zalman

Zalman TeraMax II SE 1000W

Serial Number

Lab ID ZL10002567

Certification ID 252567

Test Result Report ID: 24PS2567A

Certificate Issue Date: Sep 13, 2024

Scheme: ETA-EMI PSU

115V 230V

Scheme: LAMBDA PSU

115V 230V

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	Zalman
Model	TeraMax II SE 1000W
OEM/ODM	Huizhou Jiumeng Electronics Technology Co., Ltd
Serial Number	
Product Specifications	
Manufacturer-Provided Information	
Rated Voltage (Vrms)	100-240
Rated Current (Arms)	6-12

Rated Frequency (Hz)	50-60
Rated Power (W)	1000
Operating Temperature (Continuous Full Load) (°C)	
Type	ATX12V
Cable Design	Fully Modular
Warranty	-
Cybenetics Measurements	
Dimensions (W x H x D)	
Weight	
Cooling	120mm Fluid Dynamic Bearing Fan (PY-12225M12S)
Semi-Passive Operation	✗
Cybenetics Testing Information	
Lab ID	ZL10002567
Date of receipt	Sep 6, 2024
Testing Date	Sep 12, 2024
Report Issued Date	Sep 13, 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 (750mm)	2	2	18AWG	No
6+2 pin PCIe (550mm+150mm)	1	2	18AWG	No
6+2 pin PCIe (550mm)	2	2	18AWG	No
12+4 pin PCIe (610mm) (600W)	1	1	16-26AWG	No
SATA (500mm+150mm+150mm+145mm)	3	12	18AWG	No
4-pin Molex (500mm+150mm+150mm) / FDD (+155mm)	1	3 / 1	18-22AWG	No

Protection Features(Manufacturer)

Over Power Protection	✓
Over Current (+12V) Protection	✓
Over Temperature Protection	✓
Short Circuit Protection	✓
Surge Protection	✓
Inrush Current Protection	✓
Fan Failure Protection	✗

Power Specifications

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	20	20	83.33	3	0.3
	Watts	120		1000	15	3.6
Total Max. Power (W)		1000				

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)	89.053%

Average Noise Output (>1450 Load Combinations)	29.99dBA
Average PF (>1450 Load Combinations)	0.988
Efficiency With 10W (≤500W) or 2% (>500W) Load	69.648%
Standby Power Consumption	0.0128W
Non-Accredited	
12V Ripple (Full Load)	39.06mV
5V Ripple (Full Load)	34.40mV
3.3V Ripple (Full Load)	30.06mV
5VSB Ripple (Full Load)	24.92mV
12V Load Regulation	0.91%
5V Load Regulation	2.93%
3.3V Load Regulation	4.13%
5VSB Load Regulation	2.86%
Inrush Current	38.200A

230V

Accredited	
Average Efficiency (>1450 load combinations)	91.106%
Average Noise Output (>1450 Load Combinations)	29.67dBA
Average PF (>1450 Load Combinations)	0.930
Efficiency With 10W (≤500W) or 2% (>500W) Load	67.059%
Standby Power Consumption	0.0743W
Non-Accredited	
12V Ripple (Full Load)	36.51mV
5V Ripple (Full Load)	32.87mV
3.3V Ripple (Full Load)	29.86mV
5VSB Ripple (Full Load)	25.13mV
12V Load Regulation	0.88%
5V Load Regulation	2.91%
3.3V Load Regulation	4.09%
5VSB Load Regulation	2.82%
Inrush Current	73.870A

12V Transient Response (200%)		11.05V
5V Transient Response (200%)		4.929V
3.3V Transient Response (200%)		3.194V
5VSB Transient Response (200%)		4.843V
Hold-Up Time & PWR_OK Signal		19.80ms
AC Loss to PWR_OK Hold Up Time		17.40ms
PWR_OK Inactive to DC Loss Delay		2.40ms
PSU Timings: T1 (20% / 100%)	66.0ms	64.0ms
PSU Timings: T3 (20% / 100%)	120.0ms	120.0ms
12V OCP (30.1°C / 43.8°C)	123.40A (148.09%), 11.936V	107.80A (129.37%), 11.947V
5V OCP (30.1°C / 43.8°C)	27.5A (137.50%), 5.002V	27.3A (136.50%), 4.996V
3.3V OCP (30.1°C / 43.8°C)	28.2A (141.00%), 3.269V	28.7A (143.50%), 3.261V
5VSB OCP (30.1°C / 43.8°C)	5A (166.67%), 5.012V	5A (166.67%), 5.012V
OPP (29.13°C / 42.32°C)	144.45%	121.95%

Hold-Up Time & PWR_OK Signal

Hold-Up Time (ms)	19.8
AC Loss to PWR_OK Hold Up Time (ms)	17.4
PWR_OK Inactive to DC Loss Delay (ms)	2.4

Vampire Power

Tables

115V

Detailed Results						
	Average	Min	Limit Min	Max	Limit Max	Result
Mains Voltage RMS:	114.85 V	114.80 V	113.85 V	114.88 V	116.15 V	PASS
Mains Frequency:	60.00 Hz	59.98 Hz	59.40 Hz	60.02 Hz	60.60 Hz	PASS
Mains Voltage CF:	1.419	1.418	1.340	1.420	1.490	PASS

