CORSAIR

Corsair CV650

Serial Number C65980681

Lab ID CR19650133

Certification ID 25886

Test Result Report ID: 19PS886A

Certificate Issue Date: Nov 1, 2019

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	CV650
OEM/ODM	HEC
Serial Number	C65980681
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	Fixed cables
Warranty	-
Cybenetics Measurements	
Dimensions (W x H x D)	
Weight	
Cooling	120mm Sleeve Bearing Fan (D12SH-12)
Semi-Passive Operation	✗
Cybenetics Testing Information	
Lab ID	CR19650133
Date of receipt	Oct 29, 2019
Testing Date	Nov 1, 2019
Report Issued Date	Nov 1, 2019
Engineer Name	-
Authorized By the Laboratory Technical Manager	Aristeidis Bitziopoulos
Signature	

Cables and Connectors(Non-accredited measurements)

Captive Cables				
Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors
ATX connector 20+4 pin (570mm)	1	1	18-20AWG	No
4+4 pin EPS12V (630mm)	1	1	18AWG	No
6+2 pin PCIe (570mm+110mm)	1	2	18AWG	No
SATA (490mm+120mm+120mm)	2	6	18AWG	No
SATA (480mm) / 4-pin Molex (+120mm+120mm) / FDD (+120mm)	1	1 / 2 / 1	18-20AWG	No
AC Power Cord (1380mm) - C13 coupler	1	1	18AWG	-

Power Specifications

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	24	20	52	3	0.3
	Watts	130		624	15	3.6
Total Max. Power (W)		650				

Parts Description

General Data	-
Manufacturer (OEM)	HEC
PCB Type	Single Sided
Primary Side	-
Transient Filter	4x Y caps, 3x X caps, 2x CM chokes, 1x MOV, 1x Discharge IC
Inrush Protection	NTC Thermistor
Bridge Rectifier(s)	2x GBU10K (800V, 10A @ 100°C)
APFC MOSFETs	2x Infineon IPAW60R180P7S (650V, 11A @ 100°C, 0.18Ohm)
APFC Boost Diode	1x Hestia H2S060H004 (600V, 4A @ 157°C)
Hold-up Cap(s)	1x Teapo (400V, 330uF, 2,000h @ 105°C, LG)
Main Switchers	2x Champion GPT22N50SYX
Combo APFC/PWM Controller	Champion CM6800TX
APFC Disconnect IC	Power Integrations SEN012DG
Topology	Primary side: Double Forward Secondary side: Passive Rectification & DC-DC converters
Secondary Side	-
+12V SBRs	4x PFC PFR40V60CT SBR (60V, 40A)
5V & 3.3V MOSFETs	5V: 4x Potens Semiconductor PDD3906 (30V, 51A @ 100°C, 6mOhm) 3.3V: 4x Potens Semiconductor PDD3906 (30V, 51A @ 100°C, 6mOhm) PWM Controller: 2x ANPEC APW7164
Filtering Capacitors	Electrolytic: 11x Teapo (1-3,000h @ 105°C, SC), 2x Elite (2-5,000h @ 105°C, ED), 2x Elite (1,000h @ 105°C, PS) Polymer: 2x Elite
Supervisor IC	Weltrend WT7527 (OCP, OVP, UVP, PG)
Fan Model	Yate Loon D12SH-12 (120mm, 12V, 0.30A, Sleeve Bearing Fan)
5VSB Circuit	-
Rectifier	1x PFC PFR10L60CT SBR (60V, 10A)

Standby PWM Controller	Power Integrations TNY289PG

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	✓

Performance Summary

115V

Accredited	
Average Efficiency (>1450 load combinations)	83.932%
Average Noise Output (>1450 Load Combinations)	31.67dBA
Average PF (>1450 Load Combinations)	0.988
Efficiency With 10W (≤500W) or 2% (>500W) Load	55.120%
Standby Power Consumption	0.0442W
Non-Accredited	
12V Ripple (Full Load)	50.07mV
5V Ripple (Full Load)	30.72mV
3.3V Ripple (Full Load)	23.90mV
5VSB Ripple (Full Load)	21.01mV
12V Load Regulation	1.88%
5V Load Regulation	2.95%
3.3V Load Regulation	1.76%
5VSB Load Regulation	3.39%
Inrush Current	33.662A

