EFFICIENCY AND NOISE REPORT IN ACCORDANCE WITH
CYBENETICS ETA AND CYBENETICS LAMBDA PROCEDURE

Corsair TX650M (2021)

Lab ID#: CR65001917
Receipt Date: Sep 9, 2021
Test Date: Oct 8, 2021

Report: 21PS1917A
Report Date: Oct 11, 2021

DUT INFORMATION

Brand	Corsair
Manufacturer (OEM)	Great Wall
Series	TX-M
Model Number	RPS0141
Serial Number	21264858000089170008
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 (NR120L)
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 (+-2°C / +- 3.6°F)
ErP Lot 3/6 Ready	✓
(EU) No 617/2013 Compliance	✓
ALPM (Alternative Low Power Mode) compatible	✓

115V

Average Efficiency	88.748%
Efficiency With 10W (≤500W) or 2% (>500W)	70.597
Average Efficiency 5VSB	80.558%
Standby Power Consumption (W)	0.0468820
Average PF	0.988
Avg Noise Output	26.90 dB(A)
Efficiency Rating (ETA)	GOLD
Noise Rating (LAMBDA)	A-

230V

Average Efficiency	90.729%
Average Efficiency 5VSB	80.076%
Standby Power Consumption (W)	0.0810652
Average PF	0.961
Avg Noise Output	27.10 dB(A)
Efficiency Rating (ETA)	GOLD
Noise Rating (LAMBDA)	A-

POWER SPECIFICATIONS

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	25	25	51	3	0.8
	Watts	130		612	15	9.6
Total Max. Power (W)		650				

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CABLES AND CONNECTORS

Native Cables

Description	Cable Count	Connector Count (Total)	Gauge	In Cable Caps
ATX connector 20+4 pin (610mm)	1	1	18-20AWG	No
4+4 pin EPS12V (650mm)	1	1	18AWG	No

Modular Cables

4+4 pin EPS12V (650mm)	1	1	18AWG	No
6+2 pin PCIe (600mm+150mm)	2	4	16-18AWG	No
SATA (500mm+95mm+95mm)	2	6	18AWG	No
4 pin Molex (450mm+100mm+100mm+100mm)	1	4	18AWG	No

General Data	-
Manufacturer (OEM)	Great Wall
PCB Type	Double Sided
Primary Side	-
Transient Filter	4x Y caps, 2x X caps, 3x CM chokes, 1x MOV
Inrush Protection	NTC Thermistor SCK-2R58 (2.5Ohm) & Relay
Bridge Rectifier(s)	1x GBU25KH (800V, 22.5A @ 100°C)
APFC MOSFETs	2x Advanced Power Electronics AP30SL60WL (650V, 16.5A @ 100°C, Rds(on): 0.13Ohm)
APFC Boost Diode	1x CREE C3D04060A (600V, 4A @ 155°C)
Bulk Cap(s)	2x Rubycon (450V, 270uF each or 540uF combined, 3,000h @ 105°C, MXG)
Main Switchers	2x Advanced Power Electronics AP65SL130DI (650V, 16.5A @ 100°C, Rds(on): 0.13Ohm)
APFC Controller	Champion CM6500UNX & Champion CM03AX
Resonant Controller	Champion CU6901VPA
Topology	Primary side: APFC, Half-Bridge & LLC converter Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	-
+12V MOSFETs	4x Advanced Power Electronics AP4N1R8CMT-A (45V, 180A, Rds(on): 1.8mOhm)
5V & 3.3V	DC-DC Converters: 6x Advanced Power Electronics AP0403GH (30V, 50A @ 100°C, Rds(on): 4.5mOhm) PWM Controllers: ANPEC APW7159C
Filtering Capacitors	Electrolytic: 1x Rubycon (6-10,000h @ 105°C, ZLH), 5x Rubycon (4-10,000h @ 105°C, YXJ), 1x Rubycon (3-6,000h @ 105°C, YXG), 1x Nippon Chemi-Con (4-10,000h @ 105°C, KY) Polymer: 10x Nippon Chemi-Con, 4x FPCAP
Step-Down DC-DC Converter	Texas Instruments TPS54231
Supervisor IC	IN1S429I-SCG (OVP, UVP, OCP, SG, PGO)
Fan Model	Corsair NR120L (120mm, 12V, 0.22A, Rifle Bearing Fan)
5VSB Circuit	-
Rectifier	1x Diodes Incorporated SBR10E45P5 SBR (45V, 10A)
Standby PWM Controller	Power Integrations TNY278GN