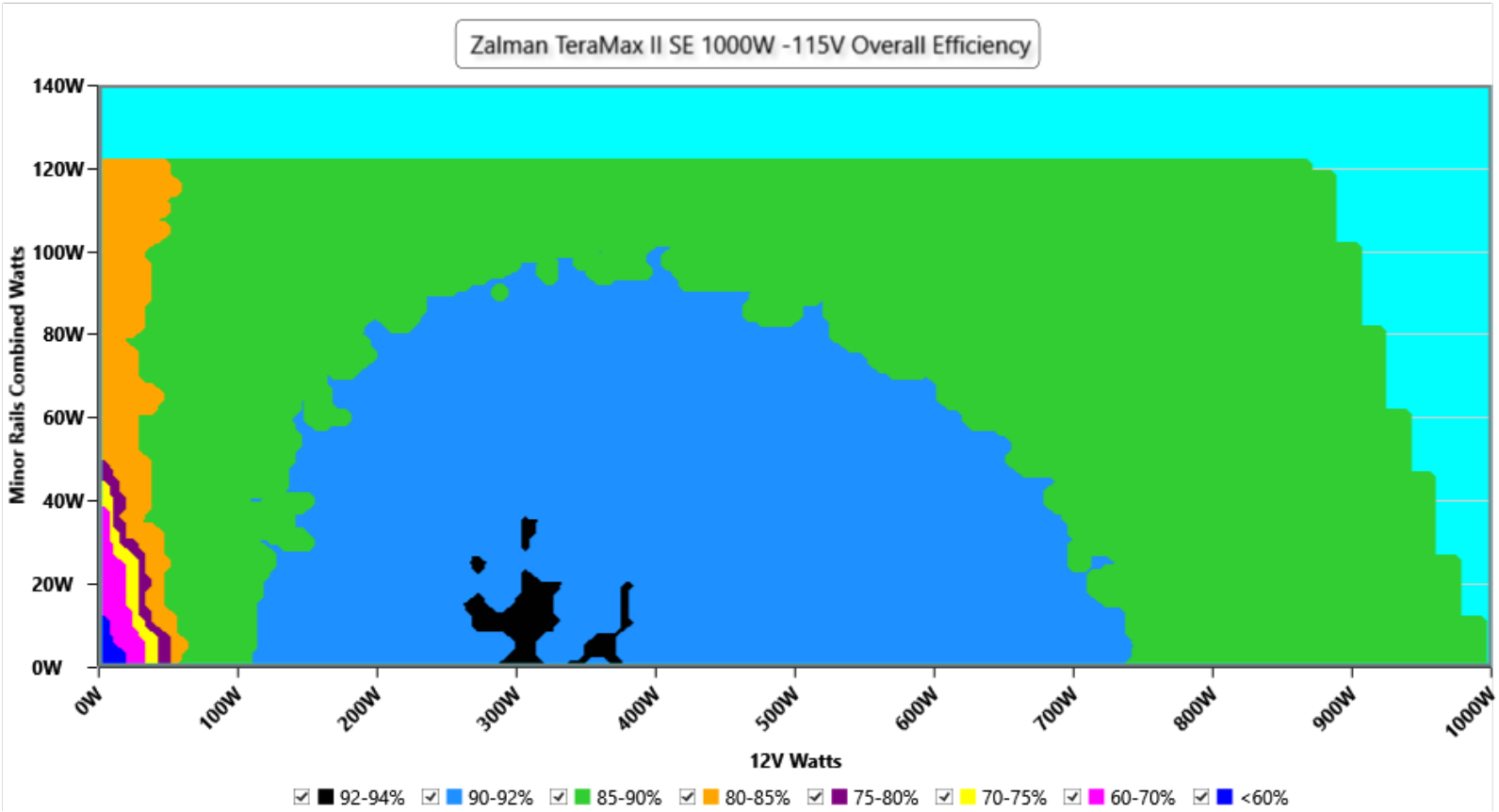
Mains Voltage THD:	0.14 %	0.11 %	N/A	0.19 %	2.00 %	PASS
Real Power:	0.013 W	0.011 W	N/A	0.015 W	N/A	N/A
Apparent Power:	10.307 W	10.283 W	N/A	10.329 W	N/A	N/A
Power Factor:	0.001	N/A	N/A	N/A	N/A	N/A

230V

Detailed Results						
	Average	Min	Limit Min	Max	Limit Max	Result
Mains Voltage RMS:	229.85 V	229.80 V	227.70 V	229.91 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:	1.419	1.418	1.340	1.420	1.490	PASS
Mains Voltage THD:	0.17 %	0.15 %	N/A	0.20 %	2.00 %	PASS
Real Power:	0.074 W	0.037 W	N/A	0.111 W	N/A	N/A
Apparent Power:	34.565 W	34.496 W	N/A	34.608 W	N/A	N/A
Power Factor:	0.003	N/A	N/A	N/A	N/A	N/A

