EFFICIENCY AND NOISE LEVEL CERTIFICATIONS

Anex

Corsair CX650M (2021)

Lab ID#: CR65001808
Receipt Date: Feb 19, 2021
Test Date: Mar 11, 2021

Report: 21PS1808A
Report Date: Mar 17, 2021

DUT INFORMATION

Brand	Corsair
Manufacturer (OEM)	Channel Well Technology
Series	CX-M
Model Number	
Serial Number	
DUT Notes	

DUT SPECIFICATIONS

Rated Voltage (Vrms)	100-240
Rated Current (Arms)	10-5
Rated Frequency (Hz)	47-63
Rated Power (W)	650
Type	ATX12V
Cooling	120mm Rifle Bearing Fan (HA1225H12F-Z)
Semi-Passive Operation	✗
Cable Design	Semi Modular

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	85.651%
Efficiency With 10W (≤500W) or 2% (>500W)	65.497
Average Efficiency 5VSB	79.093%
Standby Power Consumption (W)	0.0513862
Average PF	0.985
Avg Noise Output	33.39 dB(A)
Efficiency Rating (ETA)	SILVER
Noise Rating (LAMBDA)	Standard++

230V

Average Efficiency	88.008%
Average Efficiency 5VSB	78.807%
Standby Power Consumption (W)	0.0980837
Average PF	0.958
Avg Noise Output	33.86 dB(A)
Efficiency Rating (ETA)	SILVER
Noise Rating (LAMBDA)	Standard++

POWER SPECIFICATIONS

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	20	20	54	3	0.3
	Watts	130		648	15	3.6
Total Max. Power (W)		650				

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

Hold-Up Time (ms)	9.7
AC Loss to PWR_OK Hold Up Time (ms)	8.9
PWR_OK Inactive to DC Loss Delay (ms)	0.8

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Corsair CX650M (2021)

CABLES AND CONNECTORS

Native Cables

Description	Cable Count	Connector Count (Total)	Gauge	In Cable Caps
ATX connector 20+4 pin (610mm)	1	1	18-22AWG	No
4+4 pin EPS12V (670mm)	1	1	18AWG	No

Modular Cables

4+4 pin EPS12V (650mm)	1	1	18AWG	No
6+2 pin PCIe (600mm+150mm)	1	2	16-18AWG	No
SATA (350mm+110mm+110mm+110mm)	1	4	18AWG	No
SATA (480mm+110mm)	1	2	18AWG	No
4-pin Molex (450mm+100mm+100mm) / FDD (+100mm)	1	3 / 1	18-22AWG	No
AC Power Cord (1400mm) - C13 coupler	1	1	18AWG	-

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General Data	-
Manufacturer (OEM)	CWT
PCB Type	Single Sided
Primary Side	-
Transient Filter	4x Y caps, 2x X caps, 2x CM chokes, 1x MOV, 1x CAP200DG (Discharge IC)
Inrush Protection	NTC Thermistor SCK - 2R58 (2.5Ohm)
Bridge Rectifier(s)	1x GBU15L06 (800V, 10A @ 100°C)
APFC MOSFETs	2x Champion GP18S50 (500V, 18A, Rds(on): 0.19Ohm)
APFC Boost Diode	1x ON Semiconductor FFSP0665A (650V, 6A @ 153°C)
Bulk Cap(s)	1x Nippon Chemi-Con (400V, 330uF, 2,000h @ 105°C, KMR)
Main Switchers	2x Silan Microelectronics SVF20N50F (500V, 12.6 @ 100°C, Rds(on): 0.27Ohm)
PFC/PWM Combo Controller	Champion CM6800TX & Champion CM03X
Topology	Primary side: APFC, Double Forward Secondary side: Semi-Synchronous Rectification (12V) & DC-DC converters (5V & 3.3V)
Secondary Side	-
+12V	2x Advanced Power AP6N3R5P (60V, 80A @ 100°C, Rds(on): 3.58mOhm) FET & 2x PFC PFR30L60CT (60V, 30A @ 100°C) SBR
5V & 3.3V MOSFETs	2x UBIQ QM3054M6 (30V, 61A @ 100°C, Rds(on): 4.8mOhm) & 2x UBIQ QN3107M6N (30V, 70A @ 100°C, Rds(on): 2.6mOhm) PWM Controller: ANPEC APW7159C
Filtering Capacitors	Electrolytic: 10x Elite (2-5,000h @ 105°C, ED), 3x Elite (4-10,000h @ 105°C, EY), 1x Elite (2-5,000h @ 105°C, EK), 1x Nippon Chemi-Con (4-10,000h @ 105°C, KY), 1x Nippon Chemi-Con (1-5,000h @ 105°C, KZE), 2x Elite (2,000h @ 105°C, PF) Polymer: 7x APAQ, 2x Elite
Driver IC	Sync Power SP6019
Supervisor IC	INI1S429I - DCG (OVP, UVP, OCP, PG, SCP)
Fan Model	Hong Hua HA1225H12F-Z (120mm, 12V, 0.58A, Rifle Bearing Fan)
5VSB Circuit	-
Standby PWM Controller	Power Integrations TNY290PG