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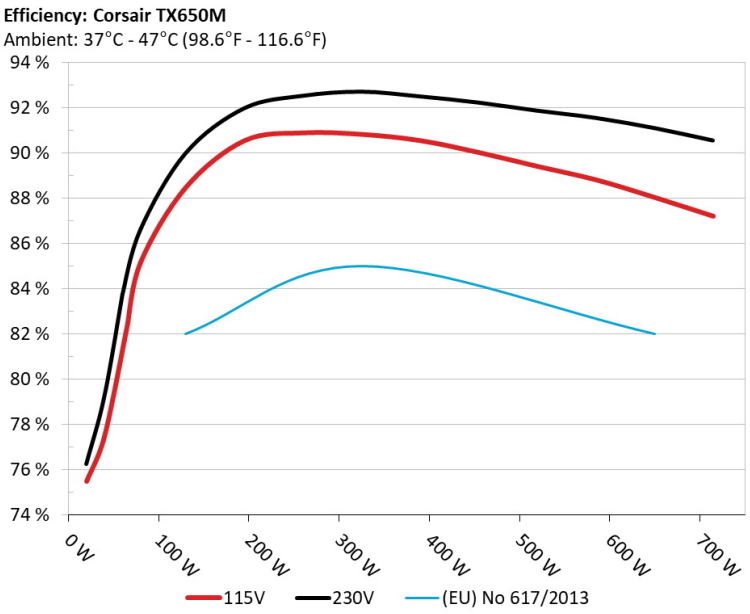
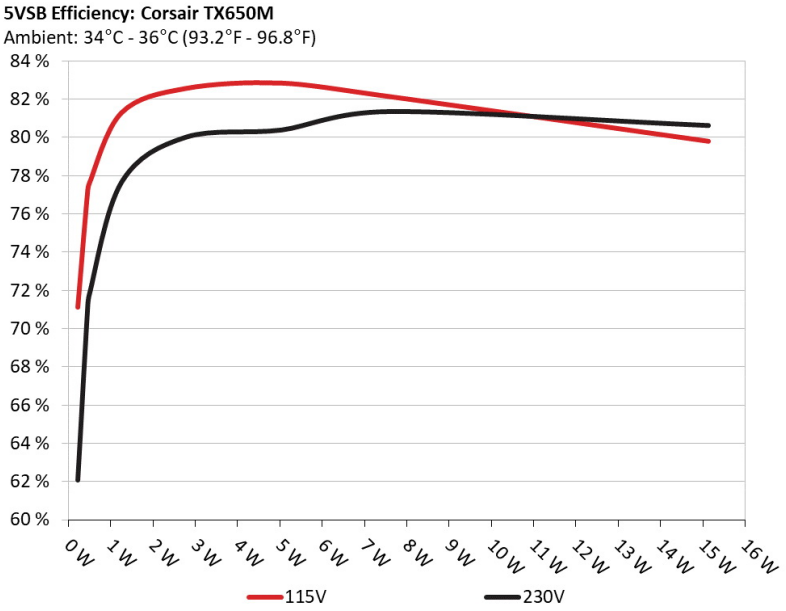
EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE



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

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.227W	71.127%	0.049
	5.051V	0.319W		115.16V
2	0.09A	0.455W	77.08%	0.088
	5.051V	0.59W		115.16V
3	0.55A	2.778W	82.536%	0.299
	5.05V	3.366W		115.16V
4	1A	5.05W	82.817%	0.364
	5.049V	6.098W		115.17V
5	1.5A	7.575W	82.121%	0.4
	5.048V	9.224W		115.17V
6	3A	15.138W	79.785%	0.451
	5.045V	18.973W		115.16V

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.227W	62.056%	0.017
	5.052V	0.366W		230.37V
2	0.09A	0.455W	70.93%	0.03
	5.051V	0.641W		230.36V
3	0.55A	2.779W	79.996%	0.143
	5.05V	3.474W		230.37V
4	1A	5.051W	80.378%	0.219
	5.049V	6.284W		230.37V
5	1.5A	7.574W	81.339%	0.27
	5.048V	9.311W		230.37V
6	3A	15.139W	80.609%	0.346
	5.046V	18.781W		230.36V

