CORSAIR

Corsair TX650M

Serial Number 21264858000089170008

Lab ID CR65001917

Certification ID 251917

Test Result Report ID: 21PS1917A

Certificate Issue Date: Oct 11, 2021

Scheme: ETA-EMI PSU

115V

230V

115V

230V

Scheme: LAMBDA PSU

Aristeidis Bitziopoulos, Certification Body General Manager

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	Corsair
Model	TX650M
OEM/ODM	Great Wall
Serial Number	21264858000089170008
Product Specifications	
Manufacturer-Provided Information	
Rated Voltage (Vrms)	100-240
Rated Current (Arms)	10-5
Rated Frequency (Hz)	47-63

Rated Power (W)	650
Operating Temperature (Continuous Full Load) (°C)	
Type	ATX12V
Cable Design	Semi Modular
Warranty	-
Cybenetics Measurements	
Dimensions (W x H x D)	
Weight	
Cooling	120mm Rifle Bearing Fan (NR120L)
Semi-Passive Operation	✗
Cybenetics Testing Information	
Lab ID	CR65001917
Date of receipt	Sep 9, 2021
Testing Date	Oct 8, 2021
Report Issued Date	Oct 11, 2021
Engineer Name	-
Authorized By the Laboratory Technical Manager	Aristeidis Bitziopoulos
Signature	

Cables and Connectors(Non-accredited measurements)

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

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				

Parts Description

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

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	✓

Performance Summary

115V

Accredited	
Average Efficiency (>1450 load combinations)	88.748%
Average Noise Output (>1450 Load Combinations)	26.90dBA
Average PF (>1450 Load Combinations)	0.988
Efficiency With 10W (≤500W) or 2% (>500W) Load	70.597%
Standby Power Consumption	0.0469W
Non-Accredited	
12V Ripple (Full Load)	40.30mV
5V Ripple (Full Load)	17.74mV
3.3V Ripple (Full Load)	19.03mV
5VSB Ripple (Full Load)	22.95mV
12V Load Regulation	0.54%
5V Load Regulation	0.85%
3.3V Load Regulation	0.95%
5VSB Load Regulation	1.49%
Inrush Current	44.720A

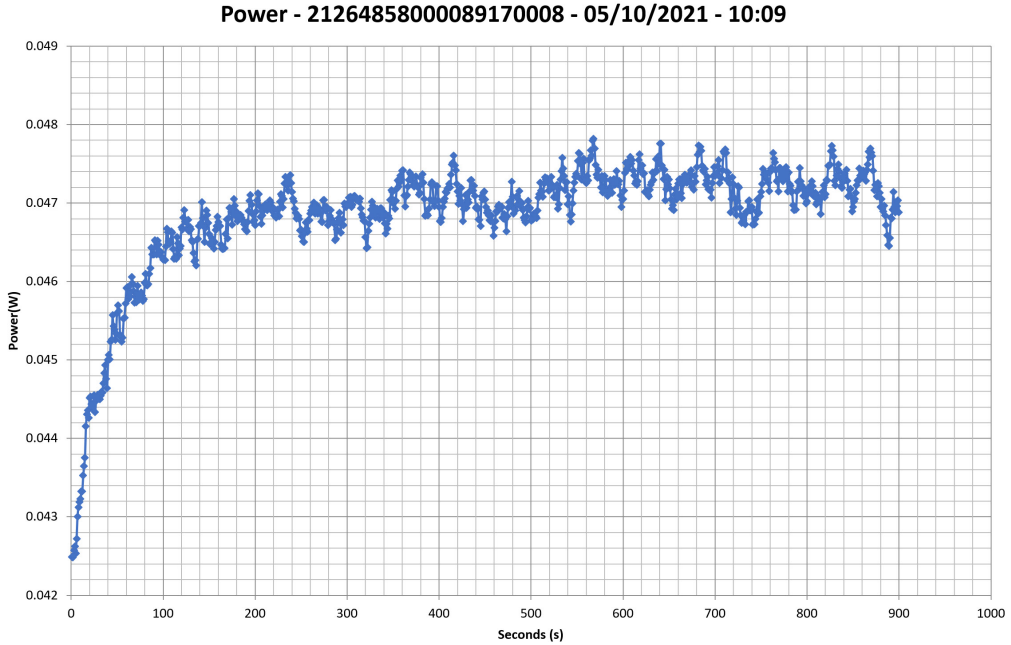
230V		
Accredited		
Average Efficiency (>1450 load combinations)		90.729%
Average Noise Output (>1450 Load Combinations)		27.10dBA
Average PF (>1450 Load Combinations)		0.961
Efficiency With 10W (≤500W) or 2% (>500W) Load		-
Standby Power Consumption		0.0811W
Non-Accredited		
12V Ripple (Full Load)		43.66mV
5V Ripple (Full Load)		18.33mV
3.3V Ripple (Full Load)		21.49mV
5VSB Ripple (Full Load)		21.19mV
12V Load Regulation		0.58%
5V Load Regulation		1.25%
3.3V Load Regulation		1.41%
5VSB Load Regulation		1.53%
Inrush Current		85.250A
Hold-Up Time & PWR_OK Signal		19.50ms
AC Loss to PWR_OK Hold Up Time		15.10ms
PWR_OK Inactive to DC Loss Delay		4.40ms
PSU Timings: T1 (20% / 100%)	33.5ms	33.0ms
PSU Timings: T3 (20% / 100%)	133.0ms	132.5ms
OPP (27.04°C / 43.33°C)	120.91%	120.90%