Efficiency Graph

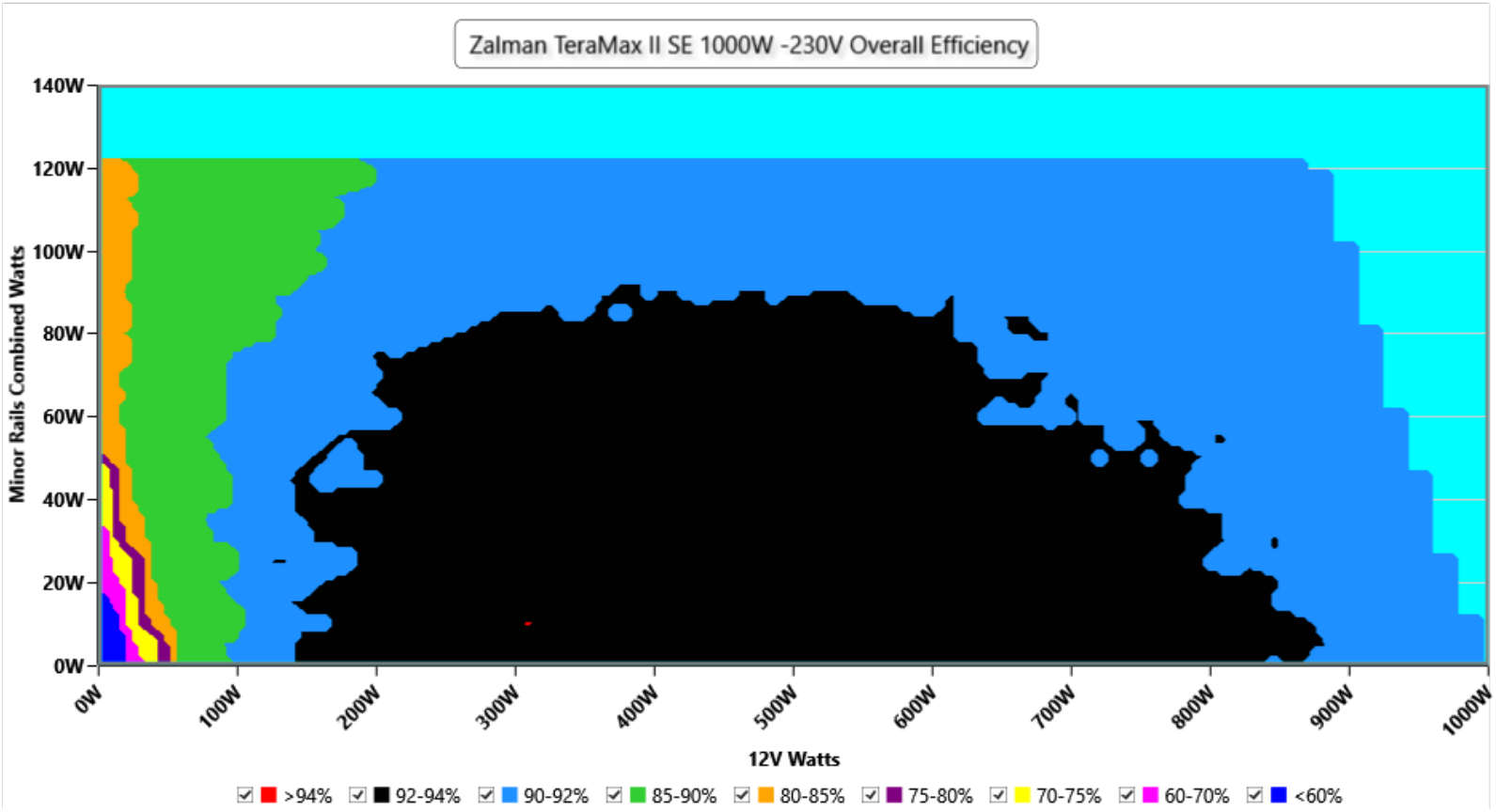
115V



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

230V

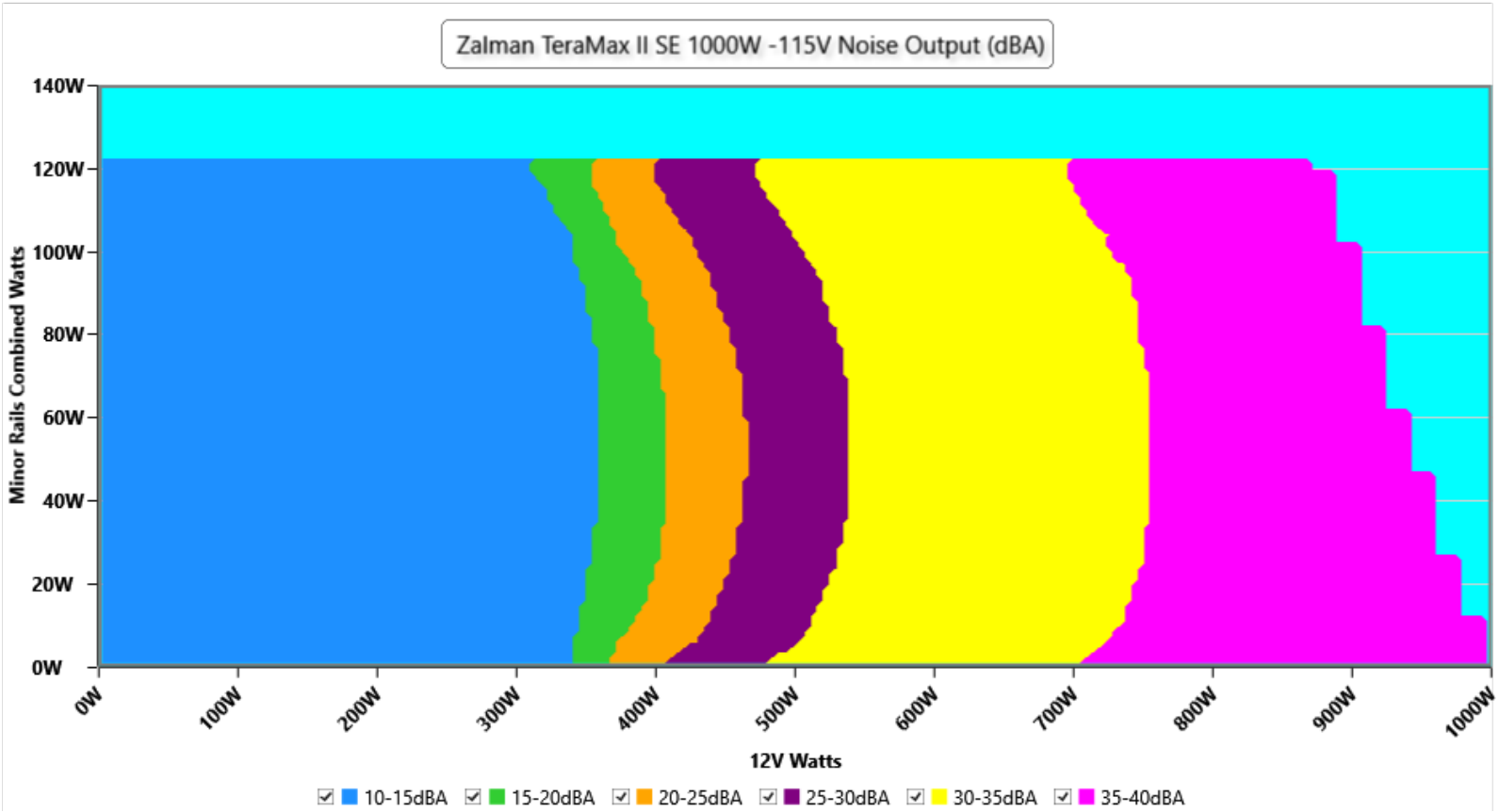


INFO

