



Kolink Enclave 500W (#2)

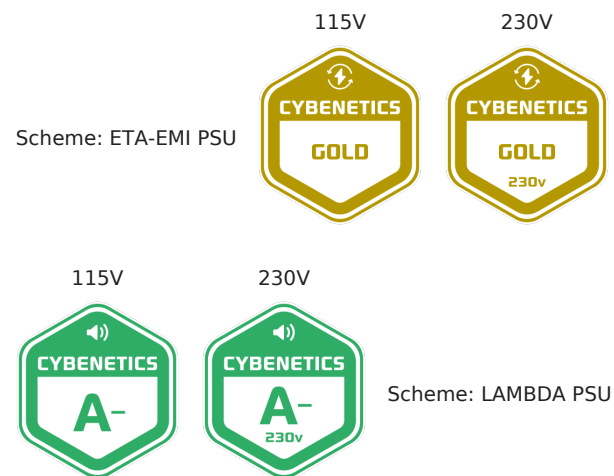
Serial Number KOL-016-0619000002

Lab ID KL50001613

Certification ID 251613

Test Result Report ID: 20PS1613A

Certificate Issue Date: Mar 4, 2020



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	Kolink
Model	Enclave 500W (#2)
OEM/ODM	Kolink
Serial Number	KOL-016-0619000002
Product Specifications	
Manufacturer-Provided Information	
Rated Voltage (Vrms)	100-240
Rated Current (Arms)	
Rated Frequency (Hz)	50-60

Rated Power (W)	500
Operating Temperature (Continuous Full Load) (°C)	
Type	ATX12V
Cable Design	Fully Modular
Warranty	-
Cybenetics Measurements	
Dimensions (W x H x D)	
Weight	
Cooling	120mm Rifle Bearing Fan (EFS-12E12H)
Semi-Passive Operation	X
Cybenetics Testing Information	
Lab ID	KL50001613
Date of receipt	Jun 11, 2019
Testing Date	Feb 28, 2020
Report Issued Date	Mar 4, 2020
Engineer Name	-
Authorized By the Laboratory Technical Manager	Aristeidis Bitziopoulos
Signature	

Cables and Connectors(Non-accredited measurements)

Modular Cables				
Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors
ATX connector 20+4 pin (500mm)	1	1	18-22AWG	No
4+4 pin EPS12V (650mm)	1	1	18AWG	No
6+2 pin PCIe (600mm+100mm)	1	2	18AWG	No
SATA (450mm+120mm+120mm)	1	3	20AWG	No
SATA (450mm) / 4 pin Molex (+120mm+120mm)	2	2 / 4	18-20AWG	No

Power Specifications

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	16	16	41	3	0.5
	Watts	100		492	15	6
Total Max. Power (W)		500				

Parts Description

General Data	
Manufacturer (OEM)	Kolink
PCB Type	Double Sided
Primary Side	
Transient Filter	5x Y caps, 3x X caps, 2x CM chokes
Inrush Protection	NTC Thermistor & Relay
Bridge Rectifier(s)	1x GBU1506 (600V, 15A @ 100°C)
APFC MOSFETS	2x Advanced Power AP65SL380AI (650V, 6.5A @ 100°C, 0.38Ohm)
APFC Boost Diode	1x Infineon IDH06G65C6 (650V, 6A @ 145°C)
Hold-up Cap(s)	1x Teapo (420V, 330uF, 2000h @ 105°C, LG)
Main Switchers	4x Great Power GPT10N50AD (500V, 9.7A, 0.7Ohm)
APFC Controller	On Semiconductor NCP1654
Resonant Controllers	Champion CM6901T6
Topology	Primary side: Full-Bridge & LLC converter Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	
+12V MOSFETS	4x Nexperia PSMN2R6-40YS (40V, 100A @ 100°C, 5.3mOhm @ 175°C)
5V & 3.3V	DC-DC Converters: 4x Excelliance MOS EMB09N03HR (30V, 35A @ 100°C, 9.5mOhm) PWM Controllers: ANPEC APW7159
Filtering Capacitors	Electrolytics: 10x Teapo (1-3,000h @ 105°C, SC), 1x CapXon (2-5,000h @ 105°C, KF) Polymers: CapXon
Supervisor IC	IN1S313I-DAG & UTC393
Fan Model	DWPH EFS-12E12H (120mm, 12V, 0.50A, Rifle Bearing Fan)
5VSB Circuit	

Rectifier	1x MBR2045CT SBR (45V, 20A)
Standby PWM Controller	Infineon ICE2QR4765

Test Results

Temperature & Compliance Info

Temperature Range (°C /°F)	28-32 / 82.4-89.6
ErP Lot 3/6 Ready	ErP Lot 6 2010: ✓ ErP Lot 6 2013: ✓ ErP Lot 3 2014 & CEC: Partially
(EU) No 617/2013 Compliance	✓
ALPM (Alternative Low Power Mode) compatible	✓

Performance Summary

115V

Accredited	
Average Efficiency (>1450 load combinations)	88.654%
Average Noise Output (>1450 Load Combinations)	28.05dBA
Average PF (>1450 Load Combinations)	0.986
Efficiency With 10W ($\leq$ 500W) or 2% (>500W) Load	52.344%
Standby Power Consumption	0.0869W
Non-Accredited	
12V Ripple (Full Load)	47.14mV
5V Ripple (Full Load)	6.98mV
3.3V Ripple (Full Load)	18.68mV
5VSB Ripple (Full Load)	9.54mV
12V Load Regulation	0.83%
5V Load Regulation	1.81%
3.3V Load Regulation	2.39%
5VSB Load Regulation	3.01%