Hold-Up Time & PWR_OK Signal

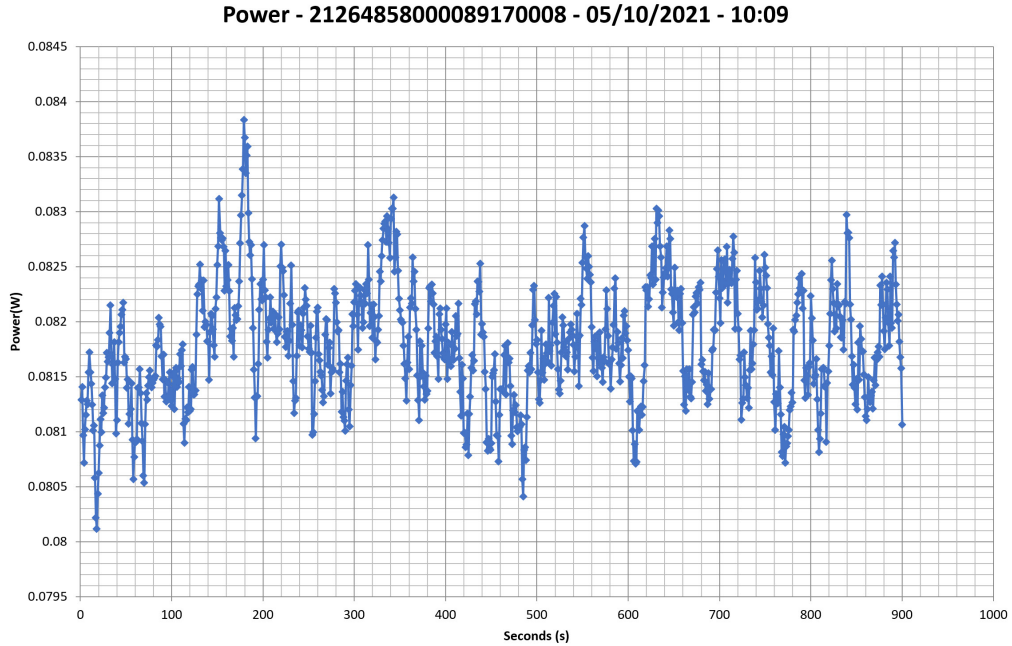
Hold-Up Time (ms)	19.5
AC Loss to PWR_OK Hold Up Time (ms)	15.1
PWR_OK Inactive to DC Loss Delay (ms)	4.4