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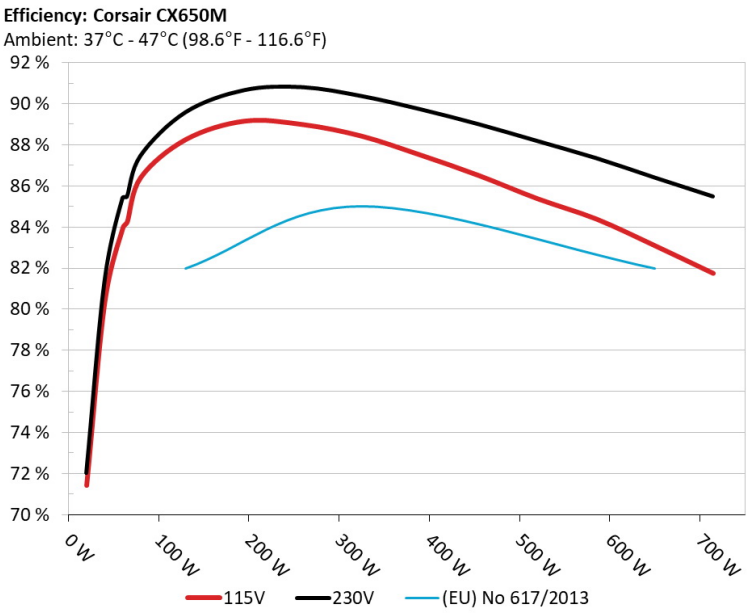
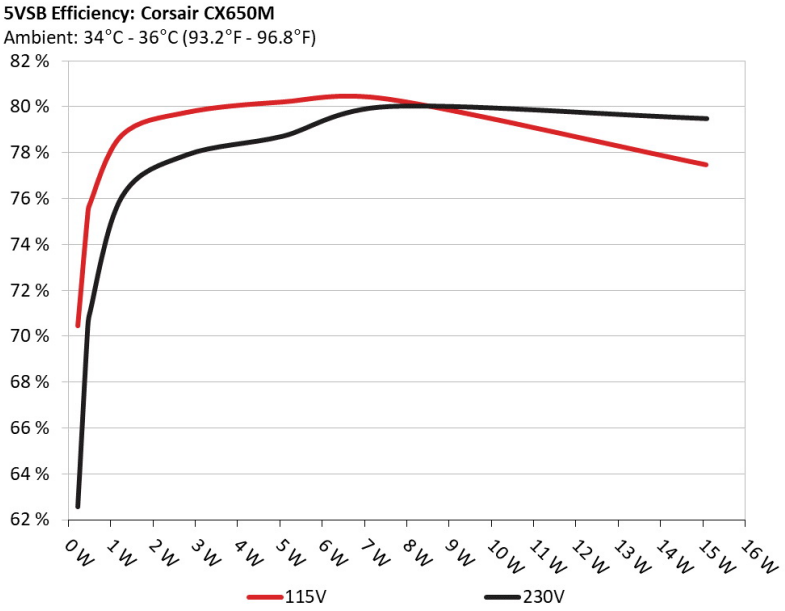
EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE



