



ASRock Steel Legend SL-650G

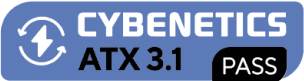
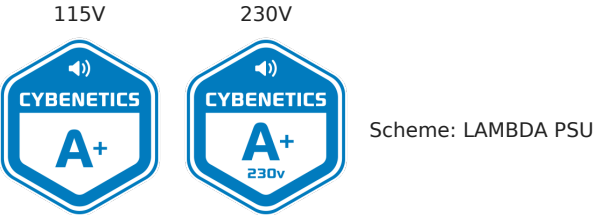
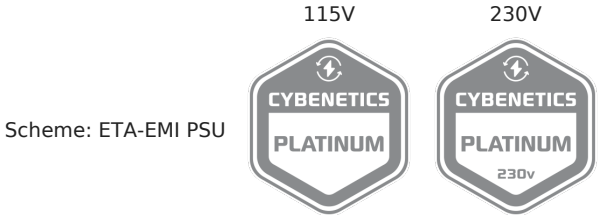
Serial Number

Lab ID AR65002673

Certification ID 252673

Test Result Report ID: 24PS2673A

Certificate Issue Date: Dec 9, 2024



PASS

Outside Validation Scope

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	ASRock
Model	Steel Legend SL-650G
OEM/ODM	HEC
Serial Number	
Product Specifications	
Manufacturer-Provided Information	
Rated Voltage (Vrms)	100-240
Rated Current (Arms)	5-9

Rated Frequency (Hz)	50-60
Rated Power (W)	650
Operating Temperature (Continuous Full Load) (°C)	
Type	ATX12V
Cable Design	Fully Modular
Warranty	-
Cybenetics Measurements	
Dimensions (W x H x D)	
Weight	
Cooling	135mm Fluid Dynamic Bearing Fan (RL4ZS1352512HH)
Semi-Passive Operation	✓ (selectable)
Cybenetics Testing Information	
Lab ID	AR65002673
Date of receipt	Nov 22, 2024
Testing Date	Dec 6, 2024
Report Issued Date	Dec 9, 2024
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 (600mm)	1	1	18AWG	No
4+4 pin EPS12V (645mm+145mm)	1	2	18AWG	No
6+2 pin PCIe (595mm)	2	2	18AWG	No
SATA (450mm+120mm+120mm)	2	6	18AWG	No
4-pin Molex (440mm+110mm+110mm)	1	3	18AWG	No

Protection Features(Manufacturer)

Over Voltage Protection	✓
Under Voltage Protection	✓
Over Power Protection	✓
Over Current (+12V) Protection	✓
Over Temperature Protection	✓
Short Circuit Protection	✓
Surge Protection	✓

Power Specifications

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	20	20	54.2	3	0.3
	Watts	120		650	15	3.6
Total Max. Power (W)		650				

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	✓
ALPM (Alternative Low Power Mode) compatible	✓
ATX v3.1 PSU Power Excursion	✓

Performance Summary

115V	
Accredited	
Average Efficiency (>1450 load combinations)	89.831%

Average Noise Output (>1450 Load Combinations)	17.28dBA
Average PF (>1450 Load Combinations)	0.984
Efficiency With 10W ($\leq$ 500W) or 2% (>500W) Load	69.499%
Standby Power Consumption	0.0391W
Non-Accredited	
12V Ripple (Full Load)	41.76mV
5V Ripple (Full Load)	20.21mV
3.3V Ripple (Full Load)	21.19mV
5VSB Ripple (Full Load)	30.88mV
12V Load Regulation	0.52%
5V Load Regulation	0.55%
3.3V Load Regulation	0.69%
5VSB Load Regulation	2.39%
Inrush Current	30.090A

230V

Accredited	
Average Efficiency (>1450 load combinations)	92.020%
Average Noise Output (>1450 Load Combinations)	17.45dBA
Average PF (>1450 Load Combinations)	0.958
Efficiency With 10W ($\leq$ 500W) or 2% (>500W) Load	72.249%
Standby Power Consumption	0.0966W
Non-Accredited	
12V Ripple (Full Load)	41.41mV
5V Ripple (Full Load)	18.72mV
3.3V Ripple (Full Load)	21.24mV
5VSB Ripple (Full Load)	24.74mV
12V Load Regulation	0.53%
5V Load Regulation	0.53%
3.3V Load Regulation	0.69%
5VSB Load Regulation	2.39%
Inrush Current	60.100A

12V Transient Response (200%)	11.68V	
5V Transient Response (200%)	5.053V	
3.3V Transient Response (200%)	3.268V	
5VSB Transient Response (200%)	5.040V	
Hold-Up Time & PWR_OK Signal	15.80ms	
AC Loss to PWR_OK Hold Up Time	13.30ms	
PWR_OK Inactive to DC Loss Delay	2.50ms	
PSU Timings: T1 (20% / 100%)	53.0ms	52.0ms
PSU Timings: T3 (20% / 100%)	123.0ms	123.0ms
12V OCP (27.2°C / 42.6°C)	68.40A (126.20%), 12.015V	68.20A (125.83%), 12.026V
5V OCP (27.2°C / 42.6°C)	28.7A (143.50%), 5.066V	27.6A (138.00%), 5.067V
3.3V OCP (27.2°C / 42.6°C)	28.5A (142.50%), 3.317V	27.7A (138.50%), 3.32V
5VSB OCP (27.2°C / 42.6°C)	4.1A (136.67%), 5.07V	4A (133.33%), 5.076V
OPP (28.13°C / 42.62°C)	140.41%	138.31%