Graphs

115V

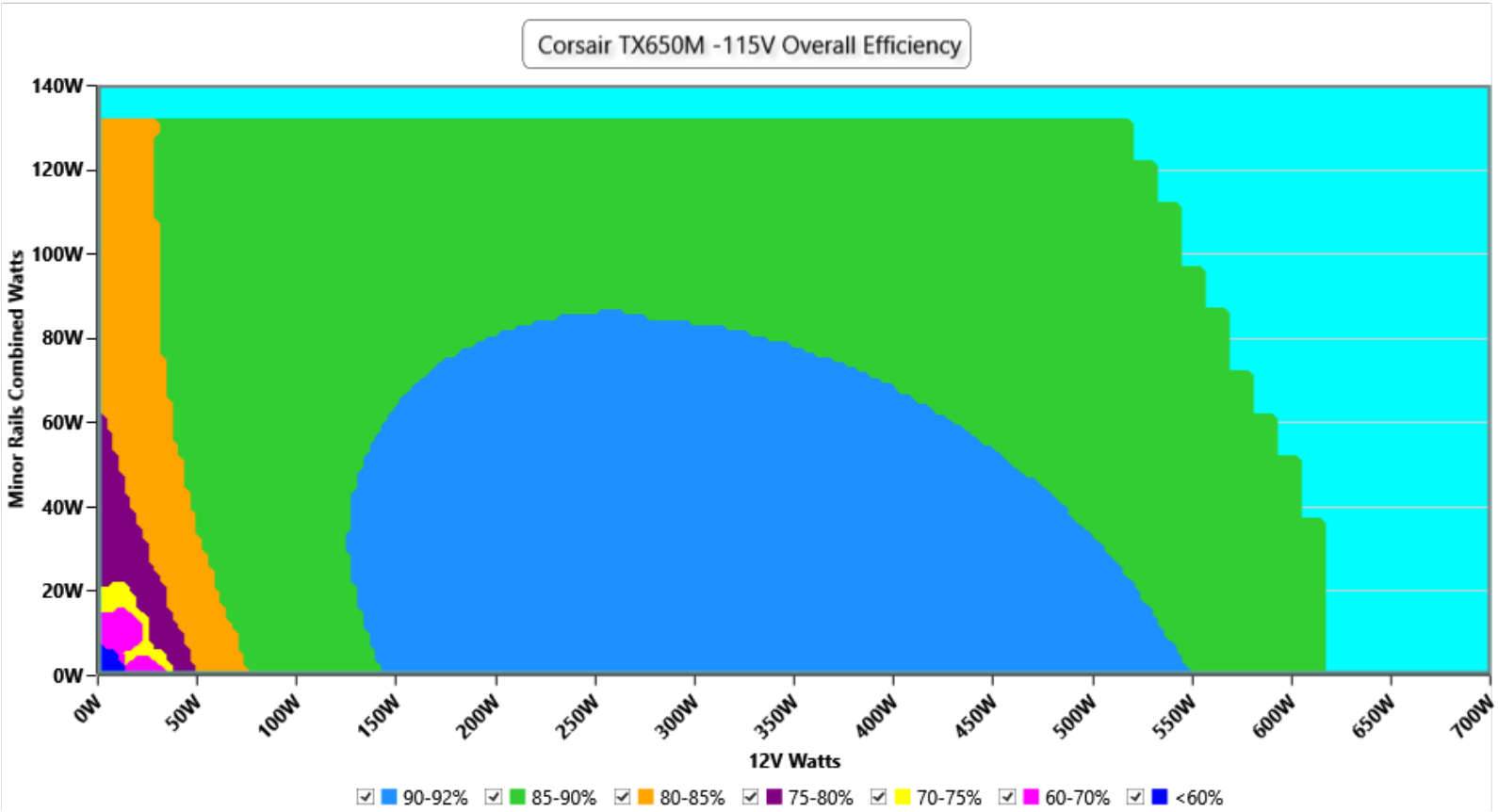


230V



Efficiency Graph

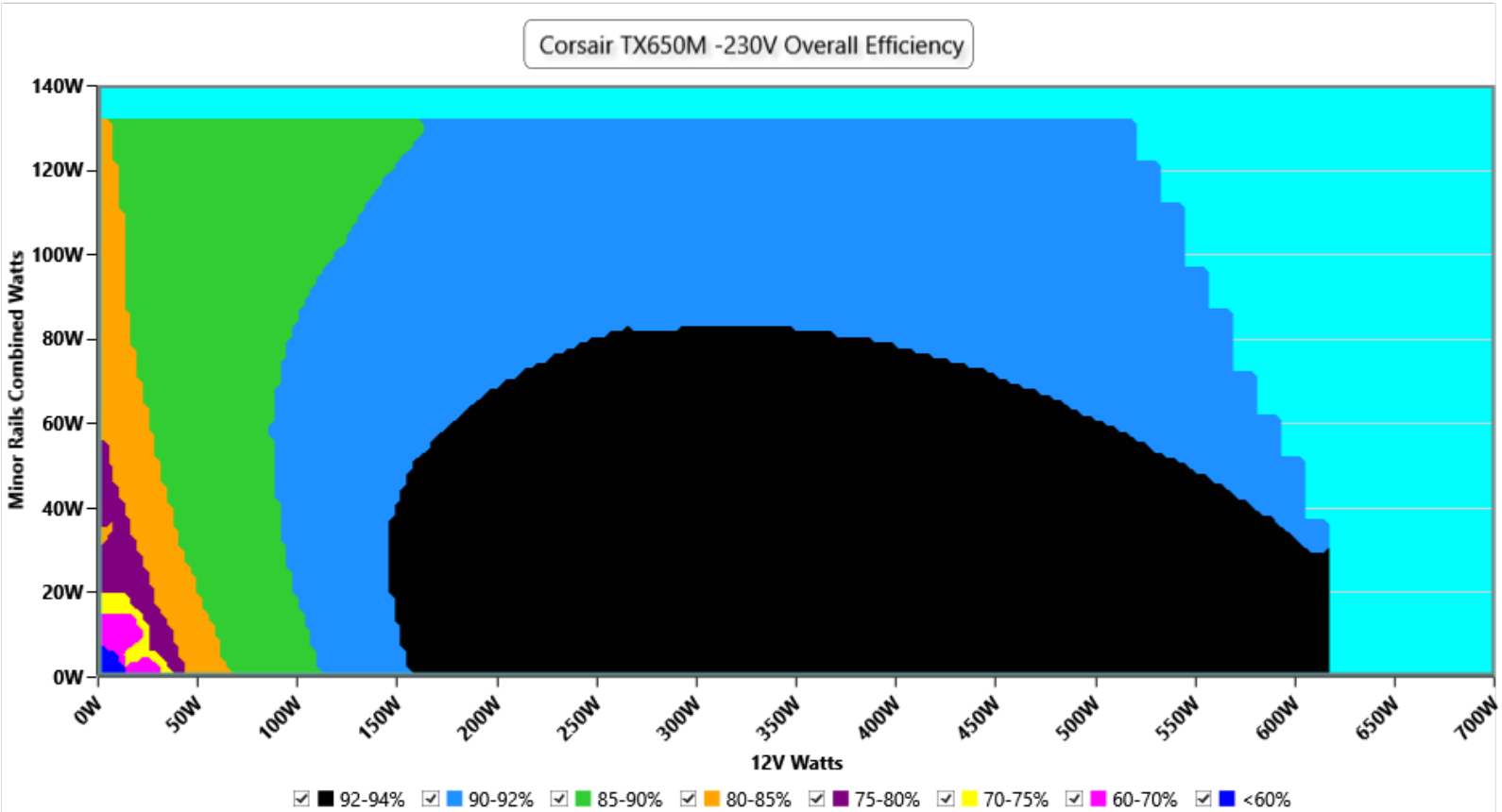
115V