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

Anex

Corsair CX650M (2021)

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.229	70.462%	0.037
	5.093V	0.325		115.11V
2	0.090A	0.458	75.205%	0.068
	5.092V	0.609		115.11V
3	0.550A	2.796	79.749%	0.271
	5.082V	3.506		115.10V
4	1.000A	5.073	80.206%	0.348
	5.072V	6.325		115.11V
5	1.500A	7.592	80.322%	0.391
	5.061V	9.452		115.11V
6	3.000A	15.083	77.472%	0.452
	5.028V	19.469		115.11V

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.229	62.568%	0.012
	5.093V	0.366		230.26V
2	0.090A	0.458	70.245%	0.022
	5.092V	0.652		230.26V
3	0.550A	2.796	77.905%	0.112
	5.082V	3.589		230.25V
4	1.000A	5.073	78.724%	0.181
	5.072V	6.444		230.25V
5	1.500A	7.592	80.017%	0.233
	5.061V	9.488		230.25V
6	3.000A	15.084	79.490%	0.323
	5.028V	18.976		230.25V

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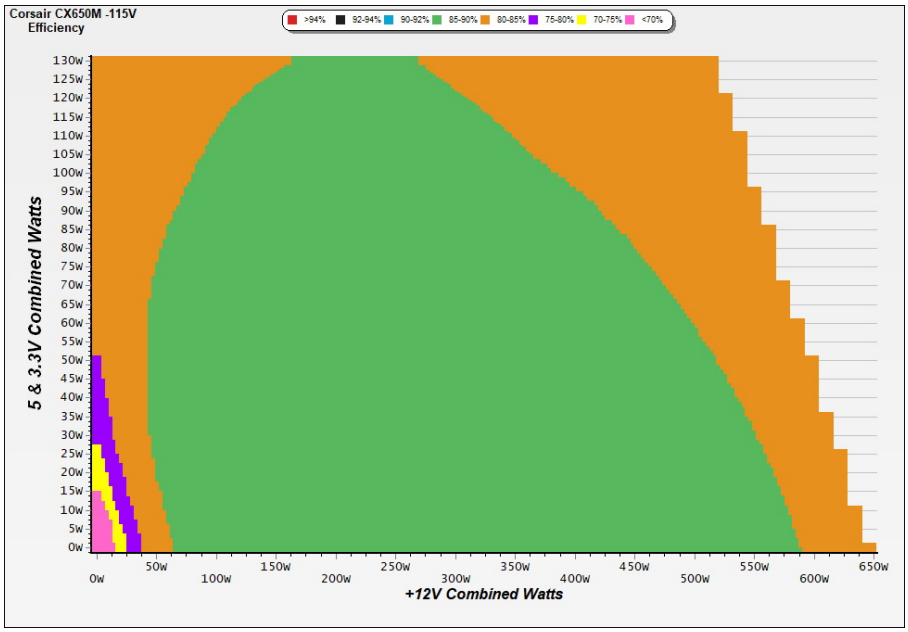
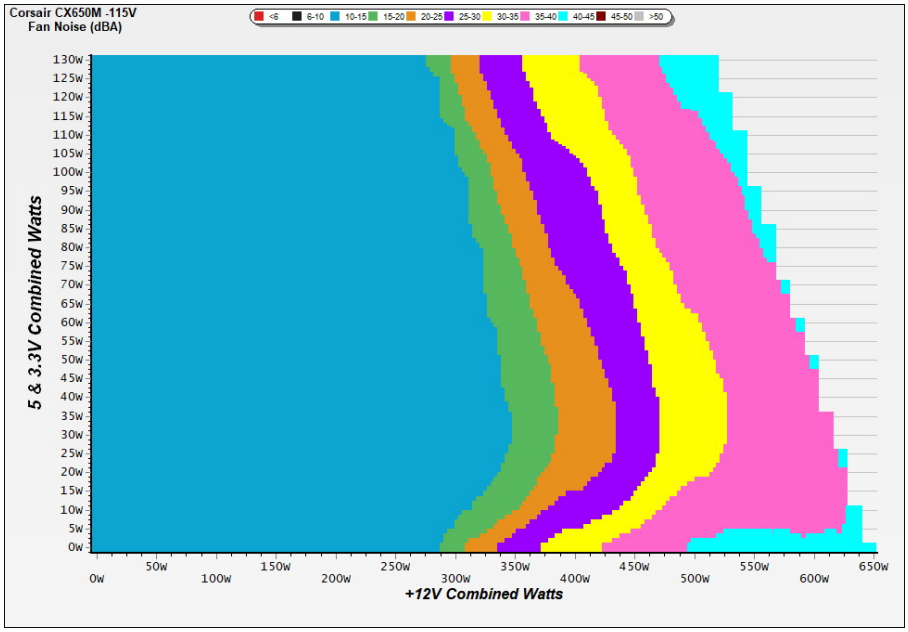
EFFICIENCY GRAPH 115V