Hold-Up Time & PWR_OK Signal

Hold-Up Time (ms)	15.8
AC Loss to PWR_OK Hold Up Time (ms)	13.3
PWR_OK Inactive to DC Loss Delay (ms)	2.5

Vampire Power

Tables

115V

Detailed Results						
	Average	Min	Limit Min	Max	Limit Max	Result
Mains Voltage RMS:	115.06 V	115.02 V	113.85 V	115.10 V	116.15 V	PASS
Mains Frequency:	60.00 Hz	59.99 Hz	59.40 Hz	60.01 Hz	60.60 Hz	PASS
Mains Voltage CF:	1.417	1.415	1.340	1.418	1.490	PASS

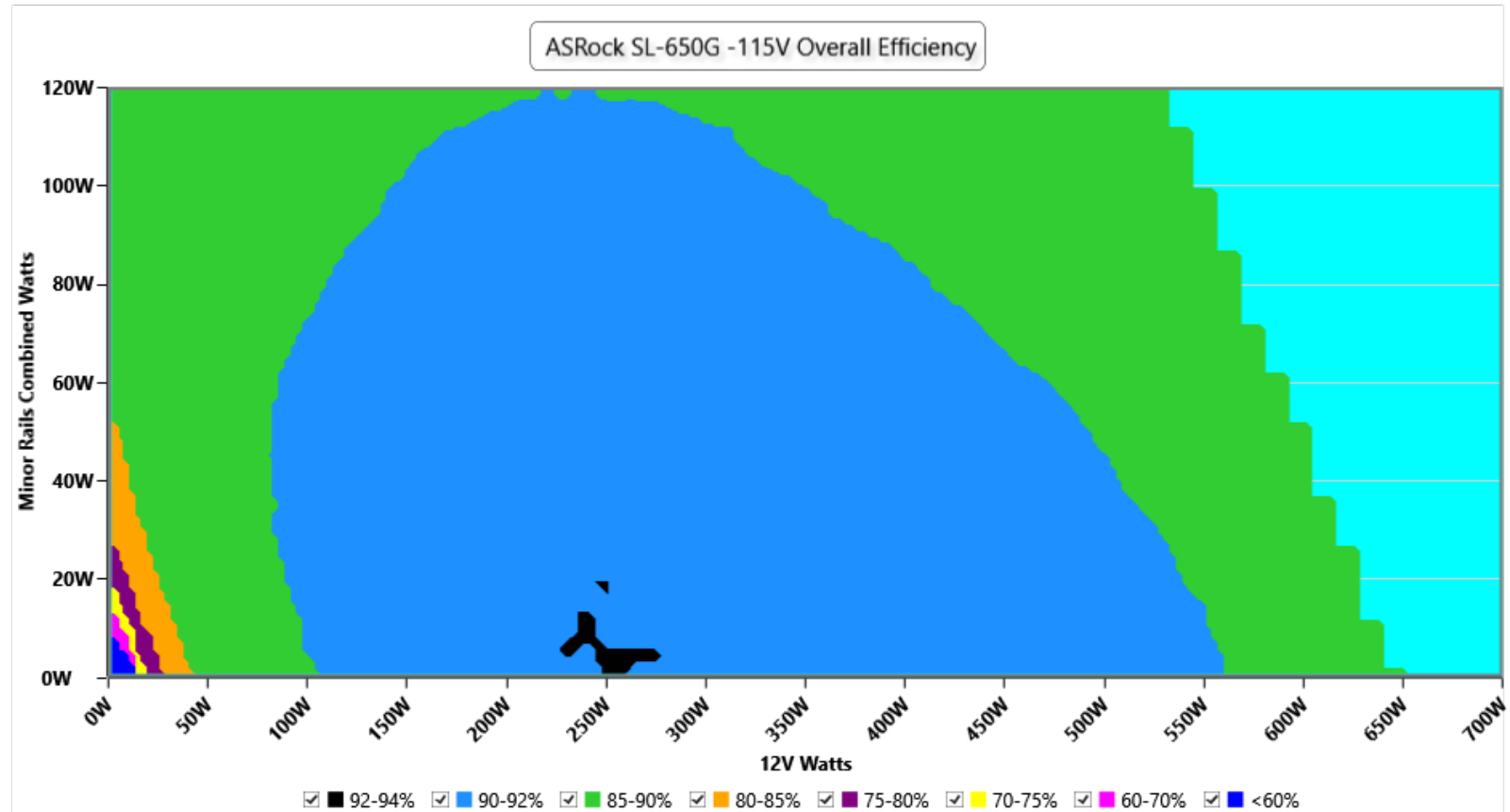
Mains Voltage THD:	0.14 %	0.11 %	N/A	0.19 %	2.00 %	PASS
Real Power:	0.039 W	-0.004 W	N/A	0.077 W	N/A	N/A
Apparent Power:	8.206 W	8.142 W	N/A	8.270 W	N/A	N/A
Power Factor:	0.007	N/A	N/A	N/A	N/A	N/A