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

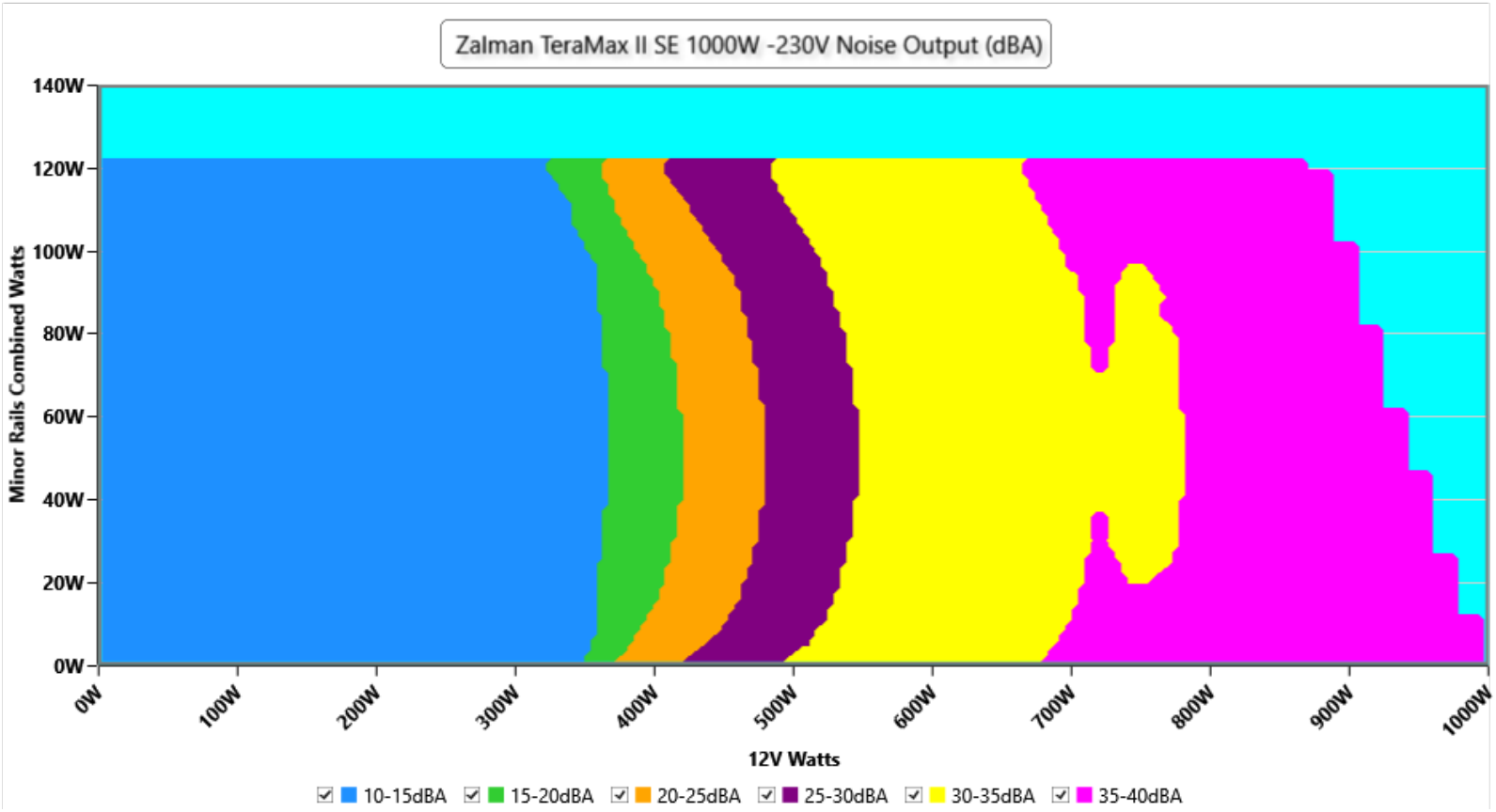
115V



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