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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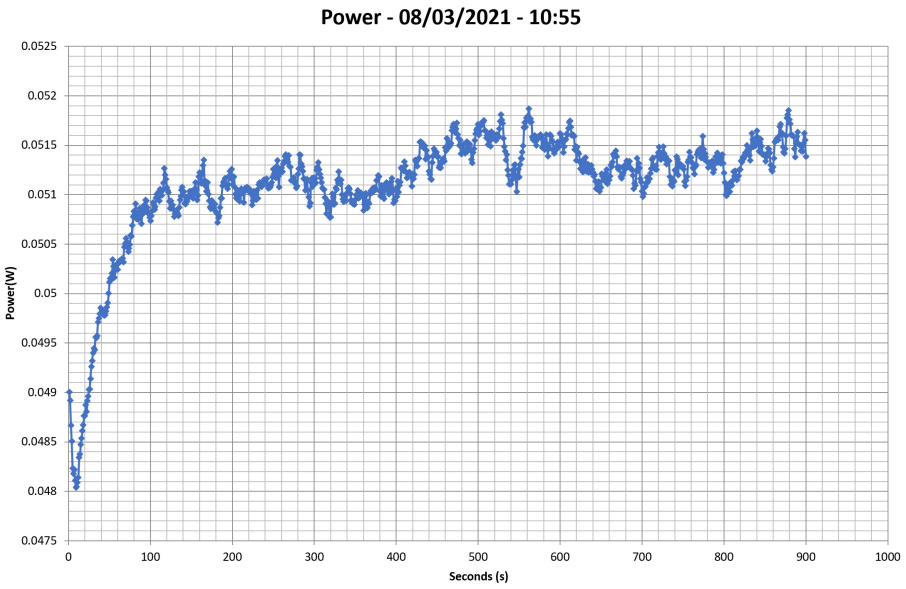
VAMPIRE POWER -115V



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

Anex

Corsair CX650M (2021)