Inrush Current	26.490A
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230V

Accredited		
Average Efficiency (>1450 load combinations)	90.577%	
Average Noise Output (>1450 Load Combinations)	29.70dBA	
Average PF (>1450 Load Combinations)	0.930	
Efficiency With 10W (≤500W) or 2% (>500W) Load	-	
Standby Power Consumption	0.1350W	
Non-Accredited		
12V Ripple (Full Load)	49.39mV	
5V Ripple (Full Load)	7.04mV	
3.3V Ripple (Full Load)	17.19mV	
5VSB Ripple (Full Load)	10.10mV	
12V Load Regulation	0.81%	
5V Load Regulation	1.73%	
3.3V Load Regulation	2.36%	
5VSB Load Regulation	2.96%	
Inrush Current	75.320A	
Hold-Up Time & PWR_OK Signal	18.50ms	
AC Loss to PWR_OK Hold Up Time	14.70ms	
PWR_OK Inactive to DC Loss Delay	3.80ms	
PSU Timings: T1 (20% / 100%)	52.0ms	52.0ms
PSU Timings: T3 (20% / 100%)	134.0ms	134.0ms
OPP (0.00°C / 0.00°C)	124.16%	-

Hold-Up Time & PWR_OK Signal

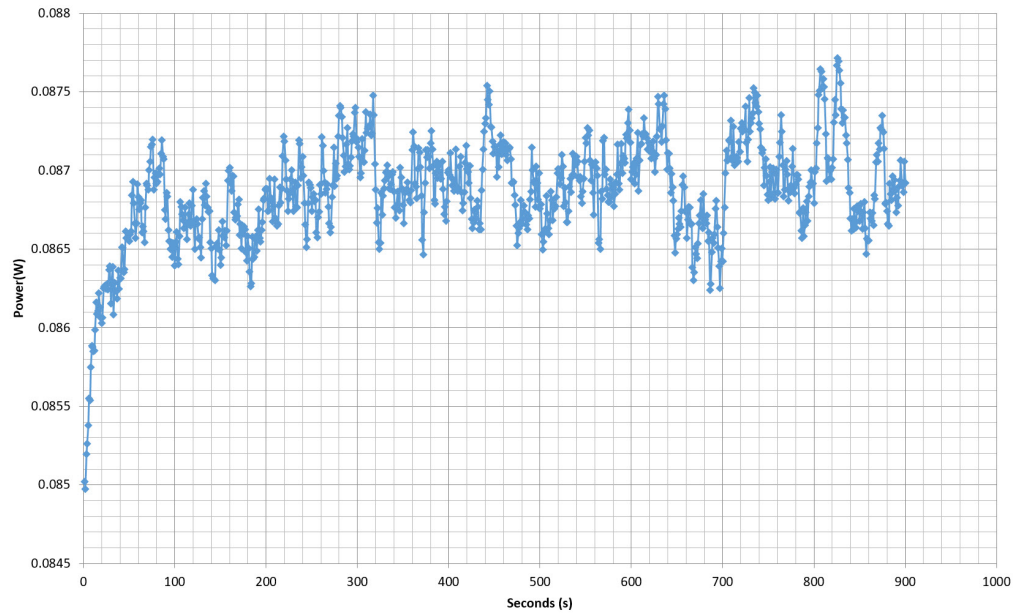
Hold-Up Time (ms)	18.5
AC Loss to PWR_OK Hold Up Time (ms)	14.7
PWR_OK Inactive to DC Loss Delay (ms)	3.8

