

Anex

Asus TUF-450B-GAMING (#2)

Lab ID#: AS45002086
Receipt Date: Aug 25, 2022
Test Date: Nov 2, 2022

Report: 22PS2086A

Report Date: Nov 3, 2022

DUT INFORMATION

Brand	Asus
Manufacturer (OEM)	Great Wall
Series	TUF Gaming
Model Number	TUF-450B-GAMING
Serial Number	2K120072116
DUT Notes	

DUT SPECIFICATIONS

Rated Voltage (Vrms)	100-240
Rated Current (Arms)	7-3
Rated Frequency (Hz)	47-63
Rated Power (W)	450
Type	ATX12V
Cooling	135mm Double Ball-Bearing Fan (CF1325H12D)
Semi-Passive Operation	✓
Cable Design	Fixed cables

TEST EQUIPMENT

Electronic Loads	Chroma 63601-5 x4 Chroma 63600-2 x2 63640-80-80 x20 63610-80-20 x2
AC Sources	Chroma 6530, Keysight AC6804B
Power Analyzers	N4L PPA1530 x2
Sound Analyzer	Bruel & Kjaer 2270 G4
Microphone	Bruel & Kjaer Type 4955-A
Data Loggers	Picoscope TC-08 x2, Labjack U3-HV x2
Tachometer	UNI-T UT372 x2
Digital Multimeter	Keysight U1273AX, Fluke 289, Keithley 2015 - THD
UPS	CyberPower OLS3000E 3kVA x2
Transformer	3kVA x2

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RESULTS

Temperature Range (°C /°F)	30-32 / 86-89.6
ErP Lot 3/6 Ready	✓
(EU) No 617/2013 Compliance	✓
ALPM (Alternative Low Power Mode) compatible	✓

115V

Average Efficiency	85.738%
Efficiency With 10W (≤500W) or 2% (>500W)	64.499
Average Efficiency 5VSB	79.013%
Standby Power Consumption (W)	0.0537000
Average PF	0.985
Avg Noise Output	27.56 dB(A)
Efficiency Rating (ETA)	SILVER
Noise Rating (LAMBDA)	A-

230V

Average Efficiency	88.208%
Average Efficiency 5VSB	78.534%
Standby Power Consumption (W)	0.1174000
Average PF	0.941
Avg Noise Output	27.50 dB(A)
Efficiency Rating (ETA)	SILVER
Noise Rating (LAMBDA)	A-

POWER SPECIFICATIONS

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	20	20	37.4	3	0.8
	Watts	110		448.8	15	9.6
Total Max. Power (W)		450				

HOLD-UP TIME & POWER OK SIGNAL (230V)

Hold-Up Time (ms)	13.8
AC Loss to PWR_OK Hold Up Time (ms)	9.7
PWR_OK Inactive to DC Loss Delay (ms)	4.1

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CABLES AND CONNECTORS				
Captive Cables				
Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors
ATX connector 20+4 pin (600mm)	1	1	18-20AWG	No
4+4 pin EPS12V (820mm)	1	1	18AWG	No
6+2 pin PCIe (620mm+100mm)	1	2	18AWG	No
SATA (420mm+110mm+110mm)	1	3	18AWG	No
SATA (410mm+110mm)	1	2	18AWG	No
4-pin Molex (400mm+150mm+150mm+150mm)	1	4	18AWG	No
Modular Cables				
AC Power Cord (1390mm) - C13 coupler	1	1	18AWG	-

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Asus TUF-450B-GAMING (#2)