230V		
Accredited		
Average Efficiency (>1450 load combinations)	86.313%	
Average Noise Output (>1450 Load Combinations)	31.48dBA	
Average PF (>1450 Load Combinations)	0.958	
Efficiency With 10W (≤500W) or 2% (>500W) Load	-	
Standby Power Consumption	0.0952W	
Non-Accredited		
12V Ripple (Full Load)	53.97mV	
5V Ripple (Full Load)	32.18mV	
3.3V Ripple (Full Load)	27.52mV	
5VSB Ripple (Full Load)	24.87mV	
12V Load Regulation	1.81%	
5V Load Regulation	2.89%	
3.3V Load Regulation	1.71%	
5VSB Load Regulation	3.31%	
Inrush Current	50.229A	
Hold-Up Time & PWR_OK Signal	14.30ms	
AC Loss to PWR_OK Hold Up Time	12.10ms	
PWR_OK Inactive to DC Loss Delay	2.20ms	
PSU Timings: T1 (20% / 100%)	56.0ms	56.0ms
PSU Timings: T3 (20% / 100%)	322.0ms	322.0ms
OPP (0.00°C / 0.00°C)	-	-

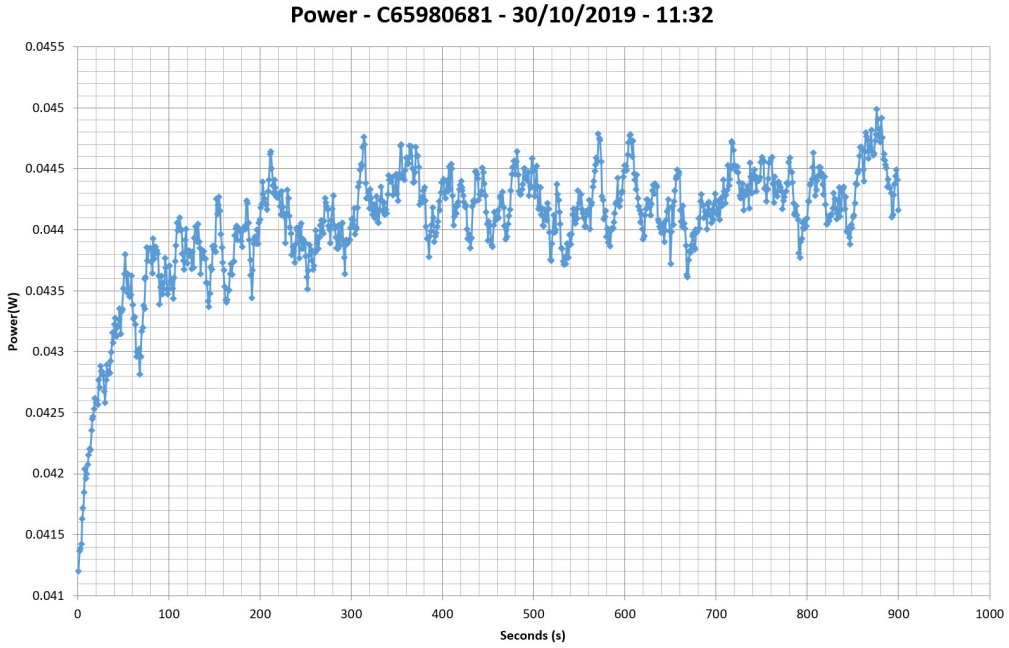
Hold-Up Time & PWR_OK Signal

Hold-Up Time (ms)	14.3
AC Loss to PWR_OK Hold Up Time (ms)	12.1
PWR_OK Inactive to DC Loss Delay (ms)	2.2