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115V

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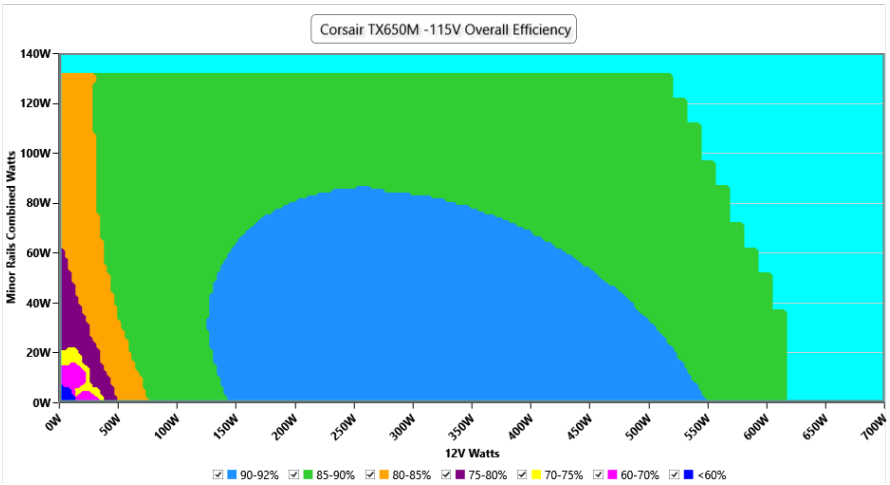
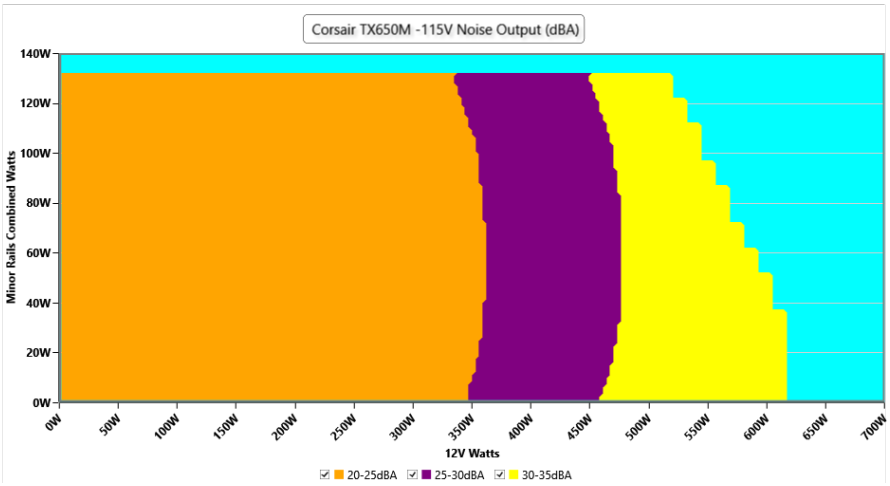
EFFICIENCY GRAPH 115V