General Data	-
Manufacturer (OEM)	Great Wall
PCB Type	Single Sided
Primary Side	-
Transient Filter	4x Y caps, 2x X caps, 2x CM chokes, 1x MOV
Inrush Protection	NTC Thermistor SCK-1R58 (1.5 Ohm)
Bridge Rectifier(s)	1x GBU1508 (800V, 15A @ 100°C)
APFC MOSFETs	1x Advanced Power AP30SL60WL (650V, 16.5A @ 100°C, Rds(on): 0.13Ohm)
APFC Boost Diode	1x STMicroelectronics STTH8S06FP (600V, 8A)
Bulk Cap(s)	1x Lelon (450V, 270uF, 2,000h @ 105°C, LSG)
Main Switchers	2x STMicroelectronics STF13NM60N (600V, 6.9A @ 100°C, Rds(on): 0.36Ohm)
APFC Controller	Champion CM6500UNX & CM03AX
Resonant Controller	Champion CM6901X
Topology	Primary side: APFC, Half-Bridge & LLC converter Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	-
+12V MOSFETs	2x STMicroelectronics STP100N6F7 (60V, 75A @ 100°C, Rds(on): 5.6mOhm)
5V & 3.3V	DC-DC Converters
Filtering Capacitors	Electrolytic: 3x Elite (3-5,000h @ 105°C, EJ), 3x Teapo (1-3,000h @ 105°C, SC), 1x Teapo (1-2,000h @ 105°C, SZ), 1x Teapo (105°C, TB), 1x Teapo (105°C, TA) Polymer: 4x Lelon, 2x no info
Supervisor IC	IN1S429I - DCG
Fan Model	Champion CF1325H12D (135mm, 12V, 0.6A, Double Ball Bearing)
5VSB Circuit	-
Rectifier	1x SBR
Standby PWM Controller	Power Intergrations TNY278PN

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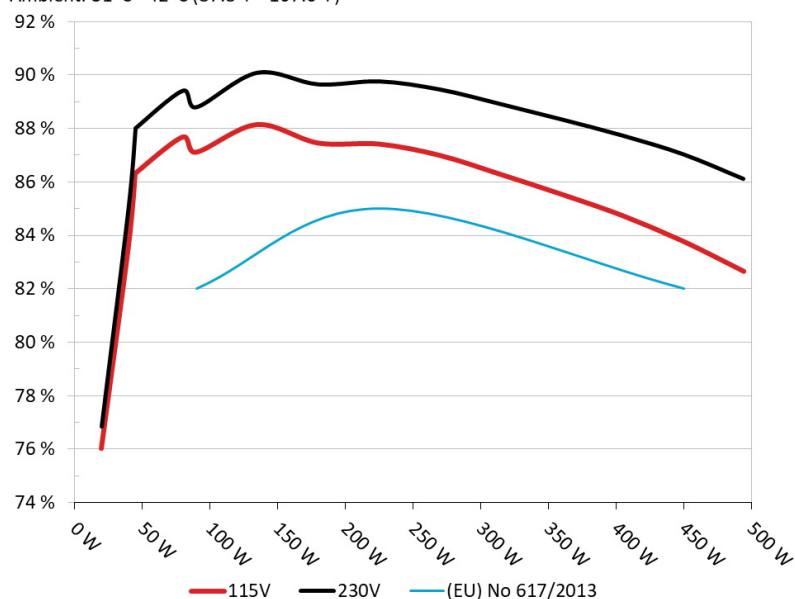
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EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE

Efficiency: ASUS TUF-450W-BRONZE-GAMING

Ambient: 31°C - 42°C (87.8°F - 107.6°F)



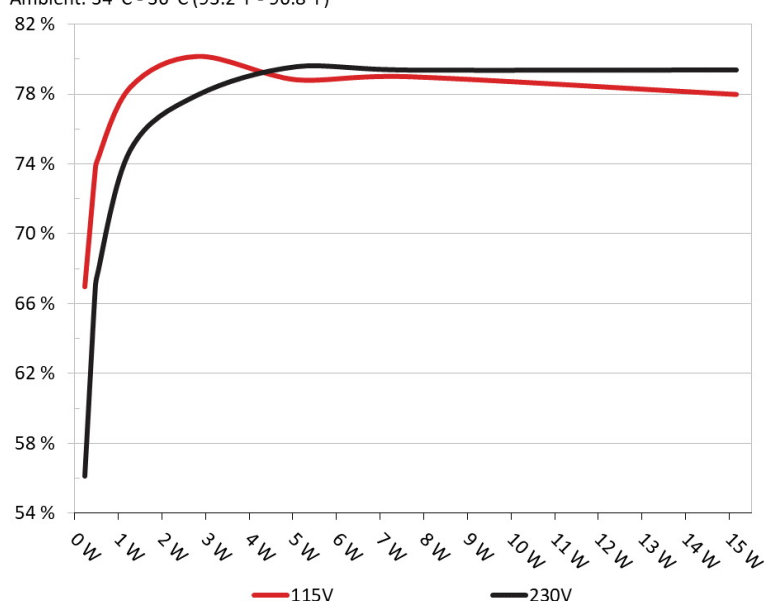
INFO

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: ASUS TUF-450W-BRONZE-GAMING