230V

Detailed Results						
	Average	Min	Limit Min	Max	Limit Max	Result
Mains Voltage RMS:	231.02 V	230.93 V	227.70 V	231.09 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	1.419	1.490	PASS
Mains Voltage THD:	0.17 %	0.15 %	N/A	0.26 %	2.00 %	PASS
Real Power:	0.097 W	0.056 W	N/A	0.155 W	N/A	N/A
Apparent Power:	27.910 W	27.687 W	N/A	28.105 W	N/A	N/A
Power Factor:	0.004	N/A	N/A	N/A	N/A	N/A

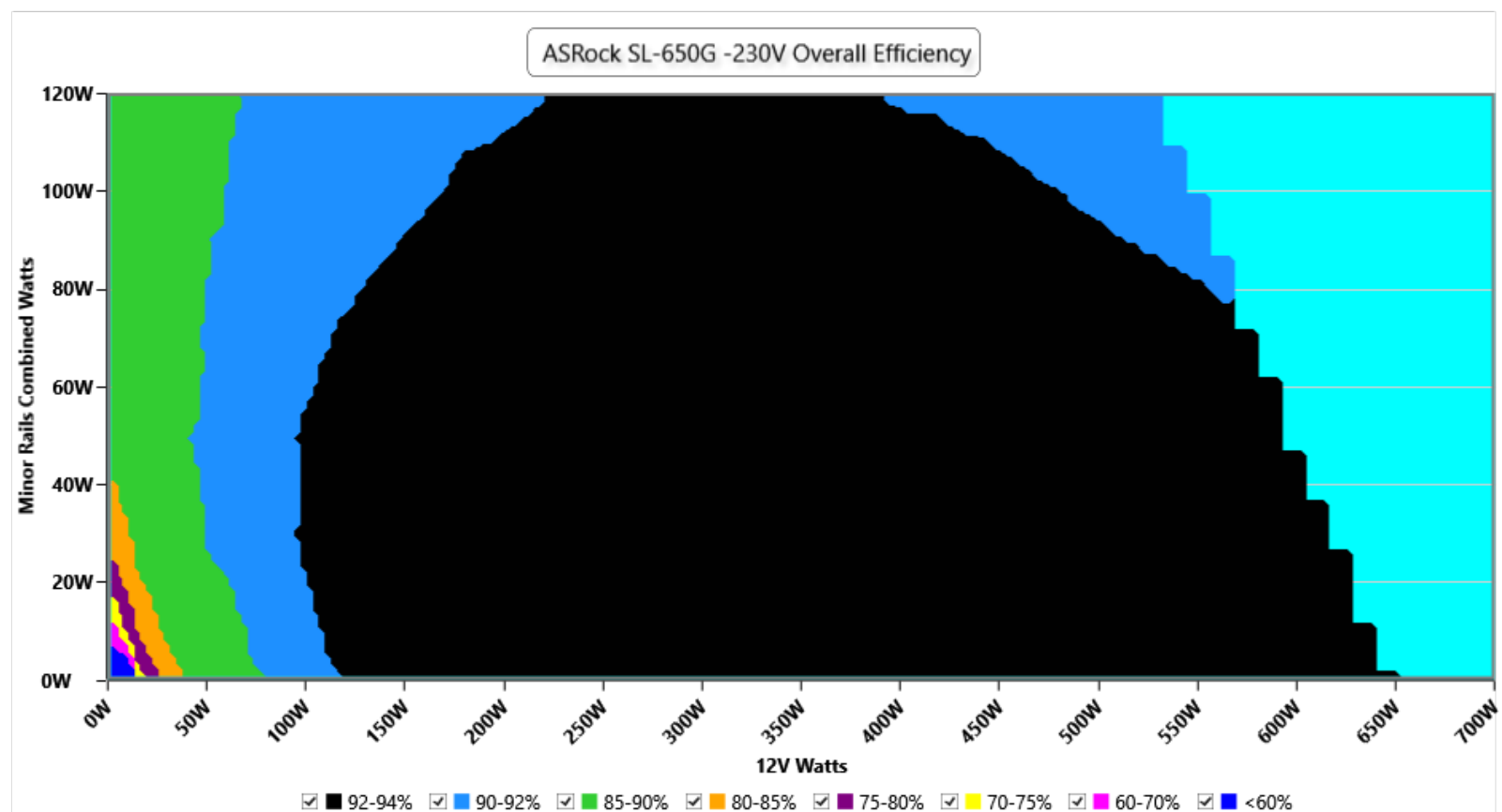
Efficiency Graph

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

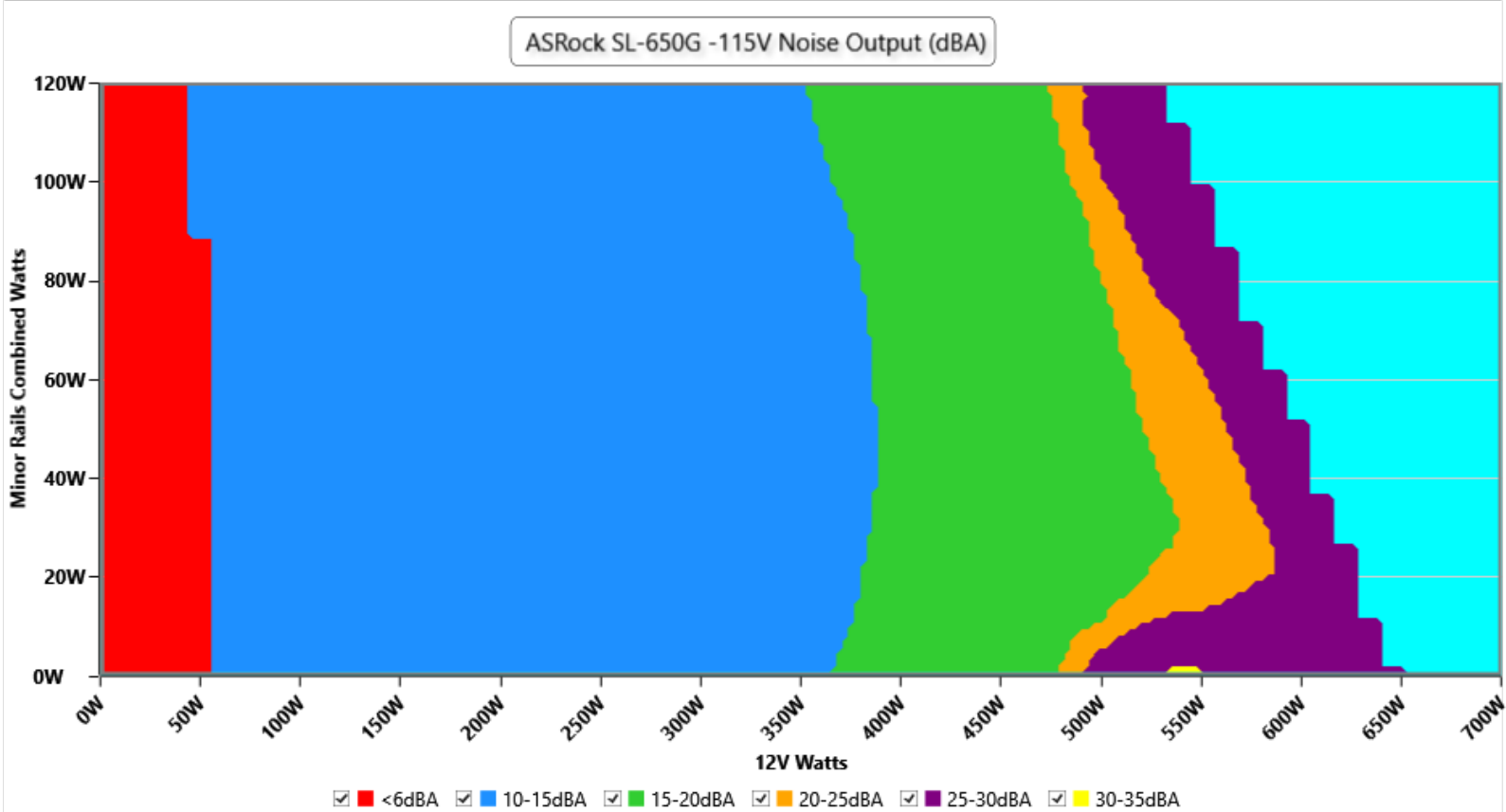


INFO

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

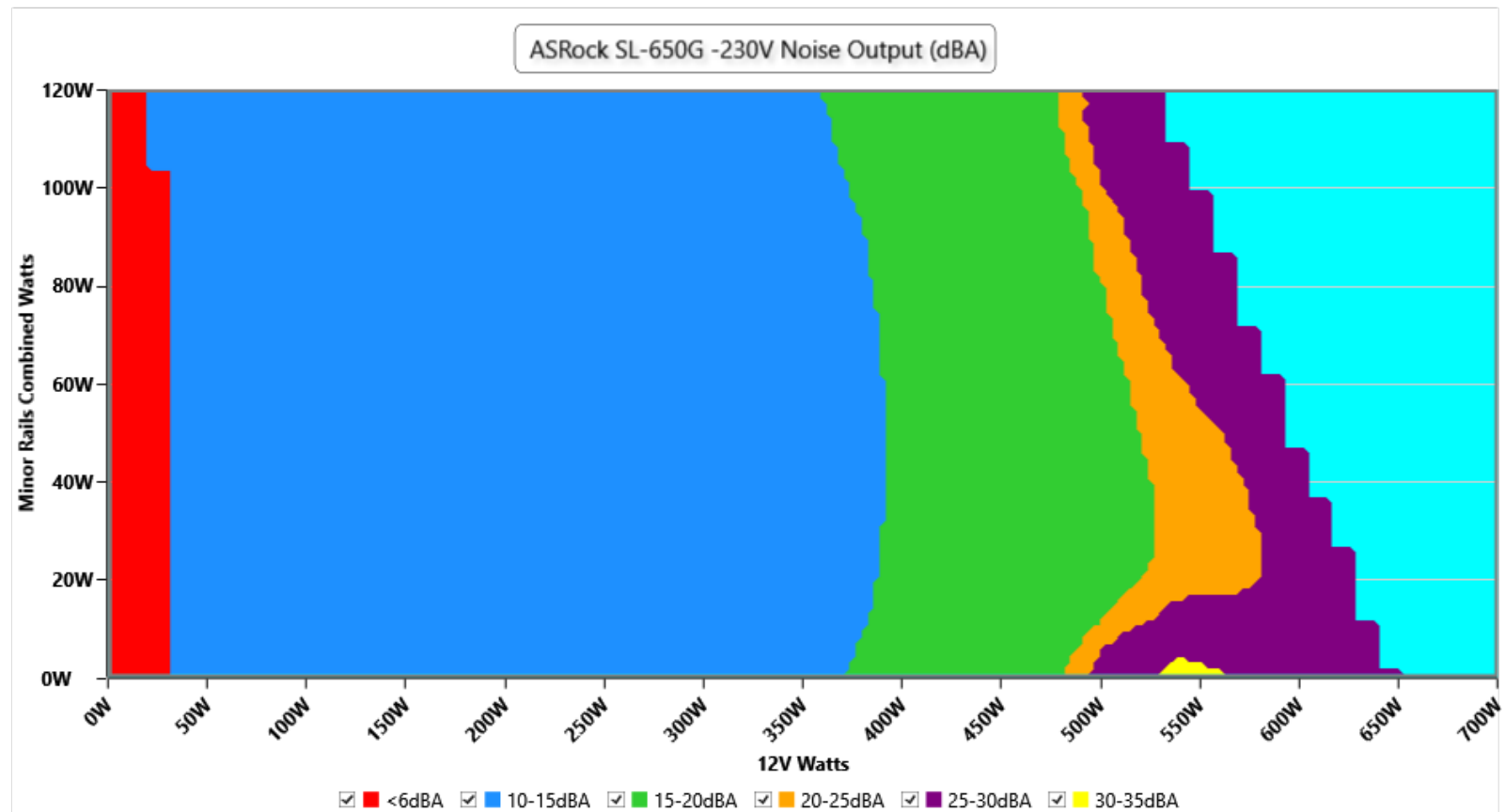
Noise Graph