Vampire Power

Graphs

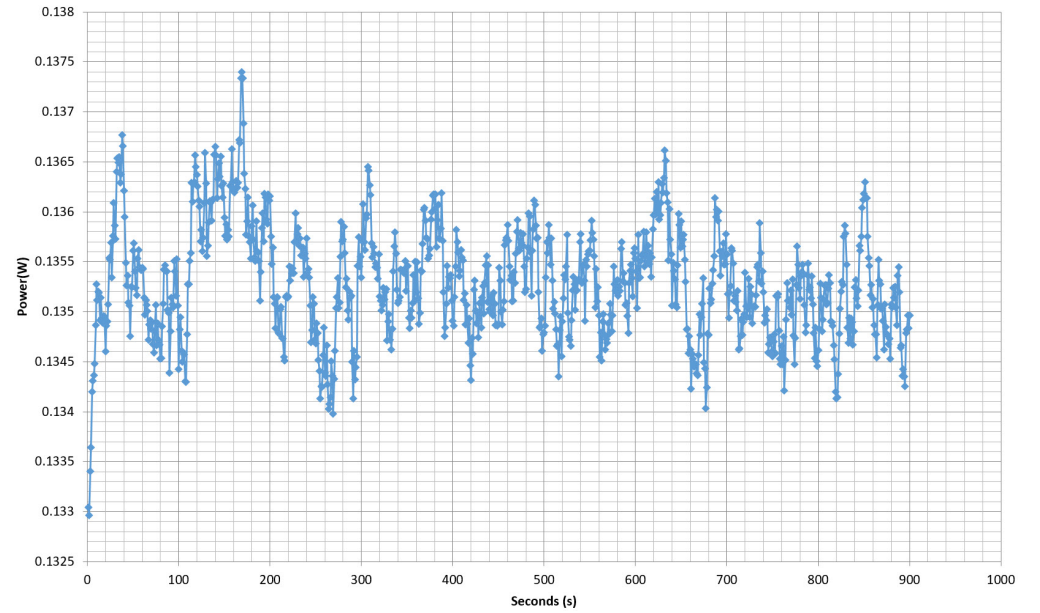
115V

Power - 25/02/2020 - 12:00



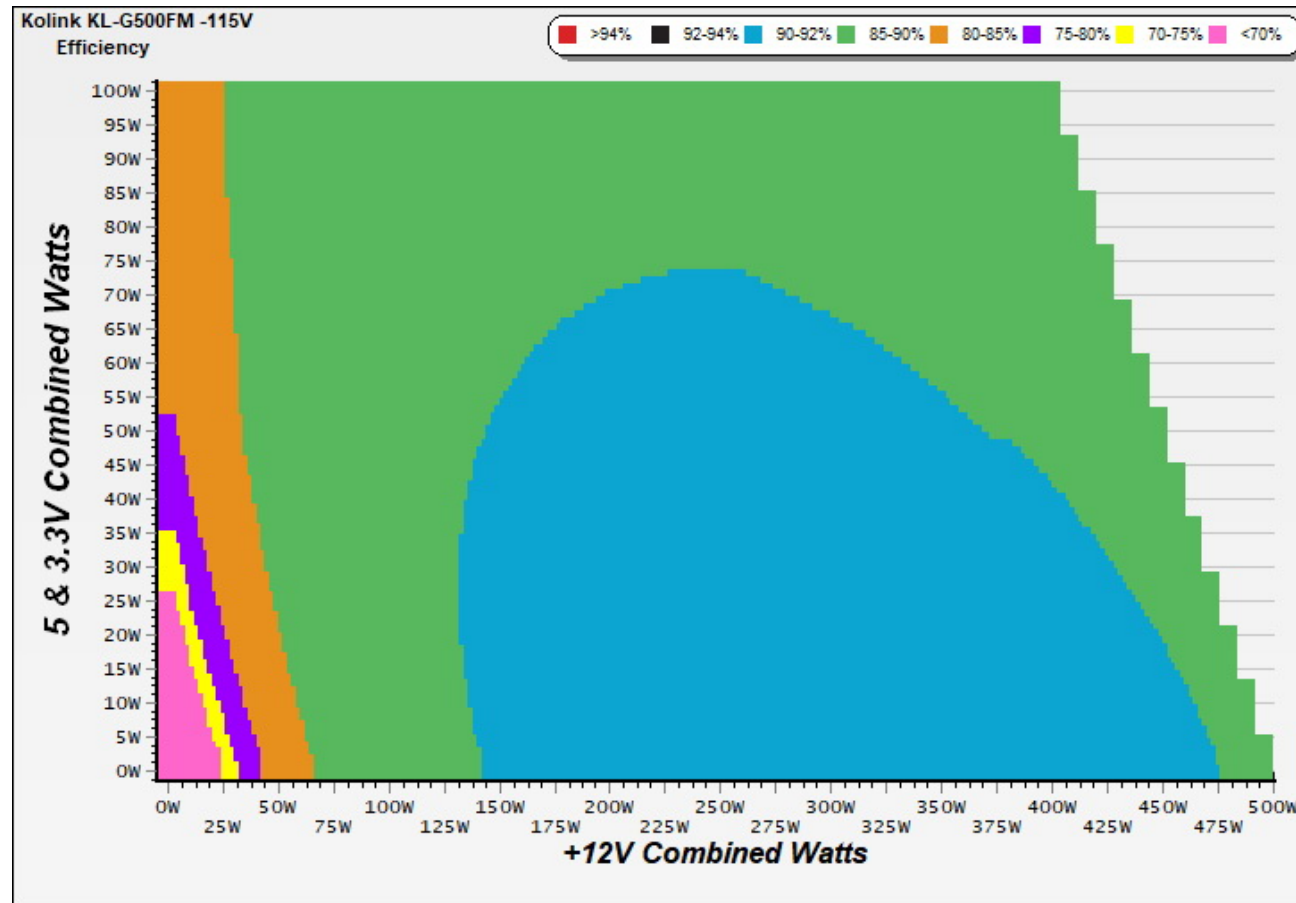
230V

Power - 25/02/2020 - 12:00



Efficiency Graph

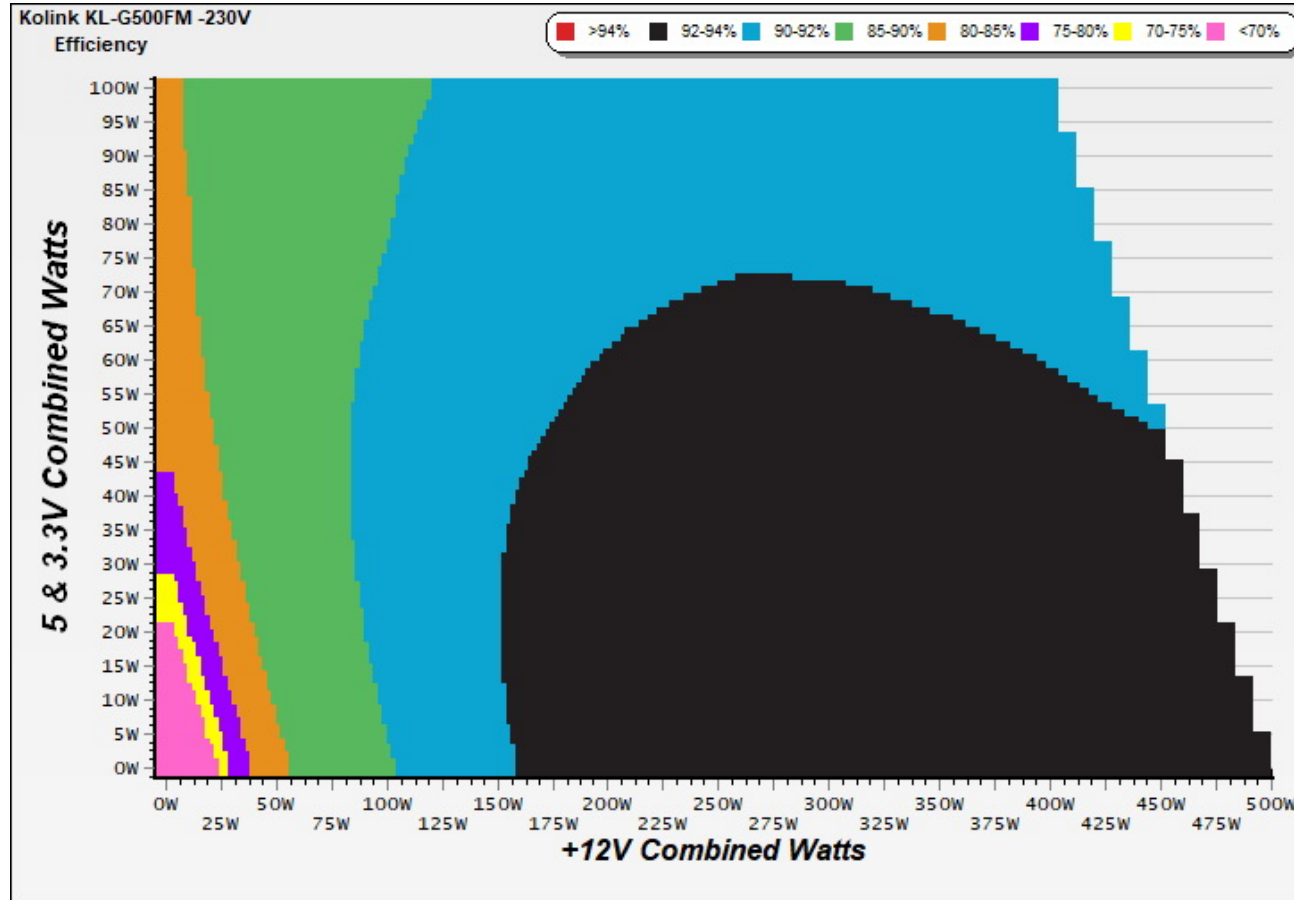
