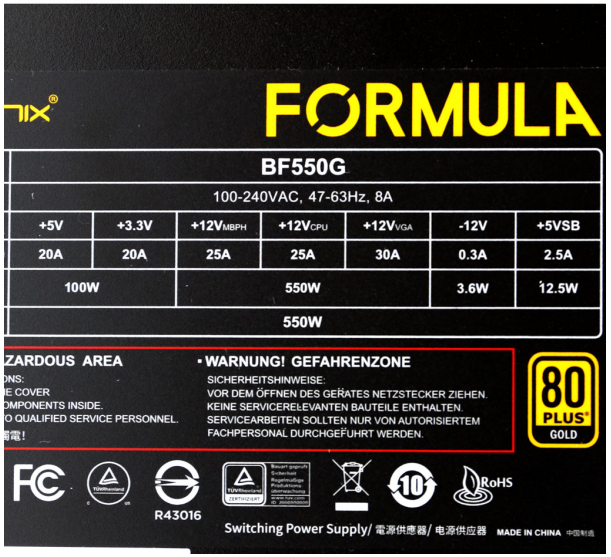
Test	12V	5V	3.3V	5VSB	Pass/Fail
90% Load	23.9 mV	15.7 mV	13.1 mV	18.5 mV	Pass
100% Load	24.9 mV	17.7 mV	18.1 mV	14.4 mV	Pass
110% Load	25.6 mV	17.8 mV	18.7 mV	14.8 mV	Pass
Crossload 1	8.3 mV	14.1 mV	12.5 mV	6.6 mV	Pass
Crossload 2	24.0 mV	12.0 mV	17.2 mV	14.8 mV	Pass

The results above are not used in the certification process

Bitfenix Formula Gold 550W (#2)



Top side



Power specifications label