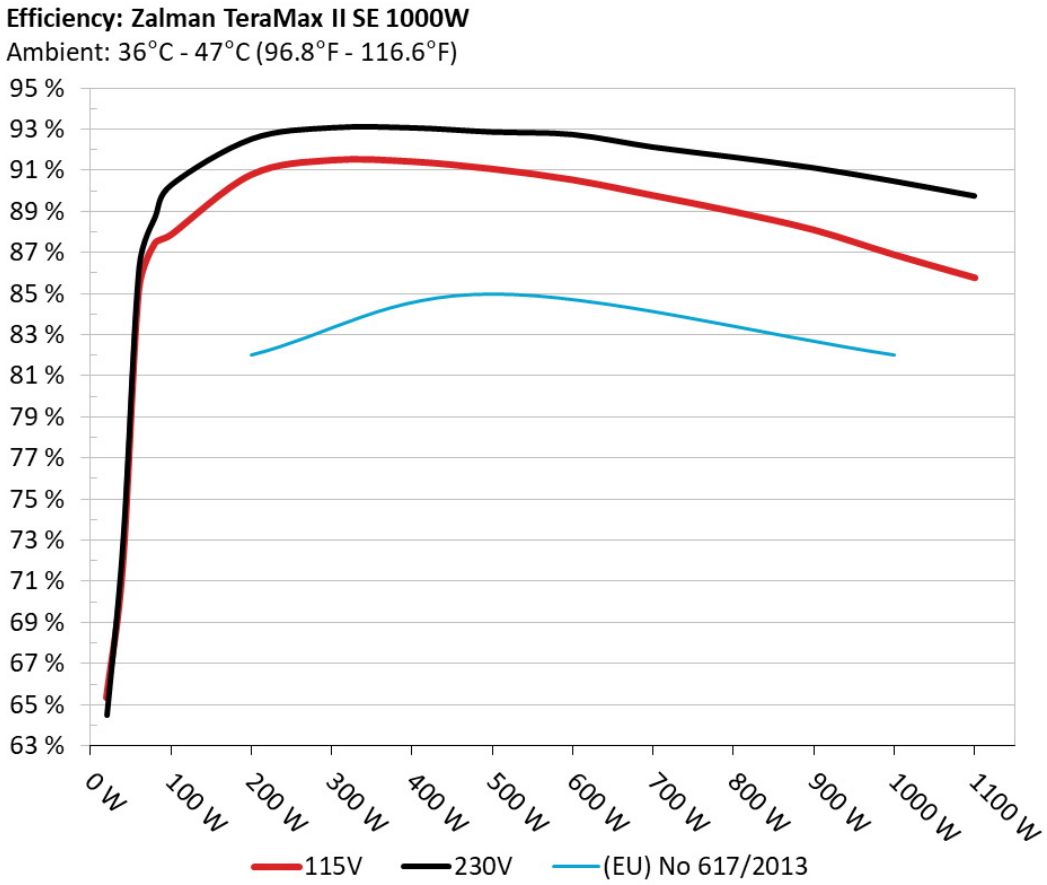


INFO

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

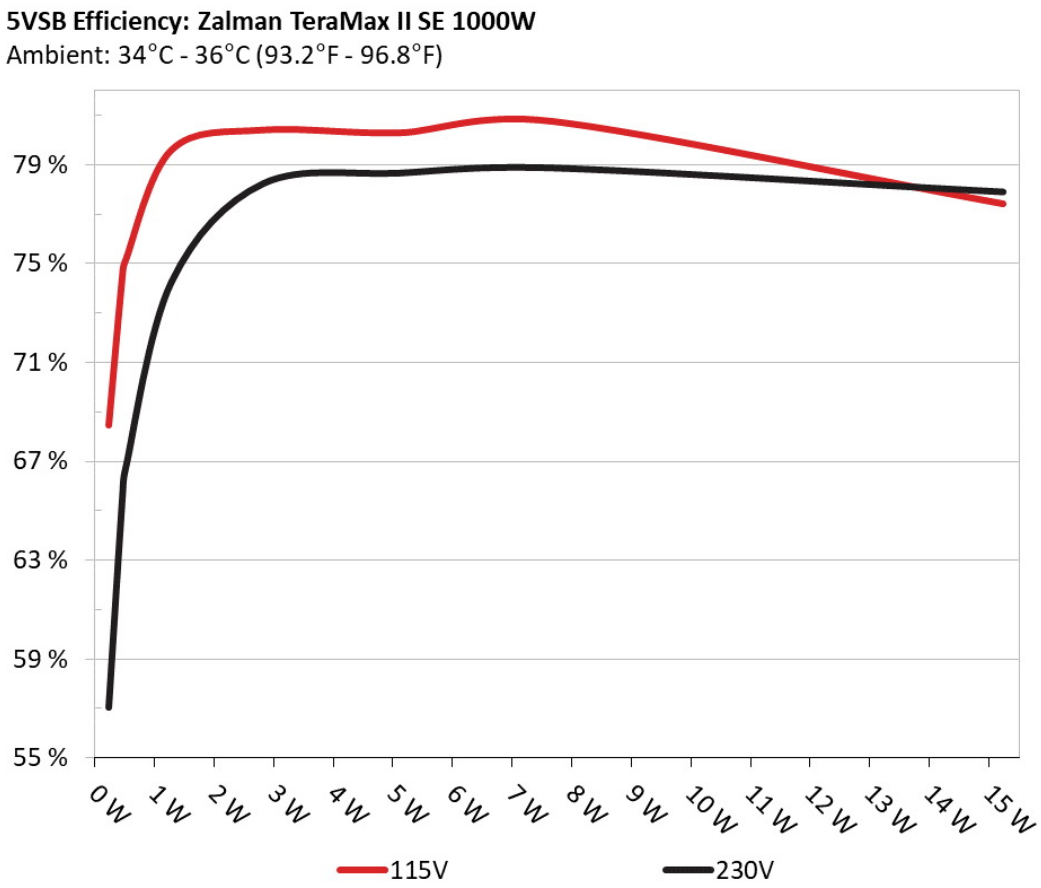
Efficiency under high ambient temperature