115V



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

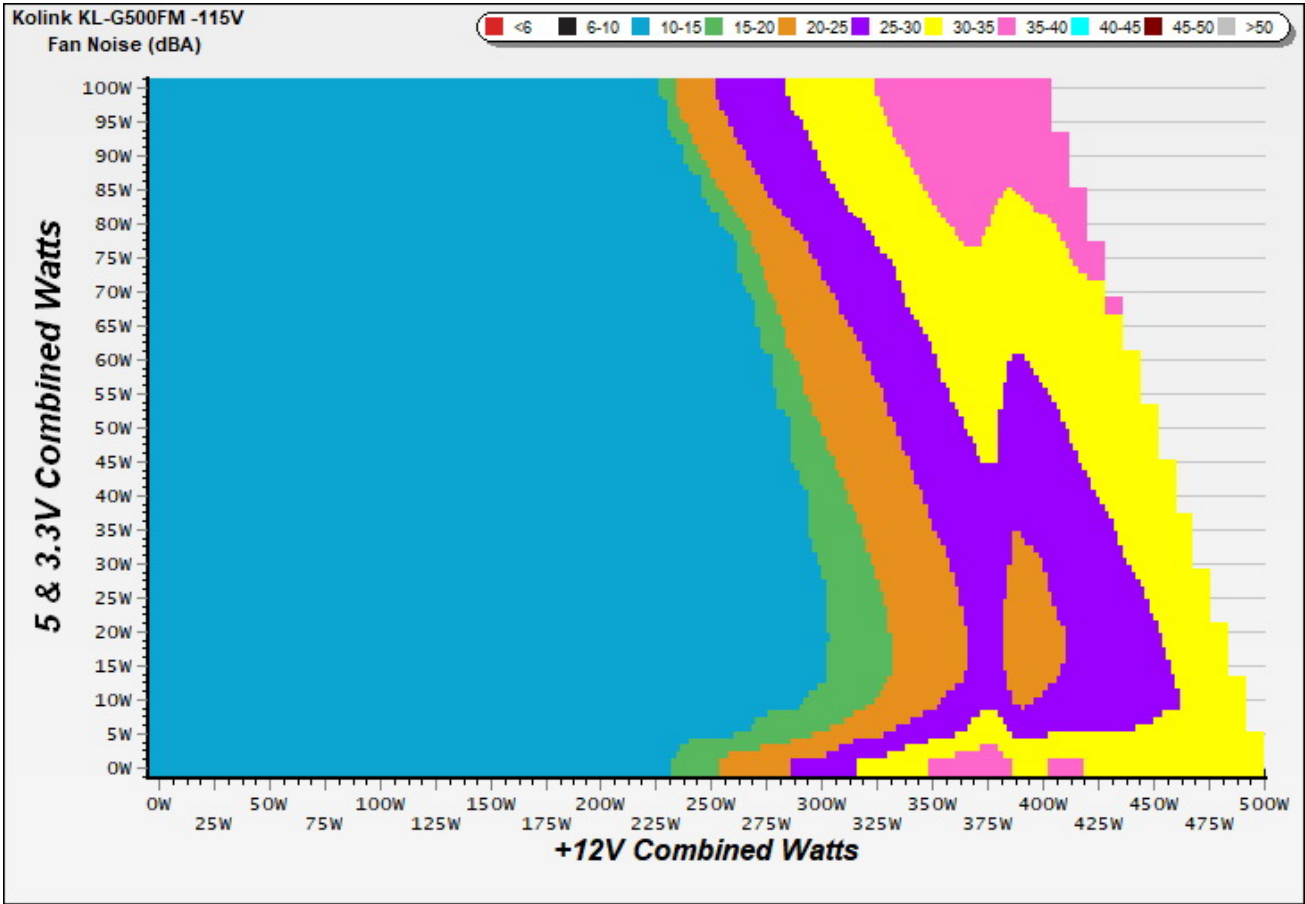


INFO

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

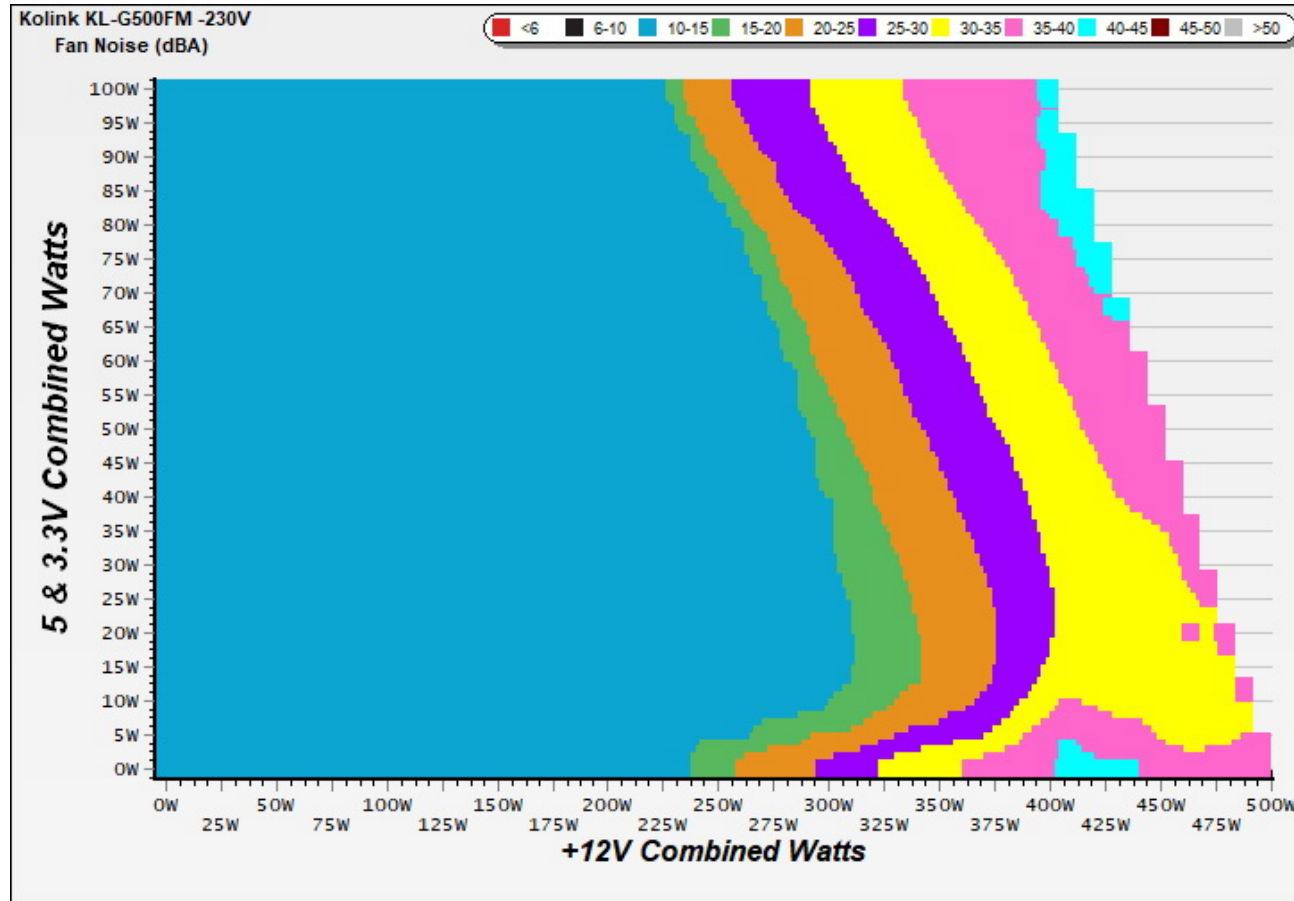
115V