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
1	3.572A	1.998A	1.984A	0.989A	64.968	84.246%	703	13.6	40.12°C	0.951
	12.139V	5.007V	3.329V	5.055V	77.117				43.38°C	115.11V
2	8.180A	2.999A	2.978A	1.191A	130.035	88.259%	707	13.8	40.66°C	0.974
	12.120V	4.999V	3.324V	5.040V	147.333				44.72°C	115.11V
3	13.138A	3.506A	3.477A	1.394A	195.046	89.149%	711	14.0	41.30°C	0.983
	12.101V	4.995V	3.321V	5.024V	218.787				46.25°C	115.11V
4	18.114A	4.008A	3.980A	1.597A	260.056	88.980%	715	14.1	41.54°C	0.986
	12.082V	4.989V	3.318V	5.010V	292.264				47.16°C	115.11V
5	22.762A	5.018A	4.981A	1.803A	325.092	88.418%	719	14.3	42.04°C	0.989
	12.063V	4.983V	3.314V	4.993V	367.675				48.34°C	115.10V
6	27.378A	6.032A	5.983A	2.000A	389.474	87.511%	1228	28.7	42.73°C	0.990
	12.043V	4.974V	3.310V	4.977V	445.056				49.85°C	115.09V
7	32.084A	7.051A	6.988A	2.219A	454.837	86.503%	1601	38.7	43.40°C	0.991
	12.022V	4.966V	3.306V	4.960V	525.804				51.45°C	115.09V
8	36.808A	8.003A	7.994A	2.429A	519.813	85.377%	2040	43.5	43.59°C	0.992
	12.001V	4.958V	3.302V	4.943V	608.841				52.86°C	115.08V
9	41.936A	8.584A	8.484A	2.433A	584.985	84.389%	2234	45.7	44.10°C	0.993
	11.982V	4.952V	3.300V	4.933V	693.198				54.14°C	115.06V
10	46.834A	9.098A	9.010A	3.058A	649.844	83.097%	2237	45.6	45.29°C	0.994
	11.960V	4.947V	3.296V	4.907V	782.035				55.78°C	115.06V
11	52.351A	9.104A	9.021A	3.066A	714.676	81.749%	2235	45.7	46.78°C	0.994
	11.938V	4.944V	3.292V	4.893V	874.237				57.65°C	115.06V
CL1	0.116A	16.004A	15.998A	0.000A	133.193	80.294%	731	14.8	42.06°C	0.979
	12.104V	4.930V	3.306V	5.031V	165.881				48.99°C	115.11V
CL2	54.005A	0.999A	1.000A	1.000A	659.596	83.638%	2234	45.7	45.77°C	0.994
	11.968V	4.994V	3.306V	4.969V	788.636				55.60°C	115.06V

Anex

Corsair CX650M (2021)

20-80W LOAD TESTS 115V

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	PF/AC Volts
1	1.222A	0.498A	0.494A	0.197A	19.997	71.436%	693	13.1	0.876
	12.152V	5.019V	3.335V	5.083V	27.993				115.12V
2	2.444A	0.998A	0.990A	0.394A	39.987	80.329%	697	13.3	0.929
	12.146V	5.014V	3.332V	5.075V	49.779				115.12V
3	3.671A	1.496A	1.488A	0.592A	60.018	83.940%	699	13.4	0.947
	12.141V	5.010V	3.330V	5.066V	71.501				115.11V
4	4.892A	1.998A	1.983A	0.791A	79.968	86.410%	702	13.6	0.961
	12.135V	5.006V	3.328V	5.058V	92.545				115.11V

RIPPLE MEASUREMENTS 115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	7.40mV	14.90mV	10.90mV	12.70mV	Pass
20% Load	8.40mV	14.30mV	10.80mV	13.80mV	Pass
30% Load	8.90mV	13.10mV	10.90mV	14.60mV	Pass
40% Load	11.20mV	12.70mV	11.80mV	15.50mV	Pass
50% Load	11.60mV	13.30mV	11.20mV	16.30mV	Pass
60% Load	13.00mV	14.30mV	14.20mV	19.30mV	Pass
70% Load	13.30mV	16.10mV	12.50mV	21.00mV	Pass
80% Load	16.70mV	15.80mV	14.90mV	32.80mV	Pass
90% Load	18.00mV	16.10mV	15.90mV	31.60mV	Pass
100% Load	29.40mV	17.80mV	15.60mV	27.00mV	Pass
110% Load	35.00mV	18.60mV	16.30mV	27.80mV	Pass
Crossload1	12.60mV	17.90mV	15.50mV	14.40mV	Pass
Crossload2	30.30mV	14.50mV	13.30mV	20.20mV	Pass