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

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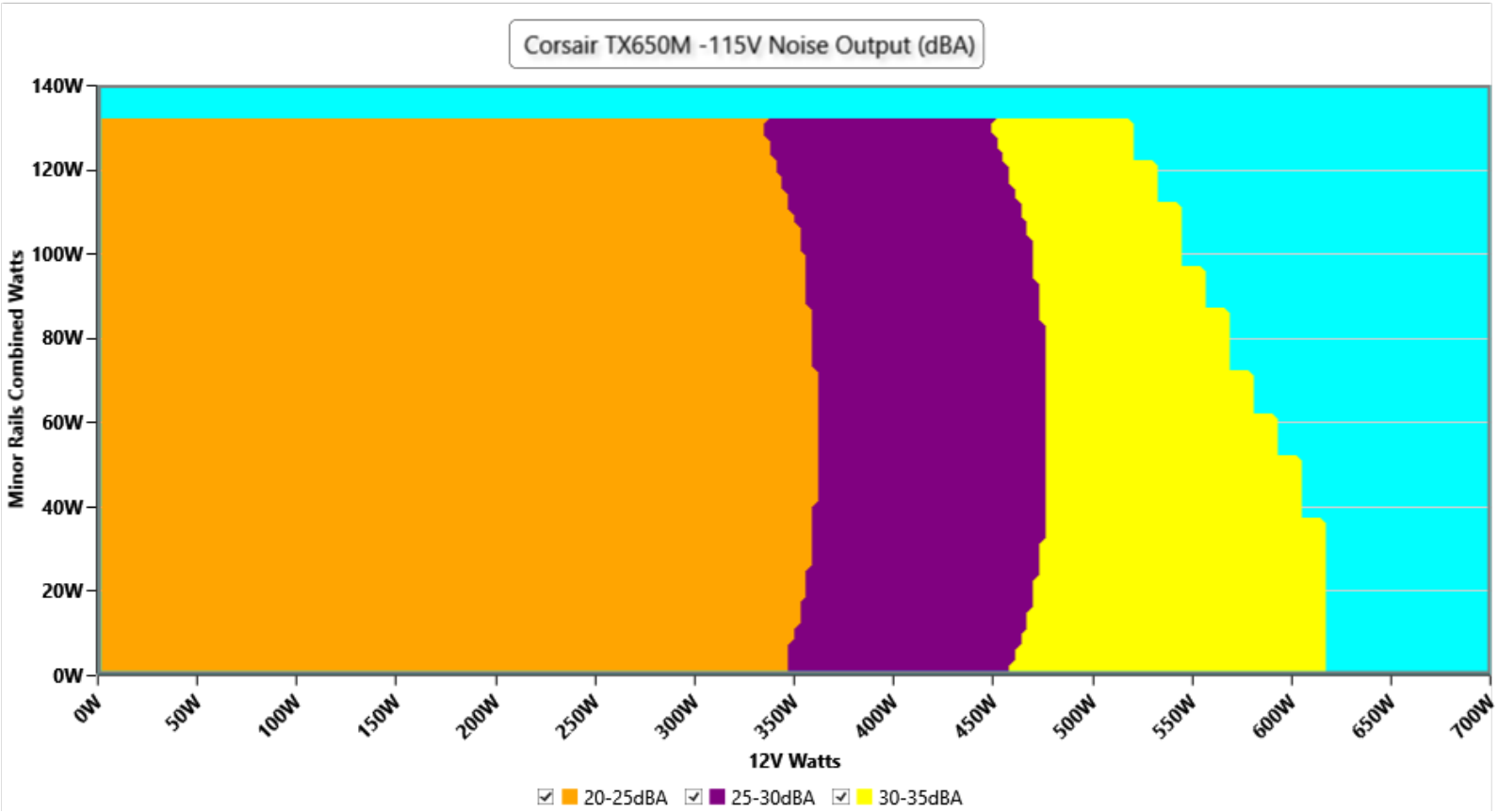
Noise Graph