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

230V



INFO

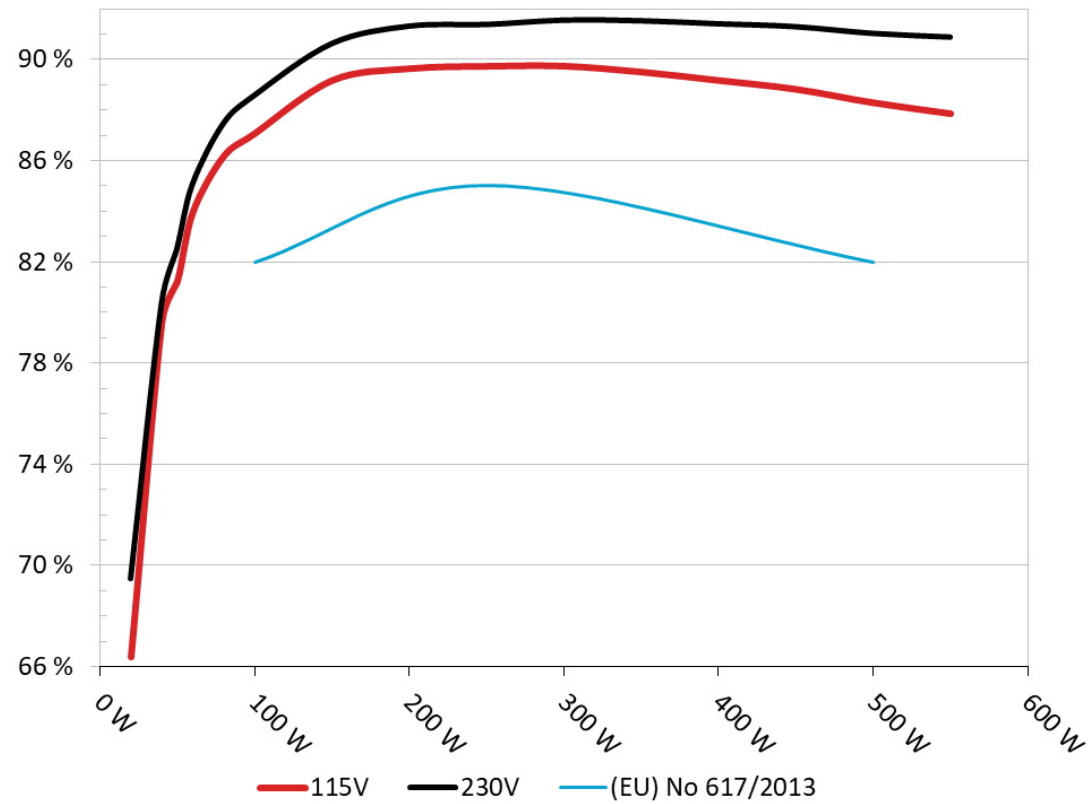
The PSU's noise in its entire operational range and under 30-32 °C ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails