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230V

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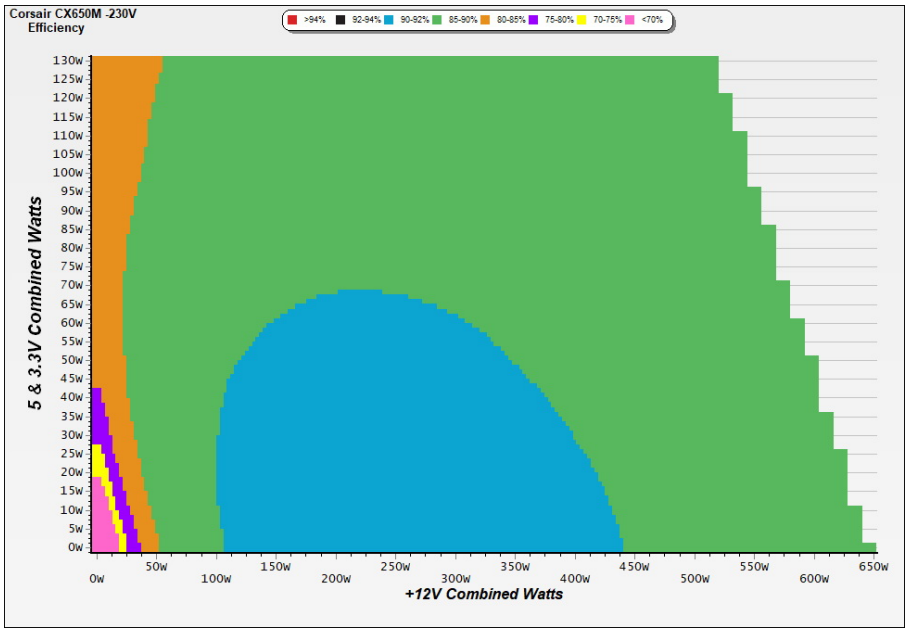
EFFICIENCY GRAPH 230V



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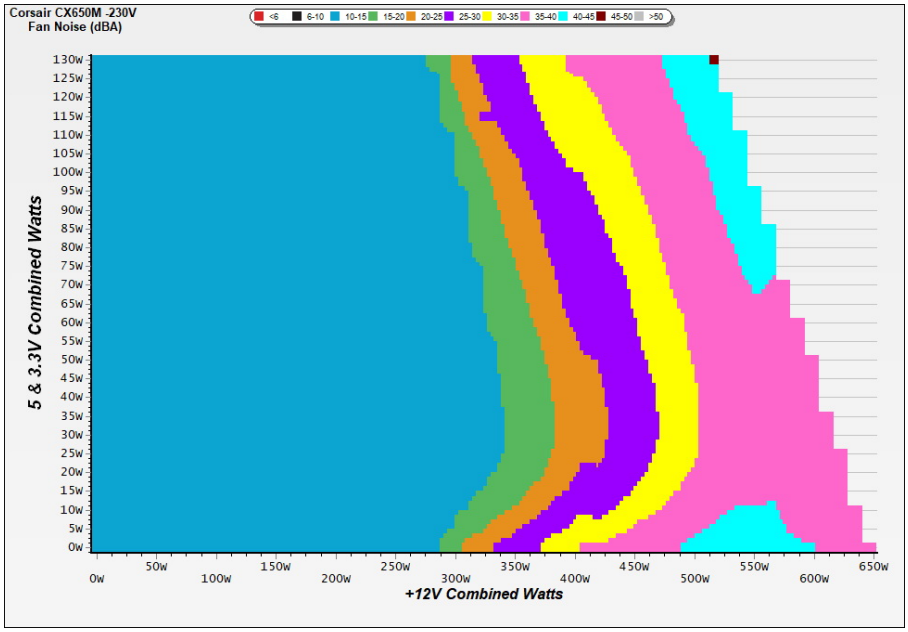
NOISE GRAPH 230V