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

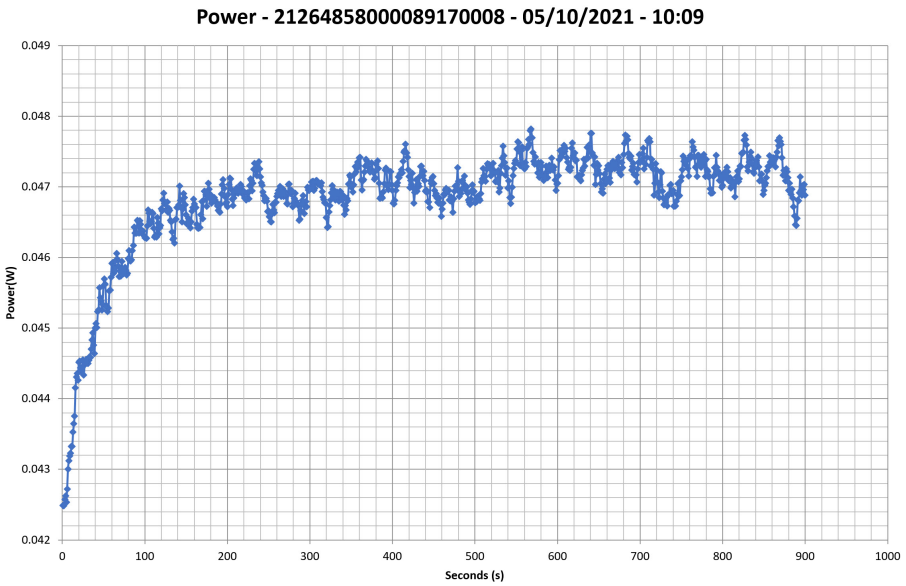
NOISE GRAPH 115V



INFO

The PSU's noise in its entire operational range and under 30-32 °C (+-2 °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

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

COMMISSION REGULATION (EU) NO 617/2013 TESTING 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%	3.604A	1.997A	2.002A	0.992A	65.004	82.251%	955	24.8	40.21°C	0.977
	12.043V	5.008V	3.297V	5.042V	79.031				45.25°C	115.18V
20%	8.228A	2.998A	3.005A	1.192A	129.952	88.479%	927	23.8	40.54°C	0.984
	12.037V	5.005V	3.294V	5.034V	146.873				46.28°C	115.18V
50%	22.865A	5.008A	5.022A	1.796A	325.034	90.823%	1052	27.5	42.5°C	0.99
	12.006V	4.993V	3.286V	5.013V	357.877				49.69°C	115.16V
100%	46.772A	9.057A	9.086A	3.016A	650.053	88.03%	1401	36.2	45.89°C	0.995
	11.980V	4.969V	3.269V	4.975V	738.446				55.87°C	115.19V

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230V

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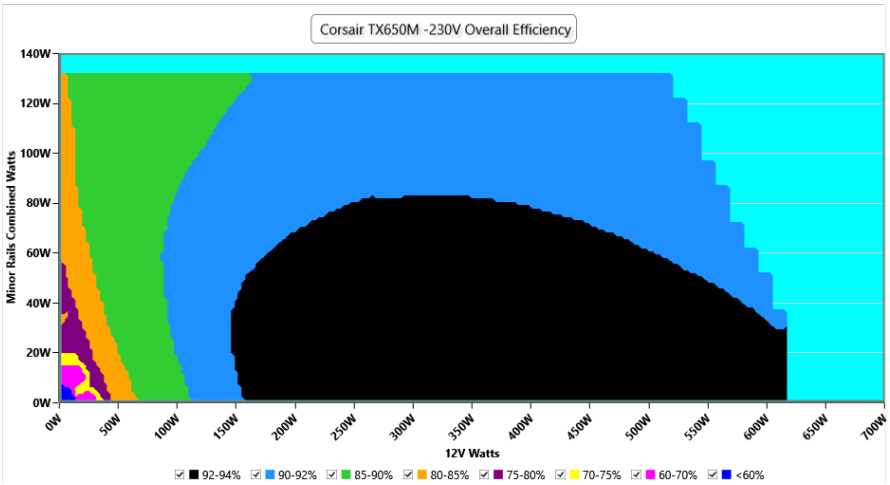
EFFICIENCY GRAPH 230V



INFO

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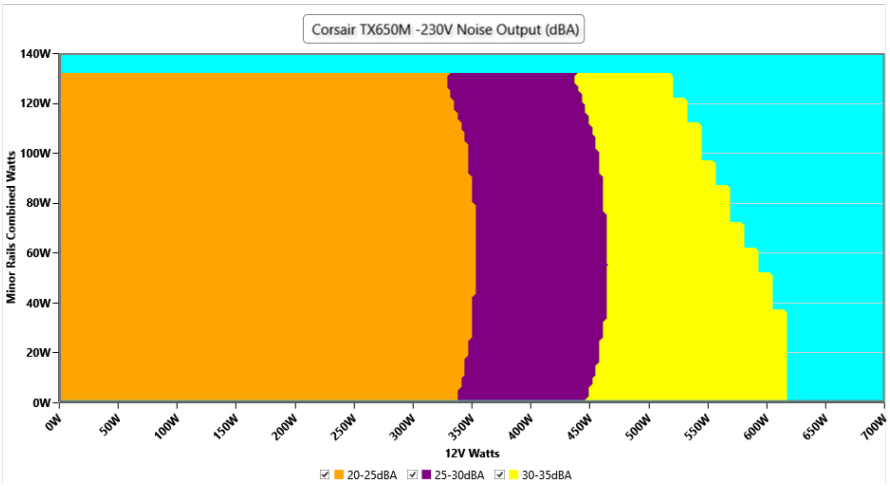
NOISE GRAPH 230V