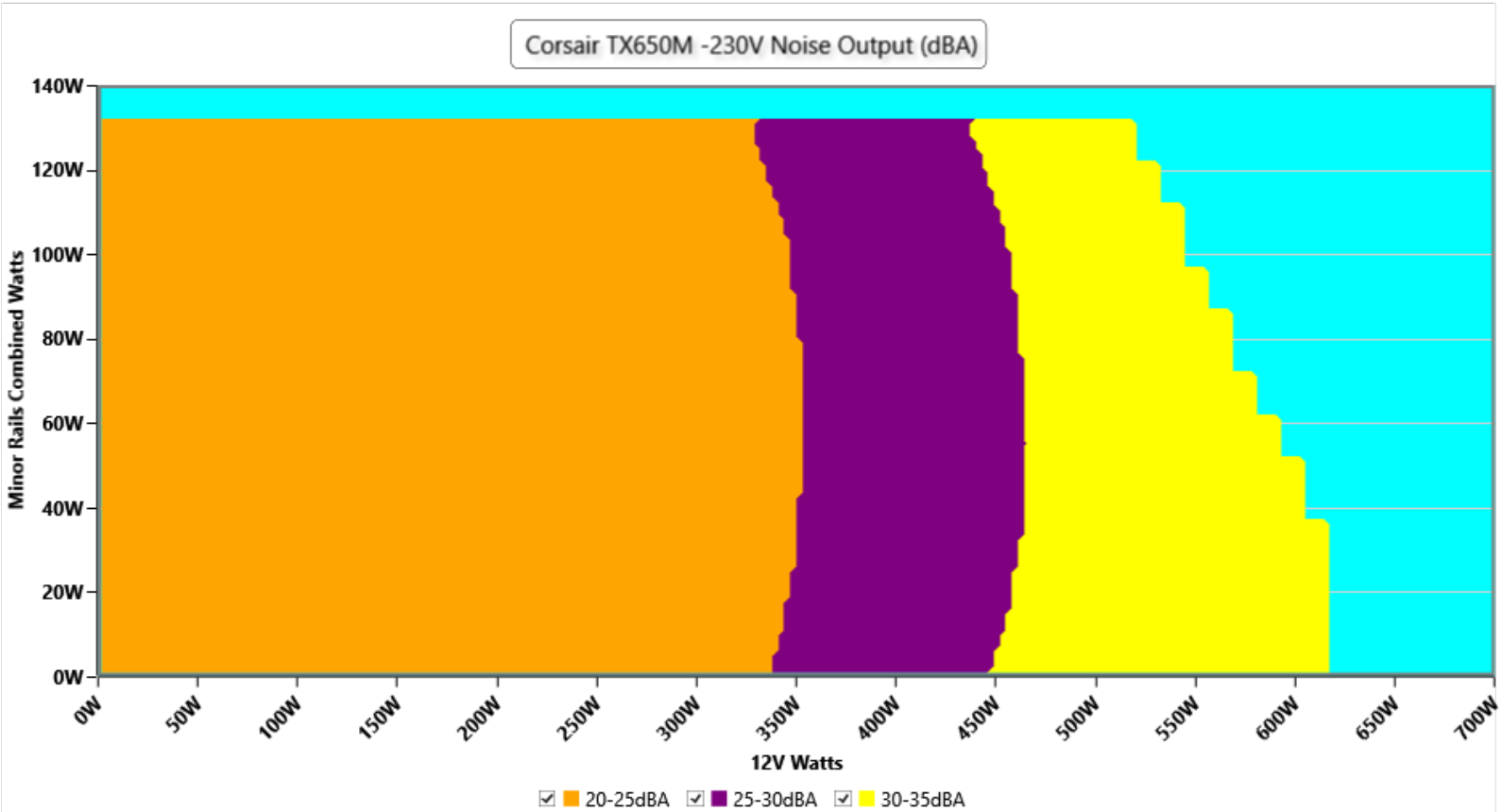
115V



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

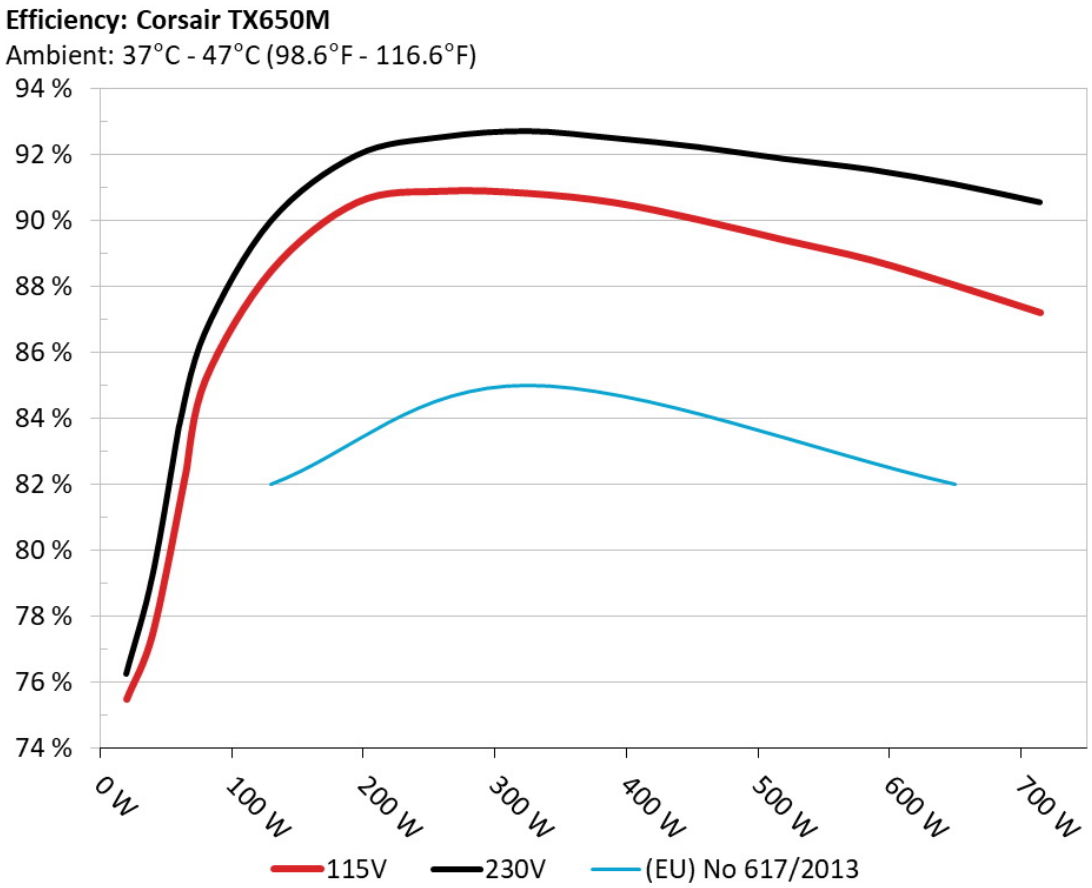


INFO

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