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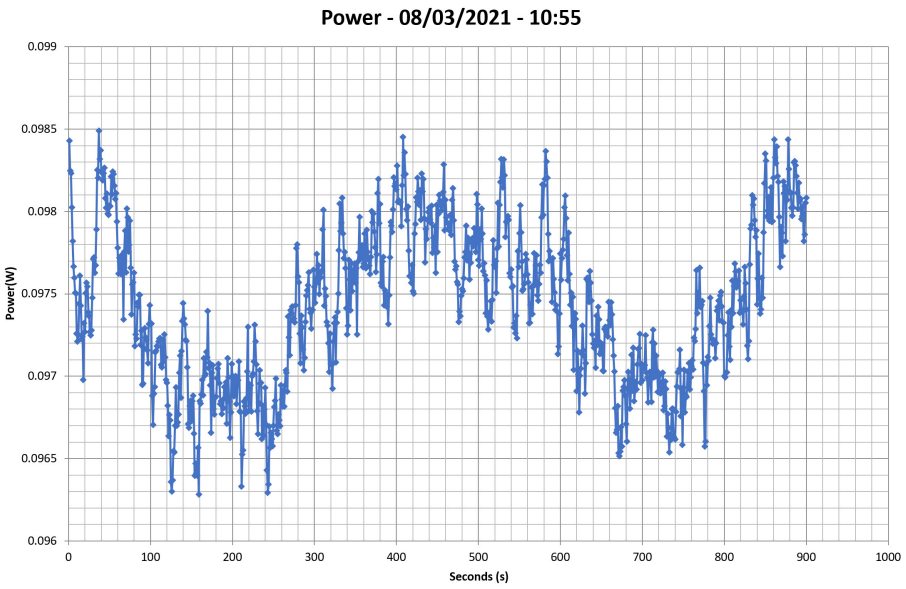
VAMPIRE POWER -230V



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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
1	3.572A	1.998A	1.983A	0.989A	64.963	85.477%	705	13.7	40.02°C	0.846
	12.139V	5.006V	3.329V	5.055V	76.001				43.79°C	230.23V
2	8.178A	3.001A	2.979A	1.191A	130.024	89.596%	708	13.8	40.84°C	0.925
	12.120V	4.998V	3.325V	5.040V	145.123				45.05°C	230.22V
3	13.138A	3.505A	3.476A	1.393A	195.030	90.669%	711	14.0	41.17°C	0.952
	12.101V	4.994V	3.321V	5.025V	215.100				46.42°C	230.22V
4	18.111A	4.009A	3.978A	1.597A	260.036	90.811%	716	14.2	41.48°C	0.965
	12.083V	4.989V	3.318V	5.010V	286.348				47.43°C	230.22V
5	22.761A	5.020A	4.980A	1.803A	325.076	90.381%	813	17.6	42.19°C	0.973
	12.063V	4.981V	3.314V	4.993V	359.671				48.74°C	230.22V
6	27.374A	6.033A	5.982A	2.000A	389.428	89.748%	1237	29.0	42.65°C	0.977
	12.043V	4.974V	3.310V	4.977V	433.912				50.26°C	230.22V
7	32.079A	7.051A	6.987A	2.218A	454.794	89.012%	1591	38.3	43.44°C	0.981
	12.023V	4.965V	3.306V	4.960V	510.936				51.80°C	230.22V
8	36.802A	8.003A	7.991A	2.428A	519.772	88.198%	1935	43.6	43.87°C	0.983
	12.002V	4.958V	3.303V	4.943V	589.324				53.11°C	230.22V
9	41.941A	8.584A	8.487A	2.434A	585.003	87.364%	2236	45.7	44.68°C	0.985
	11.981V	4.952V	3.299V	4.931V	669.618				54.43°C	230.22V
10	46.833A	9.099A	9.010A	3.058A	649.835	86.420%	2237	45.6	45.48°C	0.986
	11.960V	4.947V	3.296V	4.906V	751.947				55.73°C	230.21V
11	52.349A	9.104A	9.021A	3.066A	714.655	85.498%	2237	45.6	46.73°C	0.988
	11.938V	4.944V	3.292V	4.894V	835.870				57.49°C	230.21V
CL1	0.118A	16.002A	15.997A	0.000A	133.139	81.370%	733	14.9	41.84°C	0.937
	12.104V	4.926V	3.306V	5.031V	163.622				48.44°C	230.22V
CL2	54.007A	1.001A	1.001A	1.000A	659.578	87.124%	2236	45.7	45.58°C	0.986
	11.967V	4.994V	3.306V	4.968V	757.059				55.81°C	230.22V