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



INFO

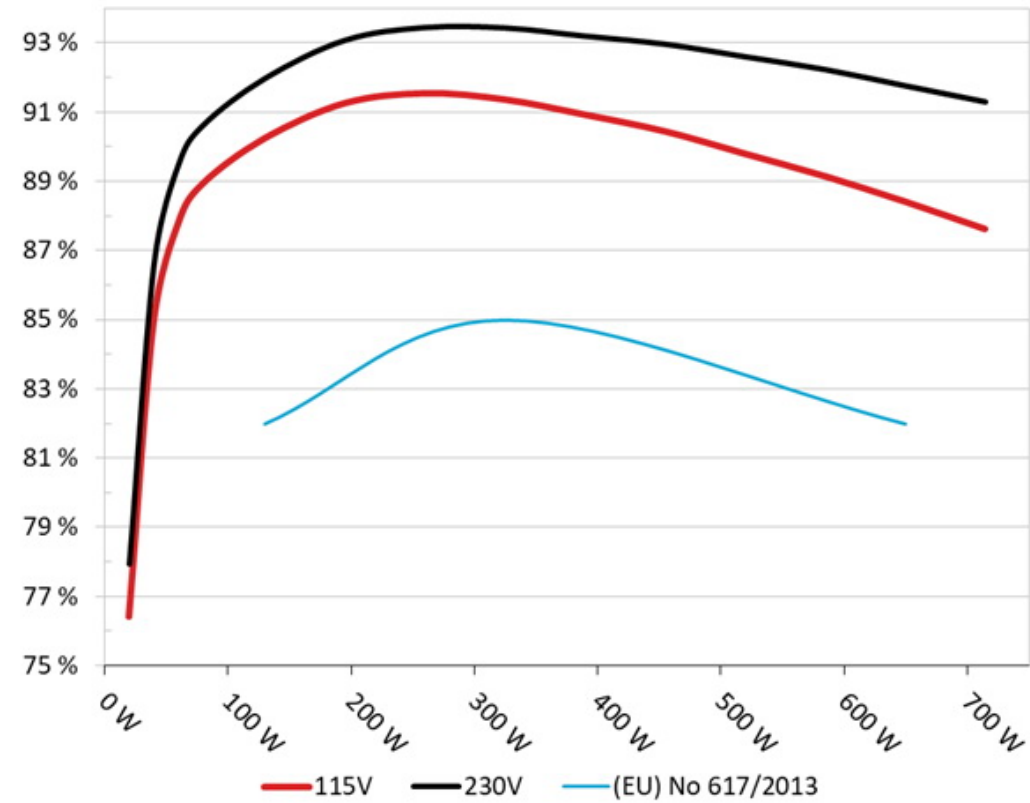
The PSU's noise in its entire operational range and under 30-32 °C ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails

Indicative Performance

Efficiency under high ambient temperature

Efficiency: ASRock SL-650G

Ambient: 36°C - 46°C (96.8°F - 114.8°F)