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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Asus TUF-450B-GAMING (#2)

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.23W	66.952%	0.031
	5.1V	0.343W		114.95V
2	0.09A	0.459W	73.396%	0.055
	5.1V	0.625W		114.94V
3	0.55A	2.802W	80.176%	0.241
	5.094V	3.495W		114.95V
4	1A	5.088W	78.831%	0.323
	5.088V	6.454W		114.92V
5	1.5A	7.621W	79.011%	0.373
	5.08V	9.646W		114.93V
6	3A	15.152W	77.99%	0.437
	5.05V	19.428W		114.93V

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.23W	56.115%	0.011
	5.099V	0.411W		229.89V
2	0.09A	0.459W	66.466%	0.018
	5.099V	0.691W		229.9V
3	0.55A	2.802W	77.933%	0.091
	5.094V	3.596W		229.9V
4	1A	5.088W	79.574%	0.152
	5.088V	6.394W		229.89V
5	1.5A	7.621W	79.378%	0.201
	5.08V	9.602W		229.88V
6	3A	15.164W	79.382%	0.301
	5.054V	19.104W		229.89V

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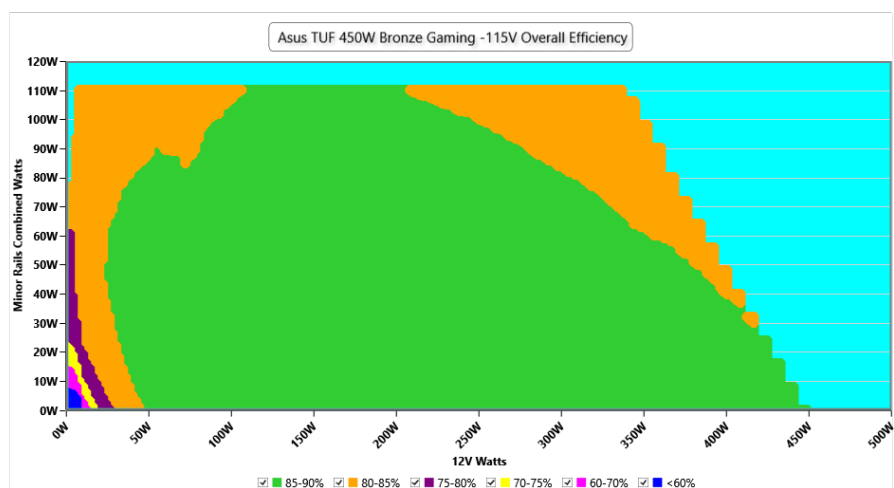
115V

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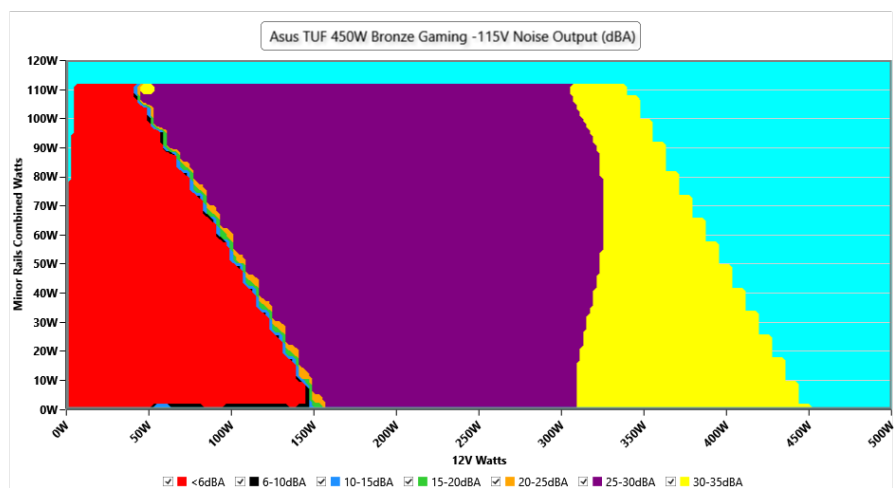
EFFICIENCY GRAPH 115V