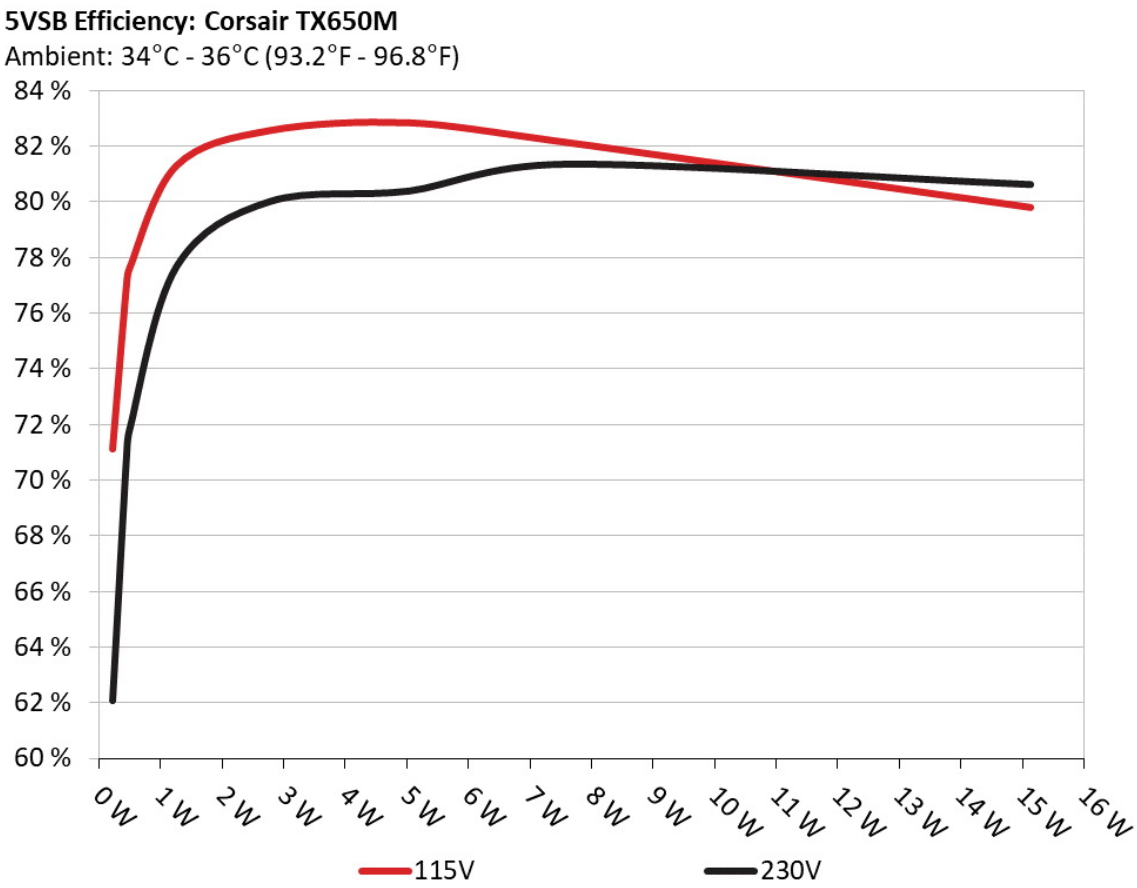
Efficiency under high ambient temperature



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	0.227W	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