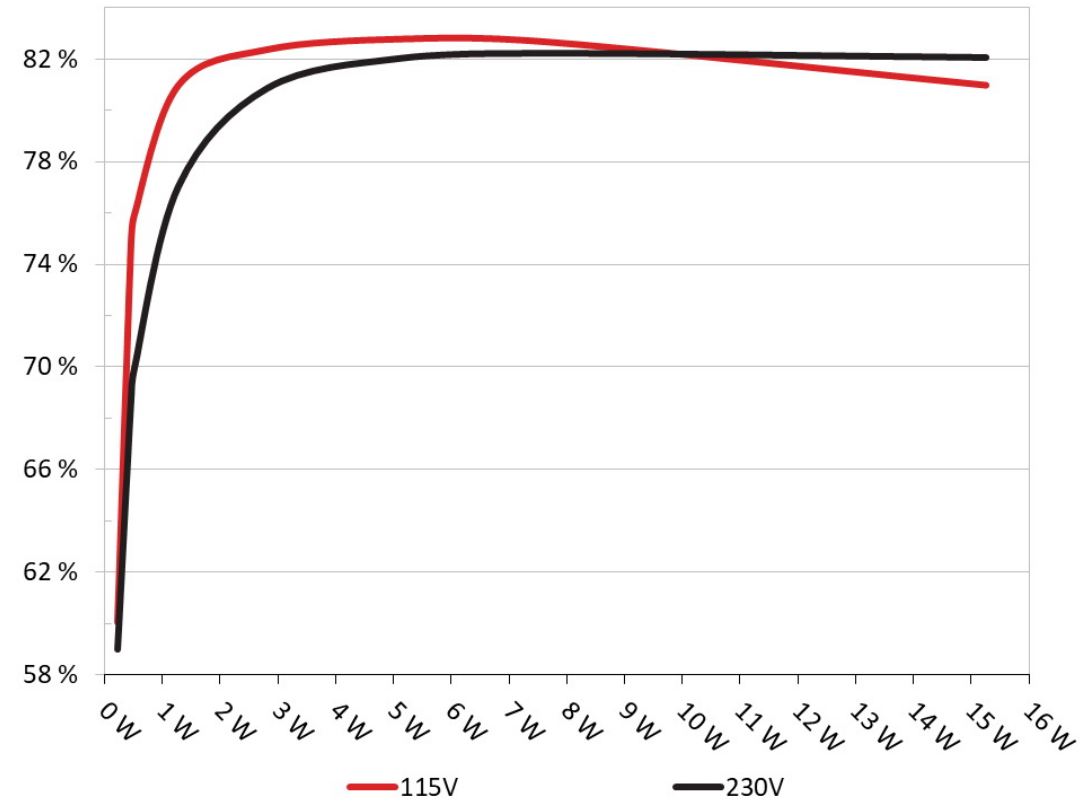
INFO

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: ASRock SL-650G

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	0.232W	60.054%	0.032
	5.148V	0.276W		114.91V
2	0.09A	0.463W	74.763%	0.071
	5.147V	0.619W		114.94V
3	0.55A	2.825W	82.366%	0.289
	5.137V	3.43W		114.91V
4	1A	5.128W	82.773%	0.364
	5.128V	6.195W		114.91V
5	1.5A	7.678W	82.659%	0.419
	5.118V	9.289W		114.91V
6	3A	15.264W	80.975%	0.486
	5.088V	18.85W		114.9V

230V

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.232W	58.995%	0.013
	5.147V	0.393W		229.91V
2	0.09A	0.463W	68.653%	0.023
	5.146V	0.675W		229.91V
3	0.55A	2.825W	80.842%	0.113
	5.137V	3.494W		229.89V
4	1A	5.128W	82.002%	0.186
	5.128V	6.254W		229.89V
5	1.5A	7.677W	82.199%	0.224
	5.118V	9.34W		229.89V
6	3A	15.263W	82.037%	0.334
	5.088V	18.606W		229.88V

Protection Features

OCP (Normal @ 27.2°C)	12V: 68.40A (126.20%), 12.015V 5V: 28.7A (143.50%), 5.066V 3.3V: 28.5A (142.50%), 3.317V 5VSB: 4.1A (136.67%), 5.07V
OCP (Hot @ 42.6°C)	12V: 68.20A (125.83%), 12.026V 5V: 27.6A (138.00%), 5.067V 3.3V: 27.7A (138.50%), 3.32V 5VSB: 4A (133.33%), 5.076V
OPP (Normal @ 28.1°C)	912.64W (140.41%)
OPP (Hot @ 42.6°C)	899.00W (138.31%)
OTP	✓ (118°C @ Heat Sink)
SCP	12V to Earth: ✓ 5V to Earth: ✓ 3.3V to Earth: ✓ 5VSB to Earth: ✓ -12V to Earth: ✓
PWR_OK	Proper Operation
NLO	✓
Fan Failure Protection	✗
SIP	Surge: MOV Inrush: NTC & Bypass Relay

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
10%	3.588A	1.953A	1.975A	0.975A	64.999	87.316%	605	11.3	40.04°C	0.96
	12.093V	5.119V	3.342V	5.127V	74.439				40.59°C	114.9V