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 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:	114.93 V	114.89 V	113.85 V	114.96 V	116.15 V	PASS
Mains Frequency:	60.00 Hz	59.99 Hz	59.40 Hz	60.02 Hz	60.60 Hz	PASS
Mains Voltage CF:	1.416	1.415	1.340	1.417	1.490	PASS
Mains Voltage THD:	0.14 %	0.12 %	N/A	0.18 %	2.00 %	PASS
Real Power:	0.054 W	0.012 W	N/A	0.075 W	N/A	N/A
Apparent Power:	11.169 W	11.146 W	N/A	11.189 W	N/A	N/A
Power Factor:	0.006	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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Asus TUF-450B-GAMING (#2)

10-110% 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%	1.946A	1.941A	1.974A	0.984A	45.004	83.087%	0	<6.0	38.18°C	0.943
	12.027V	5.151V	3.344V	5.082V	54.167				34.12°C	114.92V
20%	4.918A	2.913A	2.962A	1.182A	90.009	87.121%	0	<6.0	38.93°C	0.973
	12.017V	5.15V	3.342V	5.076V	103.315				34.63°C	114.92V
30%	8.235A	3.398A	3.457A	1.381A	134.939	88.157%	0	<6.0	39.91°C	0.983
	12.008V	5.15V	3.341V	5.071V	153.067				35.17°C	114.89V
40%	11.569A	3.888A	3.956A	1.579A	180.023	87.466%	1113	26.3	35.49°C	0.987
	11.999V	5.144V	3.337V	5.066V	205.822				40.51°C	114.88V
50%	14.558A	4.864A	4.949A	1.778A	225.02	87.427%	1125	26.6	36.23°C	0.989
	11.987V	5.14V	3.334V	5.062V	257.377				41.73°C	114.88V
60%	17.551A	5.839A	5.944A	1.978A	270.019	87.002%	1189	28.4	36.68°C	0.991
	11.978V	5.138V	3.332V	5.056V	310.359				42.76°C	114.86V
70%	20.548A	6.815A	6.939A	2.179A	315.019	86.288%	1278	30.5	37.05°C	0.992
	11.967V	5.137V	3.33V	5.05V	365.08				44.14°C	114.85V
80%	23.598A	7.793A	7.934A	2.279A	360.081	85.54%	1403	33.3	38.09°C	0.993
	11.957V	5.135V	3.327V	5.047V	420.95				46.17°C	114.84V
90%	26.996A	8.28A	8.419A	2.38A	405.067	84.741%	1541	35.8	38.89°C	0.993
	11.948V	5.134V	3.325V	5.043V	478.011				47.94°C	114.81V
100%	30.169A	8.769A	8.936A	2.982A	449.908	83.779%	1667	38.1	40.5°C	0.994
	11.939V	5.133V	3.324V	5.032V	537.019				50.53°C	114.81V
110%	33.215A	9.745A	10.024A	2.983A	494.525	82.655%	1784	39.9	41.87°C	0.994
	11.929V	5.133V	3.322V	5.029V	598.298				52.83°C	114.79V
CL1	0.117A	12.866A	13.088A	0A	111.318	82.505%	0	<6.0	44.91°C	0.98
	12.000V	5.147V	3.339V	5.079V	134.926				39.42°C	114.89V
CL2	0.116A	19.419A	0A	0A	101.423	81.034%	0	<6.0	45.94°C	0.979
	12.016V	5.151V	3.345V	5.083V	125.161				38.65°C	114.9V
CL3	0.116A	0A	19.773A	0A	67.384	76.765%	0	<6.0	46.99°C	0.969
	12.012V	5.168V	3.337V	5.076V	87.779				37.94°C	114.9V
CL4	37.597A	0A	0A	0.001A	449.672	84.823%	1724	38.9	41.19°C	0.994
	11.960V	5.152V	3.332V	5.075V	530.135				52.16°C	114.82V