INFO

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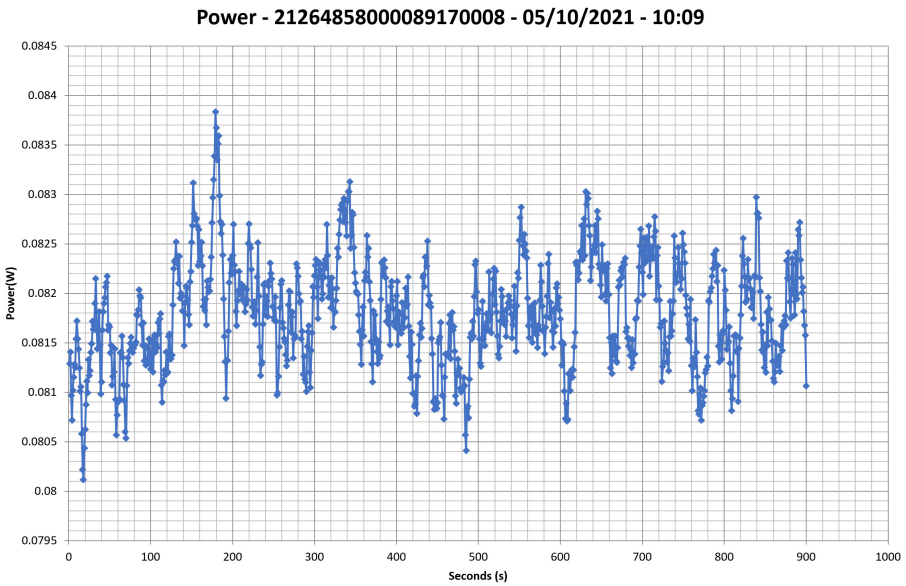
VAMPIRE POWER -230V



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COMMISSION REGULATION (EU) NO 617/2013 TESTING 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%	3.605A	2A	2.004A	0.992A	65.006	83.749%	925	23.8	39.86°C	0.854
	12.040V	5.002V	3.294V	5.041V	77.62				45.36°C	230.42V
20%	8.230A	3.003A	3.01A	1.192A	129.957	89.997%	925	23.8	40.24°C	0.931
	12.035V	4.996V	3.289V	5.033V	144.402				46.13°C	230.42V
50%	22.885A	5.023A	5.037A	1.796A	325.029	92.721%	963	25.2	41.87°C	0.972
	11.996V	4.978V	3.276V	5.011V	350.545				49.21°C	230.43V
100%	46.795A	9.098A	9.132A	3.017A	650.003	91.112%	1356	35.1	45.67°C	0.984
	11.973V	4.947V	3.252V	4.972V	713.408				55.71°C	230.42V

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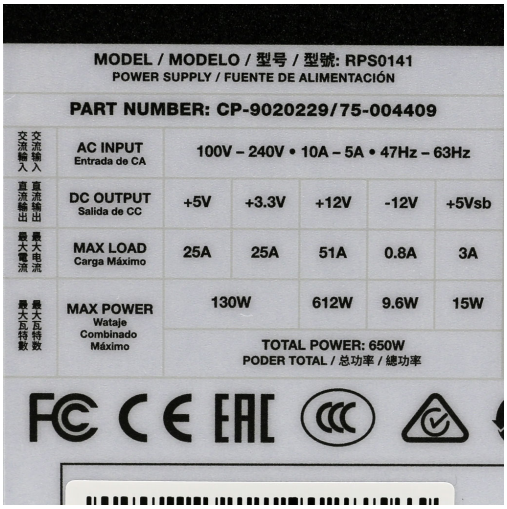
Corsair TX650M (2021)

Top side



Power specifications label

CERTIFICATIONS 115V

CYBENETICS GOLD

CYBENETICS A-

CERTIFICATIONS 230V

CYBENETICS GOLD 230v

CYBENETICS A- 230v

Aristeidis Bitziopoulos
Lab Director