Test	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
20%	8.194A	2.931A	2.964A	1.173A	129.93	90.243%	608	10.8	40.54°C	0.978
	12.084V	5.117V	3.34V	5.116V	143.98				42.46°C	114.87V
30%	13.152A	3.421A	3.46A	1.371A	194.926	91.26%	611	10.4	41.02°C	0.982
	12.079V	5.115V	3.339V	5.107V	213.595				43.75°C	114.85V
40%	18.122A	3.911A	3.956A	1.57A	260.004	91.548%	650	10.2	41.74°C	0.983
	12.073V	5.113V	3.337V	5.097V	284.006				45.75°C	114.82V
50%	22.746A	4.892A	4.948A	1.77A	324.997	91.367%	717	13.7	42.41°C	0.985
	12.068V	5.111V	3.335V	5.086V	355.704				47.68°C	114.8V
60%	27.319A	5.873A	5.942A	1.971A	389.301	90.932%	789	17.1	42.98°C	0.987
	12.061V	5.108V	3.332V	5.075V	428.123				50.27°C	114.77V
70%	31.978A	6.857A	6.938A	2.172A	454.606	90.45%	927	22	43.33°C	0.989
	12.055V	5.105V	3.33V	5.064V	502.604				52.97°C	114.75V
80%	36.643A	7.839A	7.934A	2.275A	519.385	89.804%	1300	32.8	43.93°C	0.991
	12.048V	5.102V	3.327V	5.055V	578.356				54.64°C	114.73V
90%	41.717A	8.332A	8.42A	2.378A	584.813	89.148%	1568	38.2	44.67°C	0.993
	12.041V	5.1V	3.325V	5.047V	656.005				55.9°C	114.7V
100%	46.529A	8.826A	8.937A	2.983A	649.635	88.417%	1800	42.4	45.76°C	0.994
	12.034V	5.097V	3.323V	5.028V	734.739				57.71°C	114.68V
110%	51.213A	9.813A	10.028A	2.987A	714.261	87.628%	1800	42.4	46.18°C	0.994
	12.027V	5.094V	3.32V	5.021V	815.101				59.81°C	114.65V
CL1	0.114A	14.162A	14.347A	0A	121.279	85.37%	781	16.9	41.76°C	0.979
	12.088V	5.097V	3.325V	5.13V	142.061				53.51°C	114.86V
CL2	0.114A	19.614A	0A	0A	101.352	84.563%	724	14.2	41.04°C	0.976
	12.096V	5.097V	3.338V	5.139V	119.853				51.12°C	114.87V
CL3	0.114A	0A	19.827A	0A	67.389	80.037%	682	11.6	40.01°C	0.966
	12.096V	5.109V	3.329V	5.138V	84.198				48.69°C	114.88V
CL4	53.925A	0A	0A	0A	649.462	89.22%	1786	42	45.05°C	0.993
	12.044V	5.11V	3.337V	5.097V	727.937				55.2°C	114.68V

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
10%	3.588A	1.953A	1.974A	0.975A	64.999	88.984%	608	10.8	40.01°C	0.847
	12.094V	5.119V	3.343V	5.128V	73.045				41.17°C	229.88V
20%	8.194A	2.931A	2.964A	1.173A	129.929	91.954%	611	10.4	40.5°C	0.928
	12.086V	5.117V	3.34V	5.117V	141.293				42.12°C	229.87V
30%	13.152A	3.421A	3.46A	1.371A	194.928	93.059%	615	9.8	41.02°C	0.952
	12.080V	5.115V	3.339V	5.107V	209.465				43.07°C	229.86V
40%	18.122A	3.912A	3.956A	1.57A	260.009	93.426%	658	11	41.9°C	0.964
	12.074V	5.113V	3.337V	5.097V	278.305				43.98°C	229.84V
50%	22.748A	4.892A	4.949A	1.77A	325.007	93.412%	719	13.7	42.39°C	0.971
	12.067V	5.111V	3.335V	5.086V	347.92				45.22°C	229.83V
60%	27.322A	5.874A	5.943A	1.971A	389.327	93.178%	785	17	42.53°C	0.975
	12.060V	5.108V	3.332V	5.075V	417.833				46.29°C	229.82V
70%	31.983A	6.857A	6.938A	2.172A	454.634	92.944%	858	19.9	43.43°C	0.978
	12.054V	5.105V	3.33V	5.064V	489.15				47.25°C	229.81V
80%	36.649A	7.838A	7.935A	2.275A	519.416	92.582%	1162	29.3	43.56°C	0.981
	12.047V	5.102V	3.327V	5.055V	561.036				47.79°C	229.8V
90%	41.725A	8.331A	8.422A	2.378A	584.844	92.208%	1434	35.6	44.12°C	0.982
	12.039V	5.1V	3.325V	5.046V	634.267				48.32°C	229.79V
100%	46.537A	8.826A	8.939A	2.983A	649.661	91.739%	1744	40.9	45°C	0.984
	12.032V	5.098V	3.323V	5.028V	708.159				49.35°C	229.78V
110%	51.223A	9.813A	10.03A	2.987A	714.281	91.279%	1801	42.4	46.43°C	0.986
	12.025V	5.095V	3.32V	5.021V	782.522				50.2°C	229.76V
CL1	0.114A	14.161A	14.349A	0A	121.281	87.096%	750	18.1	41.52°C	0.929
	12.086V	5.098V	3.325V	5.13V	139.248				47.32°C	229.87V
CL2	0.114A	19.613A	0A	0A	101.354	86.109%	695	12.4	40.53°C	0.913
	12.094V	5.097V	3.337V	5.139V	117.703				46.42°C	229.87V
CL3	0.114A	0A	19.829A	0A	67.392	81.287%	659	11	40.32°C	0.873
	12.094V	5.109V	3.329V	5.138V	82.91				45.63°C	229.88V