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Asus TUF-450B-GAMING (#2)

20-80W 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	1.236A	0.486A	0.493A	0.196A	19.998	76.013%	0	<6.0	34.51°C	0.86
	12.019V	5.149V	3.344V	5.096V	26.308				31.46°C	114.94V
40W	2.718A	0.68A	0.691A	0.295A	40	83.598%	0	<6.0	35.26°C	0.934
	12.027V	5.15V	3.344V	5.093V	47.848				31.93°C	114.94V
60W	4.202A	0.874A	0.888A	0.393A	60	86.329%	0	<6.0	35.84°C	0.958
	12.024V	5.15V	3.344V	5.091V	69.501				32.06°C	114.92V
80W	5.684A	1.068A	1.086A	0.491A	79.953	87.689%	0	<6.0	37.59°C	0.969
	12.021V	5.15V	3.343V	5.088V	91.175				33.61°C	114.92V

RIPPLE MEASUREMENTS 115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	28.33mV	7.82mV	7.36mV	10.23mV	Pass
20% Load	26.64mV	9.40mV	8.69mV	13.66mV	Pass
30% Load	21.16mV	10.42mV	9.05mV	15.20mV	Pass
40% Load	18.50mV	11.24mV	10.07mV	15.97mV	Pass
50% Load	19.63mV	12.16mV	11.40mV	20.57mV	Pass
60% Load	15.81mV	12.67mV	11.25mV	18.99mV	Pass
70% Load	14.74mV	13.02mV	12.22mV	20.88mV	Pass
80% Load	16.63mV	14.45mV	14.58mV	19.24mV	Pass
90% Load	18.58mV	15.37mV	15.59mV	21.54mV	Pass
100% Load	30.93mV	17.00mV	17.91mV	27.54mV	Pass
110% Load	32.04mV	18.07mV	17.76mV	27.17mV	Pass
Crossload1	29.43mV	13.45mV	14.18mV	11.91mV	Pass
Crossload2	22.65mV	13.38mV	9.05mV	10.08mV	Pass
Crossload3	26.08mV	9.14mV	15.34mV	9.21mV	Pass
Crossload4	29.59mV	15.91mV	14.34mV	17.97mV	Pass

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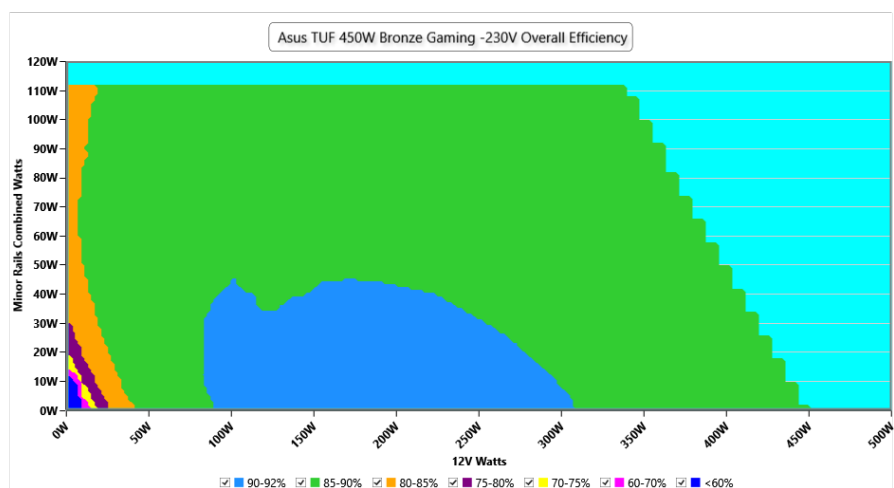
230V