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	**0.045A**	0.231W	68.455%	0.033
	5.141V	0.338W		114.86V
2	**0.09A**	0.463W	74.61%	0.059
	5.14V	0.621W		114.86V
3	**0.55A**	2.822W	80.42%	0.262
	5.131V	3.509W		114.86V
4	**1A**	5.122W	80.304%	0.355
	5.122V	6.378W		114.85V
5	**1.5A**	7.668W	80.77%	0.411
	5.112V	9.494W		114.83V
6	**3A**	15.239W	77.429%	0.479
	5.079V	19.682W		114.83V

230V

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	**0.045A**	0.231W	57.04%	0.012
	5.141V	0.405W		229.84V
2	**0.09A**	0.463W	65.68%	0.02
	5.14V	0.706W		229.84V
3	**0.55A**	2.822W	78.232%	0.099
	5.131V	3.608W		229.83V
4	**1A**	5.122W	78.66%	0.167
	5.122V	6.512W		229.83V
5	**1.5A**	7.669W	78.867%	0.222
	5.112V	9.724W		229.84V
6	**3A**	15.243W	77.897%	0.333
	5.081V	19.569W		229.83V

Protection Features

OCP (Normal @ 30.1°C)	12V: 123.40A (148.09%), 11.936V 5V: 27.5A (137.50%), 5.002V 3.3V: 28.2A (141.00%), 3.269V 5VSB: 5A (166.67%), 5.012V
OCP (Hot @ 43.8°C)	12V: 107.80A (129.37%), 11.947V 5V: 27.3A (136.50%), 4.996V 3.3V: 28.7A (143.50%), 3.261V 5VSB: 5A (166.67%), 5.012V
OPP (Normal @ 29.1°C)	1444.46W (144.45%)
OPP (Hot @ 42.3°C)	1219.45W (121.95%)
OTP	✓ (120°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%	**6.418A**	**1.958A**	**1.95A**	**0.978A**	99.987	87.87%	756	14.4	40.38°C	0.963
	12.213V	5.106V	3.384V	5.113V	113.782				43.87°C	114.81V

Test	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
20%	**13.853A**	**2.946A**	**2.936A**	**1.176A**	199.935	90.802%	760	14.7	40.91°C	0.965
	12.203V	5.092V	3.371V	5.101V	220.191				45.2°C	114.77V
30%	**21.651A**	**3.444A**	**3.437A**	**1.376A**	299.99	91.509%	805	16.9	41.17°C	0.985
	12.190V	5.081V	3.361V	5.088V	327.833				48.09°C	114.73V
40%	**29.422A**	**3.945A**	**3.939A**	**1.576A**	399.525	91.44%	1176	28	41.89°C	0.993
	12.178V	5.07V	3.351V	5.076V	436.925				49.85°C	114.71V
50%	**36.878A**	**4.943A**	**4.941A**	**1.778A**	499.279	91.085%	1324	31.8	42.11°C	0.997
	12.169V	5.058V	3.339V	5.063V	548.172				50.4°C	114.66V
60%	**44.411A**	**5.95A**	**5.956A**	**1.98A**	599.796	90.55%	1499	35	42.61°C	0.998
	12.159V	5.042V	3.325V	5.051V	662.591				53.11°C	114.64V
70%	**51.889A**	**6.963A**	**6.977A**	**2.184A**	699.53	89.79%	1626	37.6	43.14°C	0.999
	12.149V	5.027V	3.311V	5.038V	779.053				56.01°C	114.6V
80%	**59.451A**	**7.984A**	**8.013A**	**2.288A**	799.532	89.003%	1751	39.7	43.76°C	0.999
	12.139V	5.009V	3.294V	5.026V	898.331				60.35°C	114.57V
90%	**67.356A**	**8.505A**	**8.528A**	**2.393A**	899.34	88.116%	1813	40.9	44.7°C	0.999
	12.128V	4.997V	3.283V	5.015V	1020.67				63.18°C	114.53V
100%	**75.078A**	**9.028A**	**9.079A**	**3.005A**	999.336	86.907%	1860	41.8	45.82°C	0.997
	12.116V	4.984V	3.271V	4.993V	1149.9				66.69°C	114.49V
110%	**82.761A**	**10.071A**	**10.236A**	**3.011A**	1099.98	85.779%	1880	42	46.73°C	0.995
	12.103V	4.964V	3.253V	4.982V	1282.334				73.09°C	114.46V
CL1	**0.114A**	**14.497A**	**14.57A**	**0A**	121.297	80.754%	1309	31.7	42.94°C	0.983
	12.188V	4.981V	3.274V	5.123V	149.947				54.35°C	114.81V
CL2	**0.114A**	**19.87A**	**0A**	**0A**	101.344	80.565%	1027	23.9	42.22°C	0.969
	12.195V	5.03V	3.329V	5.129V	125.789				49.93°C	114.81V
CL3	**0.113A**	**0A**	**20.029A**	**0A**	67.383	74.66%	845	17.8	40.98°C	0.964
	12.197V	5.017V	3.295V	5.129V	90.244				48.05°C	114.82V
CL4	**82.438A**	**0A**	**0.001A**	**0.003A**	999.925	88.063%	1829	41.2	46.5°C	0.999
	12.129V	5.066V	3.344V	5.061V	1135.506				62.35°C	114.5V