Test	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
CL4	53.932A	0A	0A	0A	649.487	92.451%	1680	39.8	45.57°C	0.984
	12.043V	5.11V	3.337V	5.097V	702.521				48.14°C	229.78V

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])	Temps (In/Out)	PF/AC Volts
20W	1.228A	0.488A	0.493A	0.194A	19.996	76.431%	0	<6.0	46.01°C	0.888
	12.086V	5.125V	3.346V	5.148V	26.163				36.42°C	114.91V
40W	2.702A	0.683A	0.69A	0.291A	39.997	84.945%	0	<6.0	46.79°C	0.939
	12.096V	5.124V	3.346V	5.145V	47.087				37.57°C	114.9V
60W	4.178A	0.878A	0.888A	0.389A	59.997	87.799%	0	<6.0	44.72°C	0.957
	12.095V	5.123V	3.345V	5.141V	68.337				38.58°C	114.9V
80W	5.648A	1.074A	1.085A	0.487A	79.943	88.942%	607	10.9	40.38°C	0.968
	12.094V	5.122V	3.345V	5.137V	89.88				39.52°C	114.89V

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
20W	1.228A	0.488A	0.493A	0.194A	19.999	77.937%	0	<6.0	43.21°C	0.615
	12.085V	5.125V	3.345V	5.148V	25.662				36.22°C	229.88V
40W	2.702A	0.683A	0.69A	0.291A	39.997	86.598%	0	<6.0	43.86°C	0.748
	12.096V	5.124V	3.346V	5.145V	46.187				37.58°C	229.88V
60W	4.178A	0.878A	0.888A	0.389A	59.998	89.483%	0	<6.0	44.71°C	0.832
	12.094V	5.123V	3.345V	5.141V	67.052				38.24°C	229.88V
80W	5.650A	1.074A	1.085A	0.487A	79.943	90.608%	606	11.2	39.09°C	0.877
	12.092V	5.122V	3.344V	5.137V	88.229				40.64°C	229.87V

The results above are not used in the certification process

Ripple Measurements

115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	34.31mV	17.37mV	15.09mV	17.95mV	Pass
20% Load	24.71mV	19.16mV	17.08mV	18.92mV	Pass
30% Load	23.79mV	17.17mV	16.11mV	19.18mV	Pass
40% Load	27.42mV	17.52mV	16.01mV	19.44mV	Pass
50% Load	25.84mV	17.32mV	16.37mV	26.44mV	Pass
60% Load	24.97mV	18.09mV	17.03mV	30.85mV	Pass
70% Load	27.27mV	17.37mV	16.73mV	20.46mV	Pass
80% Load	26.96mV	17.52mV	18.01mV	21.07mV	Pass
90% Load	26.81mV	18.09mV	19.69mV	21.07mV	Pass
100% Load	41.76mV	20.21mV	21.19mV	30.88mV	Pass
110% Load	44.08mV	19.32mV	21.66mV	33.33mV	Pass
Crossload1	34.03mV	18.96mV	23.41mV	29.80mV	Pass
Crossload2	26.55mV	19.52mV	22.92mV	19.33mV	Pass
Crossload3	23.53mV	17.83mV	18.37mV	18.52mV	Pass
Crossload4	40.25mV	19.03mV	17.01mV	46.88mV	Pass

The results above are not used in the certification process

230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	37.13mV	17.52mV	16.68mV	20.31mV	Pass
20% Load	21.54mV	17.47mV	16.78mV	18.36mV	Pass
30% Load	24.05mV	16.86mV	16.32mV	19.69mV	Pass
40% Load	23.99mV	16.86mV	16.78mV	18.57mV	Pass
50% Load	23.43mV	17.58mV	15.75mV	18.31mV	Pass
60% Load	25.17mV	17.37mV	16.83mV	20.82mV	Pass

Test	12V	5V	3.3V	5VSB	Pass/Fail
70% Load	25.68mV	16.91mV	17.75mV	19.18mV	Pass
80% Load	27.73mV	17.88mV	18.67mV	21.89mV	Pass
90% Load	28.45mV	17.32mV	20.87mV	21.38mV	Pass
100% Load	41.41mV	18.72mV	21.24mV	24.74mV	Pass
110% Load	42.31mV	18.78mV	20.76mV	25.47mV	Pass
Crossload1	34.70mV	17.80mV	22.53mV	19.42mV	Pass
Crossload2	26.45mV	20.23mV	24.86mV	21.38mV	Pass
Crossload3	26.14mV	19.26mV	19.13mV	19.39mV	Pass
Crossload4	42.26mV	16.97mV	16.57mV	23.32mV	Pass

The results above are not used in the certification process

ASRock Steel Legend SL-650G



Top side

All data and graphs included in this test report can be used by any individual on the following conditions:

- › It should be mentioned that the test results are provided by Cybenetics
- › The link to the original test results document should be provided in any case

CYBENETICS LTD Syrou 6, Latsia, 2231, Nicosia Cyprus



Power specifications label

Cybenetics runs voluntary certification programs for power supplies - ETA for efficiency, LAMBDA for noise and SAFE for safety and correct operation - and for cooling products, with DELTA for chassis soundproofing and PHI for fan airflow and static pressure. THETA rates cooler performance on AMD AM5 and Intel LGA1851 outside ISO 17065 and accreditation scope

www.cybenetics.com - info@cybenetics.com