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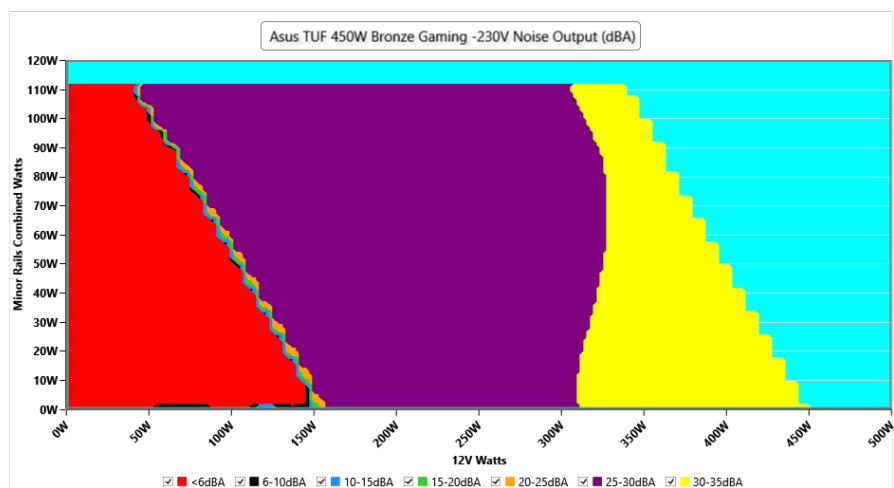
EFFICIENCY GRAPH 230V



INFO

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NOISE GRAPH 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

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VAMPIRE POWER -230V

Detailed Results

	Average	Min	Limit Min	Max	Limit Max	Result
Mains Voltage RMS:	229.88 V	229.85 V	227.70 V	229.94 V	232.30 V	PASS
Mains Frequency:	50.00 Hz	50.00 Hz	49.50 Hz	50.00 Hz	50.50 Hz	PASS
Mains Voltage CF:	1.416	1.415	1.340	1.416	1.490	PASS
Mains Voltage THD:	0.13 %	0.12 %	N/A	0.16 %	2.00 %	PASS
Real Power:	0.117 W	0.088 W	N/A	0.154 W	N/A	N/A
Apparent Power:	37.804 W	37.778 W	N/A	37.830 W	N/A	N/A
Power Factor:	0.003	N/A	N/A	N/A	N/A	N/A

INFO

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Asus TUF-450B-GAMING (#2)

10-110% LOAD TESTS 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%	1.946A	1.94A	1.973A	0.984A	45.01	84.503%	0	<6.0	38.38°C	0.721
	12.030V	5.154V	3.345V	5.081V	53.262				34.36°C	229.88V
20%	4.918A	2.912A	2.961A	1.182A	90.016	88.801%	0	<6.0	39.13°C	0.868
	12.020V	5.152V	3.343V	5.076V	101.367				34.86°C	229.88V
30%	8.234A	3.397A	3.457A	1.381A	134.953	90.09%	0	<6.0	39.76°C	0.919
	12.011V	5.152V	3.341V	5.07V	149.797				35.04°C	229.87V
40%	11.572A	3.889A	3.956A	1.579A	180.033	89.655%	1117	26.4	35.55°C	0.944
	11.997V	5.144V	3.337V	5.067V	200.807				40.62°C	229.87V
50%	14.561A	4.865A	4.949A	1.778A	225.029	89.768%	1105	28.5	36.26°C	0.957
	11.985V	5.14V	3.334V	5.063V	250.675				41.69°C	229.86V
60%	17.553A	5.84A	5.944A	1.978A	270.021	89.463%	1153	27.4	36.56°C	0.966
	11.976V	5.138V	3.332V	5.057V	301.822				42.62°C	229.86V
70%	20.549A	6.815A	6.939A	2.178A	315.017	88.917%	1259	30	37.22°C	0.972
	11.967V	5.137V	3.33V	5.051V	354.279				44.23°C	229.85V
80%	23.598A	7.792A	7.933A	2.279A	360.071	88.342%	1406	33.4	37.91°C	0.976
	11.957V	5.135V	3.328V	5.048V	407.59				45.94°C	229.84V
90%	26.994A	8.279A	8.418A	2.38A	405.031	87.739%	1537	35.7	39.31°C	0.979
	11.948V	5.135V	3.326V	5.044V	461.635				48.38°C	229.84V
100%	30.167A	8.768A	8.934A	2.981A	449.859	87.038%	1649	37.8	39.79°C	0.981
	11.939V	5.134V	3.324V	5.033V	516.855				49.82°C	229.83V
110%	33.213A	9.744A	10.022A	2.982A	494.471	86.116%	1759	39.5	40.47°C	0.983
	11.928V	5.133V	3.322V	5.03V	574.19				51.42°C	229.83V
CL1	0.116A	12.858A	13.083A	0A	111.313	84.094%	0	<6.0	44.23°C	0.906
	12.001V	5.15V	3.34V	5.08V	132.368				38.75°C	229.88V
CL2	0.116A	19.418A	0A	0A	101.424	82.609%	0	<6.0	44.26°C	0.896
	12.016V	5.151V	3.345V	5.083V	122.778				37.24°C	229.87V
CL3	0.116A	0A	19.778A	0A	67.384	78.008%	0	<6.0	45.38°C	0.838
	12.012V	5.169V	3.337V	5.076V	86.381				36.33°C	229.88V
CL4	37.603A	0A	0A	0.001A	449.687	88.152%	1691	38.5	38.89°C	0.981
	11.958V	5.148V	3.331V	5.077V	510.128				49.86°C	229.83V