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%	**6.418A**	**1.96A**	**1.95A**	**0.978A**	99.986	88.723%	757	14.5	40.37°C	0.809
	12.213V	5.102V	3.385V	5.113V	112.543				43.77°C	229.83V
20%	**13.853A**	**2.948A**	**2.936A**	**1.176A**	199.934	92.541%	758	14.6	40.63°C	0.9
	12.203V	5.088V	3.371V	5.101V	216.467				45°C	229.81V
30%	**21.646A**	**3.446A**	**3.435A**	**1.376A**	299.975	93.092%	770	14.9	41.04°C	0.925
	12.193V	5.078V	3.362V	5.089V	322.245				46.99°C	229.78V
40%	**29.420A**	**3.946A**	**3.937A**	**1.576A**	399.512	93.085%	1102	26.1	41.91°C	0.94
	12.179V	5.068V	3.353V	5.077V	429.203				49.62°C	229.78V
50%	**36.872A**	**4.946A**	**4.941A**	**1.777A**	499.225	92.882%	1332	31.9	42.09°C	0.948
	12.170V	5.054V	3.339V	5.064V	537.473				51.58°C	229.76V
60%	**44.407A**	**5.954A**	**5.955A**	**1.98A**	599.771	92.758%	1484	34.7	42.86°C	0.959
	12.160V	5.039V	3.325V	5.051V	647				53.34°C	229.75V
70%	**51.885A**	**6.968A**	**6.978A**	**2.183A**	699.505	92.145%	1608	37.5	43.21°C	0.962
	12.150V	5.024V	3.311V	5.038V	758.961				56°C	229.71V
80%	**59.445A**	**7.989A**	**8.011A**	**2.288A**	799.504	91.659%	1718	38.9	43.86°C	0.967
	12.140V	5.006V	3.295V	5.027V	872.258				59.64°C	229.7V
90%	**67.344A**	**8.506A**	**8.522A**	**2.392A**	899.302	91.14%	1791	40.4	44.31°C	0.973
	12.129V	4.996V	3.285V	5.016V	986.771				62.51°C	229.69V
100%	**75.064A**	**9.03A**	**9.073A**	**3.003A**	999.314	90.491%	1844	41.5	45.06°C	0.978
	12.118V	4.983V	3.273V	4.995V	1104.127				66.67°C	229.67V
110%	**82.742A**	**10.074A**	**10.23A**	**3.01A**	1099.948	89.77%	1875	42	46.37°C	0.982
	12.105V	4.963V	3.255V	4.984V	1226.15				72.72°C	229.65V
CL1	**0.114A**	**14.506A**	**14.569A**	**0A**	121.293	82.102%	1388	33.1	43.96°C	0.854
	12.188V	4.977V	3.274V	5.123V	147.801				56.87°C	229.82V
CL2	**0.113A**	**19.883A**	**0A**	**0A**	101.335	81.644%	1036	24.1	42.4°C	0.826
	12.196V	5.027V	3.329V	5.129V	124.099				51.12°C	229.82V
CL3	**0.113A**	**0A**	**20.026A**	**0A**	67.38	76.042%	847	17.8	41.34°C	0.649
	12.198V	5.013V	3.296V	5.129V	88.601				48.79°C	229.83V

Test	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
CL4	**82.428A**	**0A**	**0.001A**	**0.003A**	999.916	91.414%	1833	41.3	45.25°C	0.977
	12.130V	5.064V	3.346V	5.062V	1093.854				63.78°C	229.67V