230V

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

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%	3.604A	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
30%	13.223A	3.501A	3.509A	1.393A	194.941	90.544%	892	22.6	41.56°C	0.983
	12.016V	5V	3.291V	5.027V	215.299				47.56°C	115.15V
40%	18.218A	4.004A	4.014A	1.594A	260.039	90.889%	982	26.1	41.93°C	0.987
	12.012V	4.997V	3.289V	5.021V	286.106				48.65°C	115.16V
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
60%	27.484A	6.016A	6.033A	1.998A	389.58	90.549%	1088	29.0	42.68°C	0.991
	11.999V	4.988V	3.283V	5.005V	430.24				50.46°C	115.16V
70%	32.162A	7.024A	7.045A	2.202A	454.93	90.021%	1182	32.8	43°C	0.993
	11.996V	4.984V	3.28V	4.997V	505.36				51.22°C	115.17V
80%	36.848A	8.003A	8.058A	2.305A	519.608	89.408%	1255	32.6	43.68°C	0.994
	11.991V	4.98V	3.276V	4.99V	581.162				52.48°C	115.17V
90%	41.938A	8.544A	8.555A	2.409A	585.202	88.808%	1323	34.4	44.16°C	0.994
	11.986V	4.975V	3.273V	4.983V	658.954				53.58°C	115.18V
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
110%	51.472A	10.083A	10.206A	3.021A	714.702	87.203%	1482	37.7	46.67°C	0.995
	11.975V	4.96V	3.263V	4.966V	819.589				57.55°C	115.19V
CL1	0.116A	15.727A	15.736A	0A	131.316	82.497%	1247	32.4	42.57°C	0.985
	12.036V	4.979V	3.279V	5.012V	159.177				49.59°C	115.19V

Test	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
CL2	0.116A	25.138A	0A	0A	126.402	80.819%	1160	31.0	43.73°C	0.984
	12.040V	4.973V	3.282V	5.028V	156.401				51.53°C	115.2V
CL3	0.116A	0A	25.104A	0A	83.9	75.719%	1117	29.6	44.42°C	0.987
	12.035V	5V	3.286V	5.013V	110.804				53.26°C	115.2V
CL4	54.220A	0A	0A	0A	649.926	89.077%	1370	35.4	45.51°C	0.995
	11.987V	4.974V	3.271V	4.996V	729.622				55.57°C	115.18V

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%	3.605A	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
30%	13.227A	3.507A	3.516A	1.393A	194.961	91.987%	936	24.1	41.01°C	0.956
	12.014V	4.991V	3.285V	5.026V	211.943				47.27°C	230.42V
40%	18.225A	4.012A	4.024A	1.594A	260.05	92.541%	975	25.8	41.25°C	0.966
	12.008V	4.986V	3.281V	5.019V	281.011				48.06°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
60%	27.492A	6.034A	6.053A	1.999A	389.598	92.515%	1084	28.6	42.16°C	0.975
	11.996V	4.973V	3.272V	5.003V	421.118				50.07°C	230.43V
70%	32.175A	7.049A	7.073A	2.203A	454.907	92.239%	1156	30.8	43.45°C	0.978
	11.991V	4.966V	3.267V	4.995V	493.18				51.82°C	230.42V
80%	36.865A	8.003A	8.094A	2.306A	519.422	91.885%	1225	32.4	43.7°C	0.981
	11.985V	4.96V	3.262V	4.987V	565.293				52.51°C	230.42V
90%	41.961A	8.581A	8.597A	2.41A	585.161	91.561%	1288	33.5	44.18°C	0.983
	11.979V	4.953V	3.257V	4.98V	639.095				53.58°C	230.42V

Test	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
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
110%	51.489A	10.122A	10.255A	3.022A	714.652	90.564%	1453	37.3	46.99°C	0.985
	11.970V	4.94V	3.247V	4.964V	789.113				57.87°C	230.42V
CL1	0.116A	15.751A	15.756A	0A	131.31	84.103%	1231	32.4	42.4°C	0.938
	12.032V	4.971V	3.275V	5.012V	156.129				49.53°C	230.43V
CL2	0.116A	25.172A	0A	0A	126.4	82.239%	1164	31.3	43.48°C	0.937
	12.039V	4.966V	3.279V	5.027V	153.699				51.85°C	230.43V
CL3	0.116A	0A	25.128A	0A	83.896	77.329%	1090	29.1	44.37°C	0.905
	12.032V	4.997V	3.283V	5.013V	108.493				53.6°C	230.43V
CL4	54.220A	0A	0A	0A	649.824	92.224%	1298	33.8	45.5°C	0.983
	11.985V	4.97V	3.266V	4.994V	704.611				55.31°C	230.43V

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	1.240A	0.499A	0.5A	0.198A	20.003	75.475%	881	22.1	36.78°C	0.904
	11.979V	5.011V	3.3V	5.049V	26.503				39.94°C	115.18V
40W	2.714A	0.699A	0.7A	0.297A	40.001	77.508%	883	22.2	37.97°C	0.963
	12.044V	5.01V	3.299V	5.047V	51.609				41.64°C	115.18V
60W	4.196A	0.898A	0.9A	0.397A	59.999	82.36%	921	23.6	38.74°C	0.976
	12.044V	5.01V	3.298V	5.045V	72.85				42.82°C	115.18V
80W	5.674A	1.098A	1.101A	0.496A	79.957	85.181%	929	23.9	39.19°C	0.98
	12.043V	5.009V	3.298V	5.043V	93.867				43.8°C	115.18V

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	1.240A	0.499A	0.5A	0.198A	20.004	76.255%	884	22.2	36.85°C	0.585
	11.979V	5.009V	3.298V	5.048V	26.233				39.95°C	230.41V
40W	2.714A	0.699A	0.701A	0.297A	40.002	79.244%	887	22.4	37.28°C	0.765
	12.043V	5.007V	3.297V	5.046V	50.479				41°C	230.41V
60W	4.196A	0.899A	0.901A	0.397A	60.001	83.589%	917	23.5	38.27°C	0.838
	12.043V	5.006V	3.296V	5.044V	71.781				42.37°C	230.41V
80W	5.674A	1.099A	1.102A	0.496A	79.961	86.622%	924	23.7	38.77°C	0.883
	12.042V	5.004V	3.295V	5.042V	92.311				43.36°C	230.41V