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Anex

Asus TUF-450B-GAMING (#2)

20-80W LOAD TESTS 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	1.236A	0.485A	0.493A	0.196A	20.005	76.834%	0	<6.0	34.82°C	0.491
	12.025V	5.152V	3.346V	5.094V	26.038				31.8°C	229.89V
40W	2.718A	0.679A	0.69A	0.295A	40.007	85.096%	0	<6.0	36.23°C	0.684
	12.031V	5.153V	3.346V	5.092V	47.015				32.86°C	229.88V
60W	4.202A	0.873A	0.888A	0.393A	60.009	88.014%	0	<6.0	36.98°C	0.787
	12.029V	5.153V	3.345V	5.09V	68.181				33.37°C	229.88V
80W	5.684A	1.067A	1.086A	0.492A	79.973	89.418%	0	<6.0	37.79°C	0.845
	12.025V	5.153V	3.344V	5.088V	89.438				33.92°C	229.88V

RIPPLE MEASUREMENTS 230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	33.70mV	7.51mV	7.36mV	9.88mV	Pass
20% Load	27.87mV	9.04mV	8.44mV	13.66mV	Pass
30% Load	21.42mV	10.17mV	8.90mV	14.28mV	Pass
40% Load	19.68mV	10.78mV	9.97mV	15.40mV	Pass
50% Load	20.55mV	11.29mV	10.38mV	19.50mV	Pass
60% Load	15.59mV	13.58mV	12.17mV	18.06mV	Pass
70% Load	14.28mV	12.87mV	11.61mV	20.06mV	Pass
80% Load	16.17mV	14.25mV	13.96mV	19.29mV	Pass
90% Load	17.24mV	15.27mV	14.88mV	22.93mV	Pass
100% Load	29.66mV	16.99mV	17.16mV	26.21mV	Pass
110% Load	31.87mV	17.57mV	19.22mV	26.98mV	Pass
Crossload1	29.09mV	13.62mV	14.87mV	11.29mV	Pass
Crossload2	22.96mV	12.87mV	8.64mV	9.06mV	Pass
Crossload3	27.36mV	8.53mV	14.11mV	9.67mV	Pass
Crossload4	28.86mV	14.98mV	14.13mV	17.10mV	Pass

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Asus TUF-450B-GAMING (#2)

A green hexagonal badge with a white border. At the top is a speaker icon. Below it, the word "CYBERNETICS" is written in white capital letters. In the center, a large green "A-" is displayed on a white background.A green hexagonal badge with a white border. At the top is a speaker icon. Below it, the word "CYBERNETICS" is written in white capital letters. In the center is a large white "A-" with "230v" written below it in white.

- > 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