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20-80W LOAD TESTS 230V

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	PF/AC Volts
1	1.221A	0.499A	0.495A	0.197A	19.994	72.045%	696	13.3	0.599
	12.152V	5.019V	3.335V	5.082V	27.752				230.23V
2	2.444A	0.997A	0.990A	0.394A	39.983	81.322%	698	13.4	0.759
	12.146V	5.014V	3.332V	5.074V	49.166				230.23V
3	3.671A	1.497A	1.486A	0.592A	60.013	85.414%	701	13.5	0.833
	12.140V	5.010V	3.330V	5.066V	70.261				230.23V
4	4.892A	1.997A	1.984A	0.791A	79.964	87.474%	703	13.6	0.875
	12.135V	5.006V	3.328V	5.057V	91.415				230.23V

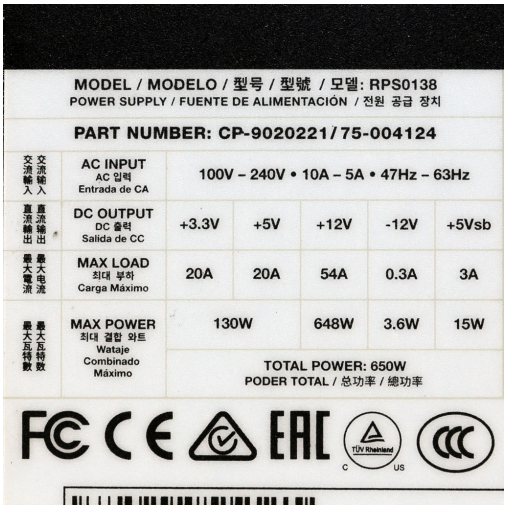
RIPPLE MEASUREMENTS 230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	7.50mV	13.40mV	12.40mV	13.10mV	Pass
20% Load	8.40mV	13.30mV	11.80mV	14.10mV	Pass
30% Load	9.60mV	12.90mV	12.20mV	18.60mV	Pass
40% Load	9.40mV	12.90mV	12.50mV	15.30mV	Pass
50% Load	10.30mV	14.10mV	12.60mV	16.40mV	Pass
60% Load	11.90mV	14.50mV	13.50mV	19.10mV	Pass
70% Load	12.90mV	14.80mV	14.20mV	21.20mV	Pass
80% Load	15.10mV	16.40mV	16.20mV	33.10mV	Pass
90% Load	17.10mV	16.40mV	15.70mV	34.00mV	Pass
100% Load	27.50mV	17.70mV	17.50mV	26.10mV	Pass
110% Load	31.70mV	18.10mV	18.20mV	27.60mV	Pass
Crossload1	13.30mV	19.20mV	17.00mV	14.50mV	Pass
Crossload2	27.10mV	14.80mV	14.70mV	19.80mV	Pass

Anex

Corsair CX650M (2021)

Top side


MODEL / MODELO / 型号 / 型號 / 모델: RPS0138
POWER SUPPLY / FUENTE DE ALIMENTACIÓN / 전원 공급 장치

PART NUMBER: CP-9020221/75-004124

交流輸入	AC INPUT AC 입력 Entrada de CA	100V – 240V • 10A – 5A • 47Hz – 63Hz				
直流輸出	DC OUTPUT DC 출력 Salida de CC	+3.3V	+5V	+12V	-12V	+5Vsb
最大電流	MAX LOAD 최대 부하 Carga Máximo	20A	20A	54A	0.3A	3A
最大瓦特數	MAX POWER 최대 결합 와트 Wataje Combinado Máximo	130W		648W	3.6W	15W
		TOTAL POWER: 650W PODER TOTAL / 总功率 / 總功率				

Power specifications label

CERTIFICATIONS 115V

CERTIFICATIONS 230V

Aristeidis Bitziopoulos
Lab Director