The results above are not used in the certification process

Ripple Measurements

115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	7.46mV	7.00mV	6.96mV	12.13mV	Pass
20% Load	14.61mV	6.70mV	7.06mV	12.49mV	Pass
30% Load	32.16mV	7.52mV	7.98mV	12.23mV	Pass
40% Load	28.42mV	9.51mV	9.06mV	13.41mV	Pass
50% Load	28.01mV	22.24mV	25.28mV	16.87mV	Pass
60% Load	26.42mV	12.63mV	12.13mV	15.14mV	Pass
70% Load	26.27mV	16.93mV	14.53mV	14.99mV	Pass
80% Load	23.82mV	15.09mV	17.51mV	15.75mV	Pass
90% Load	23.36mV	15.75mV	19.09mV	15.80mV	Pass
100% Load	40.30mV	17.74mV	19.03mV	22.95mV	Pass
110% Load	40.33mV	17.86mV	21.44mV	22.81mV	Pass
Crossload1	16.62mV	10.09mV	15.70mV	14.46mV	Pass
Crossload2	10.98mV	8.90mV	6.60mV	10.91mV	Pass

Test	12V	5V	3.3V	5VSB	Pass/Fail
Crossload3	13.64mV	5.98mV	16.38mV	11.11mV	Pass
Crossload4	40.13mV	12.04mV	13.80mV	16.67mV	Pass

The results above are not used in the certification process

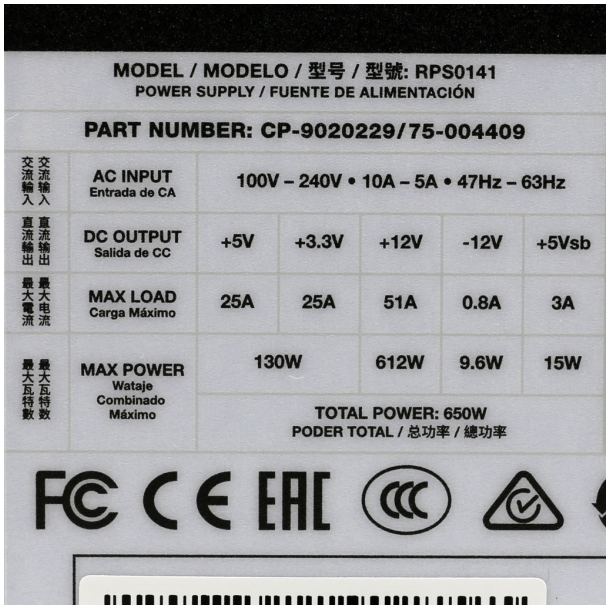
230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	7.31mV	6.70mV	6.96mV	11.78mV	Pass
20% Load	14.35mV	7.26mV	6.70mV	11.98mV	Pass
30% Load	34.16mV	7.36mV	7.93mV	11.78mV	Pass
40% Load	33.27mV	8.95mV	10.39mV	12.24mV	Pass
50% Load	31.28mV	22.19mV	24.46mV	17.33mV	Pass
60% Load	29.28mV	11.35mV	11.26mV	14.22mV	Pass
70% Load	28.26mV	15.80mV	14.12mV	14.79mV	Pass
80% Load	26.01mV	16.21mV	18.52mV	14.99mV	Pass
90% Load	27.50mV	15.75mV	19.65mV	15.96mV	Pass
100% Load	43.66mV	18.33mV	21.49mV	21.19mV	Pass
110% Load	45.75mV	18.76mV	21.40mV	22.42mV	Pass
Crossload1	25.34mV	10.55mV	17.05mV	15.05mV	Pass
Crossload2	12.24mV	8.69mV	7.07mV	11.06mV	Pass
Crossload3	12.26mV	5.78mV	16.48mV	11.01mV	Pass
Crossload4	43.87mV	13.40mV	14.06mV	16.89mV	Pass

The results above are not used in the certification process

Corsair TX650M

Top side



MODEL / MODELO / 型号 / 型號: RPS0141
POWER SUPPLY / FUENTE DE ALIMENTACIÓN

PART NUMBER: CP-9020229/75-004409

交流輸入	AC INPUT Entrada de CA	100V – 240V • 10A – 5A • 47Hz – 63Hz				
直流輸出	DC OUTPUT Salida de CC	+5V	+3.3V	+12V	-12V	+5Vsb
最大電流	MAX LOAD Carga Máximo	25A	25A	51A	0.8A	3A
最大瓦特數	MAX POWER Wataje Combinado Máximo	130W		612W	9.6W	15W
		TOTAL POWER: 650W PODER TOTAL / 总功率 / 總功率				

Power specifications label

Cybenetics □□□□□□□□□□□□□□□□□□ ETA□□□□ LAMBDA□□□□ SAFE□□□□□□□□□□□□□□□□□□ DELTA□□□□□□□ PHI□□□□□□□□□

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