Indicative Performance

Efficiency under high ambient temperature

Efficiency: Kolink KL-G500FM

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



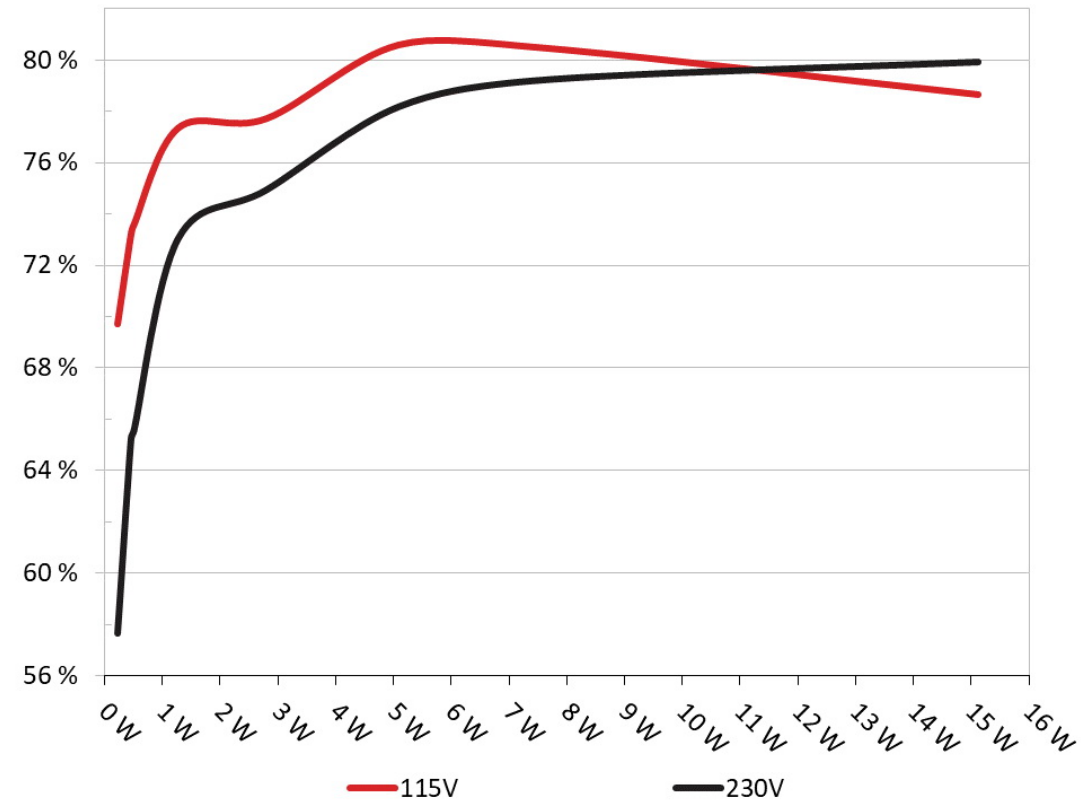
INFO

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: Kolink KL-G500FM

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

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

115V

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.230	69.697%	0.043
	5.119V	0.330		115.14V
2	0.090A	0.461	73.175%	0.080
	5.117V	0.630		115.14V
3	0.550A	2.808	77.698%	0.312
	5.105V	3.614		115.14V
4	1.000A	5.094	80.563%	0.394
	5.093V	6.323		115.15V
5	1.500A	7.621	80.441%	0.441
	5.079V	9.474		115.15V
6	3.000A	15.117	78.632%	0.497
	5.039V	19.225		115.14V

230V

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.230	57.644%	0.016
	5.118V	0.399		230.33V
2	0.090A	0.461	65.205%	0.028
	5.117V	0.707		230.33V
3	0.550A	2.808	74.940%	0.134
	5.105V	3.747		230.36V
4	1.000A	5.094	78.177%	0.208
	5.093V	6.516		230.36V
5	1.500A	7.620	79.226%	0.268
	5.079V	9.618		230.35V
6	3.001A	15.117	79.921%	0.360
	5.038V	18.915		230.34V