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])	Temps (In/Out)	PF/AC Volts
20W	**1.214A**	**0.487A**	**0.484A**	**0.195A**	19.996	65.324%	740	14.1	36.04°C	0.78
	12.226V	5.13V	3.406V	5.136V	30.641				39.31°C	114.85V
40W	**2.674A**	**0.683A**	**0.679A**	**0.292A**	39.997	71.677%	746	14.2	37.8°C	0.869
	12.222V	5.124V	3.401V	5.132V	55.822				45.25°C	114.86V
60W	**4.136A**	**0.879A**	**0.874A**	**0.39A**	59.997	85.153%	750	14.8	38.24°C	0.891
	12.218V	5.119V	3.396V	5.129V	70.741				42.14°C	114.86V
80W	**5.592A**	**1.075A**	**1.07A**	**0.488A**	79.936	87.451%	752	14.8	39.01°C	0.908
	12.216V	5.115V	3.393V	5.125V	91.48				42.56°C	114.84V

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	**1.215A**	**0.487A**	**0.484A**	**0.195A**	20.001	64.482%	741	14.1	36.49°C	0.452
	12.225V	5.128V	3.407V	5.136V	30.213				37.79°C	229.83V
40W	**2.675A**	**0.684A**	**0.679A**	**0.292A**	39.998	72.925%	751	14.8	37.22°C	0.57
	12.220V	5.119V	3.4V	5.132V	54.85				38.18°C	229.83V
60W	**4.136A**	**0.879A**	**0.874A**	**0.39A**	59.997	86.304%	752	14.8	38.77°C	0.609
	12.218V	5.116V	3.397V	5.129V	69.514				39.79°C	229.82V
80W	**5.592A**	**1.076A**	**1.069A**	**0.488A**	79.935	88.744%	753	14.8	39.2°C	0.651
	12.216V	5.113V	3.394V	5.125V	90.206				39.03°C	229.82V

The results above are not used in the certification process

Ripple Measurements

115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	16.93mV	13.70mV	14.57mV	10.21mV	Pass
20% Load	20.46mV	15.81mV	17.24mV	12.01mV	Pass
30% Load	22.56mV	16.32mV	17.95mV	13.70mV	Pass
40% Load	22.86mV	25.92mV	26.58mV	14.21mV	Pass
50% Load	20.00mV	19.50mV	21.81mV	13.19mV	Pass
60% Load	22.81mV	26.53mV	34.53mV	15.60mV	Pass
70% Load	28.39mV	34.39mV	34.63mV	17.96mV	Pass
80% Load	31.50mV	37.00mV	29.09mV	19.39mV	Pass
90% Load	38.87mV	34.03mV	29.76mV	21.24mV	Pass
100% Load	39.06mV	34.40mV	30.06mV	24.92mV	Pass
110% Load	45.69mV	34.32mV	30.76mV	27.28mV	Pass
Crossload1	19.87mV	16.10mV	19.88mV	12.58mV	Pass
Crossload2	18.92mV	21.50mV	15.29mV	10.42mV	Pass
Crossload3	16.32mV	15.04mV	19.75mV	9.75mV	Pass
Crossload4	42.21mV	27.99mV	29.72mV	22.49mV	Pass

The results above are not used in the certification process

230V

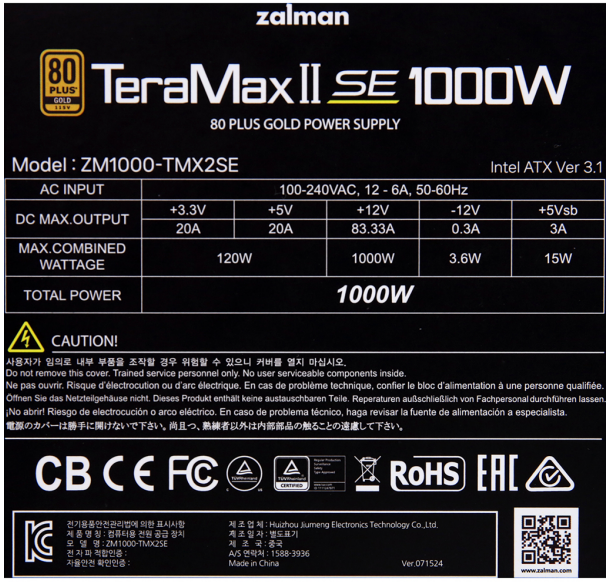
Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	15.75mV	11.86mV	13.08mV	8.36mV	Pass
20% Load	17.85mV	13.65mV	14.42mV	11.19mV	Pass
30% Load	19.54mV	16.01mV	17.29mV	13.65mV	Pass
40% Load	17.90mV	20.58mV	22.01mV	11.85mV	Pass
50% Load	23.88mV	22.94mV	27.81mV	15.55mV	Pass
60% Load	22.04mV	24.63mV	30.42mV	14.52mV	Pass

Test	12V	5V	3.3V	5VSB	Pass/Fail
70% Load	24.65mV	31.51mV	32.22mV	16.68mV	Pass
80% Load	28.85mV	34.28mV	29.76mV	19.65mV	Pass
90% Load	31.05mV	32.38mV	28.21mV	21.29mV	Pass
100% Load	36.51mV	32.87mV	29.86mV	25.13mV	Pass
110% Load	40.20mV	34.59mV	30.46mV	26.55mV	Pass
Crossload1	16.12mV	13.31mV	16.63mV	11.90mV	Pass
Crossload2	19.43mV	20.12mV	14.52mV	10.88mV	Pass
Crossload3	17.44mV	14.68mV	17.85mV	10.11mV	Pass
Crossload4	37.13mV	28.67mV	28.26mV	22.87mV	Pass

The results above are not used in the certification process

Zalman TeraMax II SE 1000W

Top side



Power specifications label

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 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

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