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	2.342A	1.993A	1.951A	0.984A	50.002	81.255%	773	14.8	40.10°C	0.952
	12.124V	5.021V	3.382V	5.083V	61.537				42.98°C	115.16V
2	5.706A	2.994A	2.936A	1.184A	100.027	87.087%	779	14.9	40.23°C	0.980
	12.113V	5.011V	3.373V	5.070V	114.859				43.97°C	115.16V
3	9.414A	3.498A	3.432A	1.384A	149.983	89.185%	784	15.1	41.07°C	0.987
	12.103V	5.002V	3.365V	5.058V	168.170				45.15°C	115.14V
4	13.133A	4.005A	3.933A	1.586A	200.024	89.652%	1446	33.1	41.74°C	0.985
	12.093V	4.994V	3.357V	5.046V	223.111				46.55°C	115.13V
5	16.516A	5.018A	4.927A	1.789A	250.054	89.746%	1798	40.0	42.39°C	0.987
	12.082V	4.984V	3.348V	5.032V	278.623				47.71°C	115.13V
6	19.898A	6.034A	5.931A	1.993A	300.007	89.751%	1808	40.0	42.43°C	0.990
	12.071V	4.974V	3.339V	5.018V	334.266				48.53°C	115.13V
7	23.298A	7.054A	6.936A	2.199A	350.083	89.519%	1820	40.0	43.21°C	0.992
	12.060V	4.963V	3.330V	5.004V	391.072				49.86°C	115.13V
8	26.702A	8.003A	7.950A	2.405A	399.748	89.187%	1823	40.0	43.70°C	0.993
	12.048V	4.953V	3.321V	4.990V	448.215				50.82°C	115.12V
9	30.512A	8.598A	8.451A	2.409A	449.815	88.837%	1824	40.0	44.65°C	0.994
	12.038V	4.944V	3.313V	4.983V	506.337				52.48°C	115.12V
10	34.099A	9.121A	8.989A	3.026A	499.832	88.303%	1832	39.9	45.35°C	0.995
	12.027V	4.935V	3.305V	4.958V	566.040				53.39°C	115.12V
11	38.291A	9.134A	9.007A	3.030A	549.855	87.872%	1833	39.9	46.63°C	0.995
	12.017V	4.927V	3.298V	4.952V	625.744				55.42°C	115.13V
CL1	0.117A	11.999A	12.000A	0.000A	101.443	82.277%	1811	40.0	42.30°C	0.985
	12.099V	4.986V	3.350V	5.082V	123.295				47.29°C	115.16V

CL2	41.009A	1.001A	1.000A	1.000A	507.030	89.391%	1824	40.0	45.92°C	0.995
	12.039V	4.959V	3.327V	5.032V	567.206				53.76°C	115.12V

The results above are not used in the certification process

230V

est #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
1	2.342A	1.992A	1.952A	0.984A	49.996	82.543%	776	14.8	40.72°C	0.738
	12.123V	5.021V	3.382V	5.083V	60.570				44.32°C	230.29V
2	5.706A	2.994A	2.934A	1.184A	100.014	88.593%	782	15.0	40.85°C	0.857
	12.112V	5.011V	3.373V	5.070V	112.892				44.75°C	230.28V
3	9.414A	3.499A	3.432A	1.384A	149.970	90.634%	787	15.1	41.55°C	0.910
	12.101V	5.002V	3.365V	5.058V	165.467				45.89°C	230.30V
4	13.134A	4.005A	3.932A	1.586A	200.009	91.326%	1400	32.9	41.88°C	0.937
	12.091V	4.994V	3.358V	5.045V	219.006				46.80°C	230.30V
5	16.517A	5.018A	4.928A	1.789A	250.042	91.391%	1806	40.0	42.19°C	0.952
	12.080V	4.984V	3.349V	5.032V	273.595				47.63°C	230.31V
6	19.901A	6.034A	5.932A	1.993A	300.000	91.563%	1816	40.0	42.57°C	0.962
	12.069V	4.973V	3.339V	5.018V	327.644				48.61°C	230.31V
7	23.300A	7.055A	6.938A	2.199A	350.073	91.535%	1824	40.0	43.20°C	0.968
	12.058V	4.963V	3.330V	5.004V	382.448				49.81°C	230.32V
8	26.706A	8.001A	7.950A	2.405A	399.725	91.418%	1824	40.0	43.40°C	0.973
	12.046V	4.953V	3.320V	4.990V	437.250				50.40°C	230.32V
9	30.516A	8.598A	8.451A	2.409A	449.801	91.304%	1834	39.9	45.30°C	0.977
	12.036V	4.944V	3.313V	4.983V	492.641				52.82°C	230.32V
10	34.107A	9.120A	8.989A	3.026A	499.846	91.039%	1835	39.9	45.44°C	0.978
	12.025V	4.935V	3.304V	4.958V	549.045				53.70°C	230.32V
11	38.300A	9.134A	9.007A	3.030A	549.878	90.894%	1841	39.9	46.59°C	0.980
	12.015V	4.927V	3.297V	4.952V	604.963				55.35°C	230.33V
CL1	0.117A	12.000A	11.999A	0.000A	101.443	83.653%	1824	40.0	42.28°C	0.869
	12.098V	4.986V	3.350V	5.081V	121.267				47.80°C	230.34V

CL2	41.013A	1.000A	0.999A	1.000A	507.025	92.103%	1833	39.9	45.40°C	0.978
	12.038V	4.958V	3.326V	5.031V	550.495				53.64°C	230.34V

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	1.224A	0.497A	0.487A	0.196A	19.991	66.371%	751	13.8	0.863
	12.121V	5.032V	3.391V	5.112V	30.120				115.16V
2	2.448A	0.994A	0.973A	0.392A	39.981	79.639%	758	14.1	0.939
	12.128V	5.026V	3.386V	5.103V	50.203				115.16V
3	3.675A	1.494A	1.464A	0.589A	60.010	83.979%	769	14.6	0.967
	12.124V	5.021V	3.382V	5.094V	71.458				115.16V
4	4.898A	1.994A	1.953A	0.787A	79.959	86.191%	772	14.8	0.981
	12.119V	5.016V	3.378V	5.085V	92.770				115.16V

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	1.223A	0.496A	0.487A	0.196A	19.984	69.505%	744	The results above are not used in the certification process Ripple Measurements 115V <table><tr><td>Test</td><td>12V</td><td>5V</td><td>3.3V</td><td>5VSB</td><td>Pass/Fail</td></tr><tr><td>10% Load</td><td>20.50mV</td><td>4.00mV</td><td>12.60mV</td><td>6.40mV</td><td>Pass</td></tr><tr><td>20% Load</td><td>30.70mV</td><td>4.20mV</td><td>12.70mV</td><td>6.80mV</td><td>Pass</td></tr><tr><td>30% Load</td><td>41.30mV</td><td>4.40mV</td><td>12.40mV</td><td>6.40mV</td><td>Pass</td></tr><tr><td>40% Load</td><td>48.20mV</td><td>4.90mV</td><td>13.00mV</td><td>6.40mV</td><td>Pass</td></tr><tr><td>50% Load</td><td>50.20mV</td><td>5.20mV</td><td>15.10mV</td><td>7.10mV</td><td>Pass</td></tr><tr><td>60% Load</td><td>41.40mV</td><td>4.90mV</td><td>13.60mV</td><td>7.30mV</td><td>Pass</td></tr><tr><td>70% Load</td><td>37.50mV</td><td>5.10mV</td><td>13.70mV</td><td>7.50mV</td><td>Pass</td></tr><tr><td>80% Load</td><td>33.90mV</td><td>5.10mV</td><td>14.60mV</td><td>7.30mV</td><td>Pass</td></tr><tr><td>90% Load</td><td>33.60mV</td><td>6.00mV</td><td>17.00mV</td><td>8.10mV</td><td>Pass</td></tr><tr><td>100% Load</td><td>47.10mV</td><td>7.00mV</td><td>18.70mV</td><td>9.50mV</td><td>Pass</td></tr><tr><td>110% Load</td><td>48.80mV</td><td>7.30mV</td><td>18.90mV</td><td>9.70mV</td><td>Pass</td></tr><tr><td>Crossload1</td><td>39.00mV</td><td>5.90mV</td><td>17.50mV</td><td>7.40mV</td><td>Pass</td></tr><tr><td>Crossload2</td><td>45.30mV</td><td>6.10mV</td><td>14.30mV</td><td>8.70mV</td><td>Pass</td></tr></table> The results above are not used in the certification process 230V <table><tr><td>Test</td><td>12V</td><td>5V</td><td>3.3V</td><td>5VSB</td><td>Pass/Fail</td></tr><tr><td>10% Load</td><td>27.10mV</td><td>4.20mV</td><td>11.50mV</td><td>6.90mV</td><td>Pass</td></tr><tr><td>20% Load</td><td>40.80mV</td><td>4.10mV</td><td>12.40mV</td><td>7.30mV</td><td>Pass</td></tr><tr><td>30% Load</td><td>50.60mV</td><td>5.00mV</td><td>12.70mV</td><td>6.90mV</td><td>Pass</td></tr></table>	Test	12V	5V	3.3V	5VSB	Pass/Fail	10% Load	20.50mV	4.00mV	12.60mV	6.40mV	Pass	20% Load	30.70mV	4.20mV	12.70mV	6.80mV	Pass	30% Load	41.30mV	4.40mV	12.40mV	6.40mV	Pass	40% Load	48.20mV	4.90mV	13.00mV	6.40mV	Pass	50% Load	50.20mV	5.20mV	15.10mV	7.10mV	Pass	60% Load	41.40mV	4.90mV	13.60mV	7.30mV	Pass	70% Load	37.50mV	5.10mV	13.70mV	7.50mV	Pass	80% Load	33.90mV	5.10mV	14.60mV	7.30mV	Pass	90% Load	33.60mV	6.00mV	17.00mV	8.10mV	Pass	100% Load	47.10mV	7.00mV	18.70mV	9.50mV	Pass	110% Load	48.80mV	7.30mV	18.90mV	9.70mV	Pass	Crossload1	39.00mV	5.90mV	17.50mV	7.40mV	Pass	Crossload2	45.30mV	6.10mV	14.30mV	8.70mV	Pass	Test	12V	5V	3.3V	5VSB	Pass/Fail	10% Load	27.10mV	4.20mV	11.50mV	6.90mV	Pass	20% Load	40.80mV	4.10mV	12.40mV	7.30mV	Pass	30% Load	50.60mV	5.00mV	12.70mV	6.90mV	Pass	
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Test	12V	5V	3.3V	5VSB	Pass/Fail
40% Load	56.60mV	5.00mV	13.00mV	7.30mV	Pass
50% Load	58.60mV	4.90mV	13.10mV	7.00mV	Pass
60% Load	49.20mV	4.90mV	12.70mV	7.50mV	Pass
70% Load	42.30mV	5.40mV	13.00mV	7.70mV	Pass
80% Load	39.10mV	5.70mV	15.90mV	8.30mV	Pass
90% Load	36.80mV	6.30mV	17.90mV	8.60mV	Pass
100% Load	49.40mV	7.00mV	17.20mV	10.10mV	Pass
110% Load	50.70mV	7.30mV	18.00mV	10.20mV	Pass
Crossload1	46.70mV	6.20mV	18.30mV	7.80mV	Pass
Crossload2	47.20mV	6.40mV	14.50mV	8.90mV	Pass

The results above are not used in the certification process

Kolink
Enclave
500W
(#2)



Top side



Power
specifications
label

All Cybenetics data runs and voluntary graph certification programs include this power