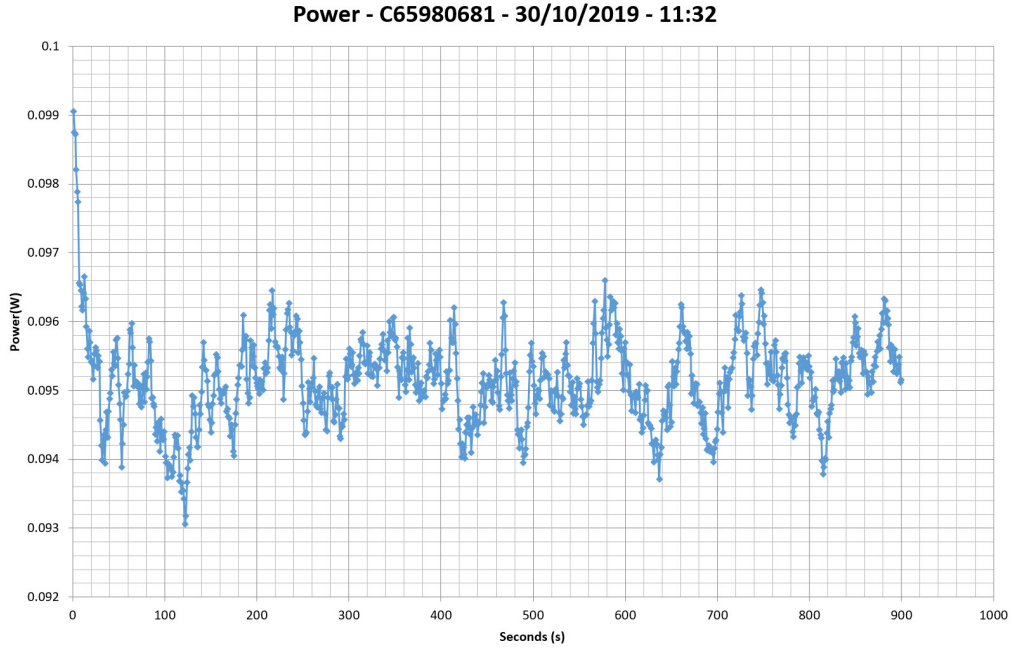
Vampire Power

Graphs

115V

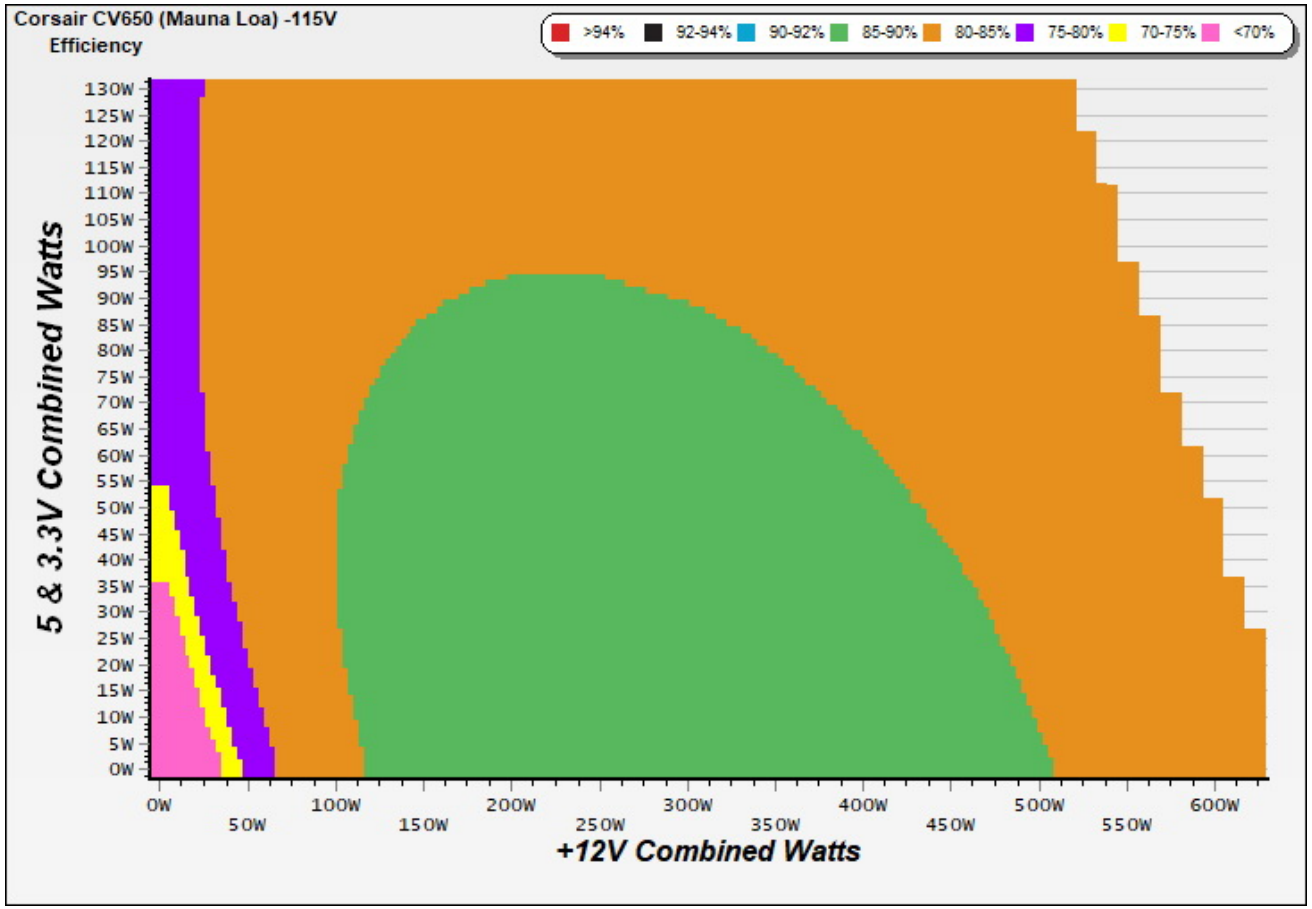


230V



Efficiency Graph

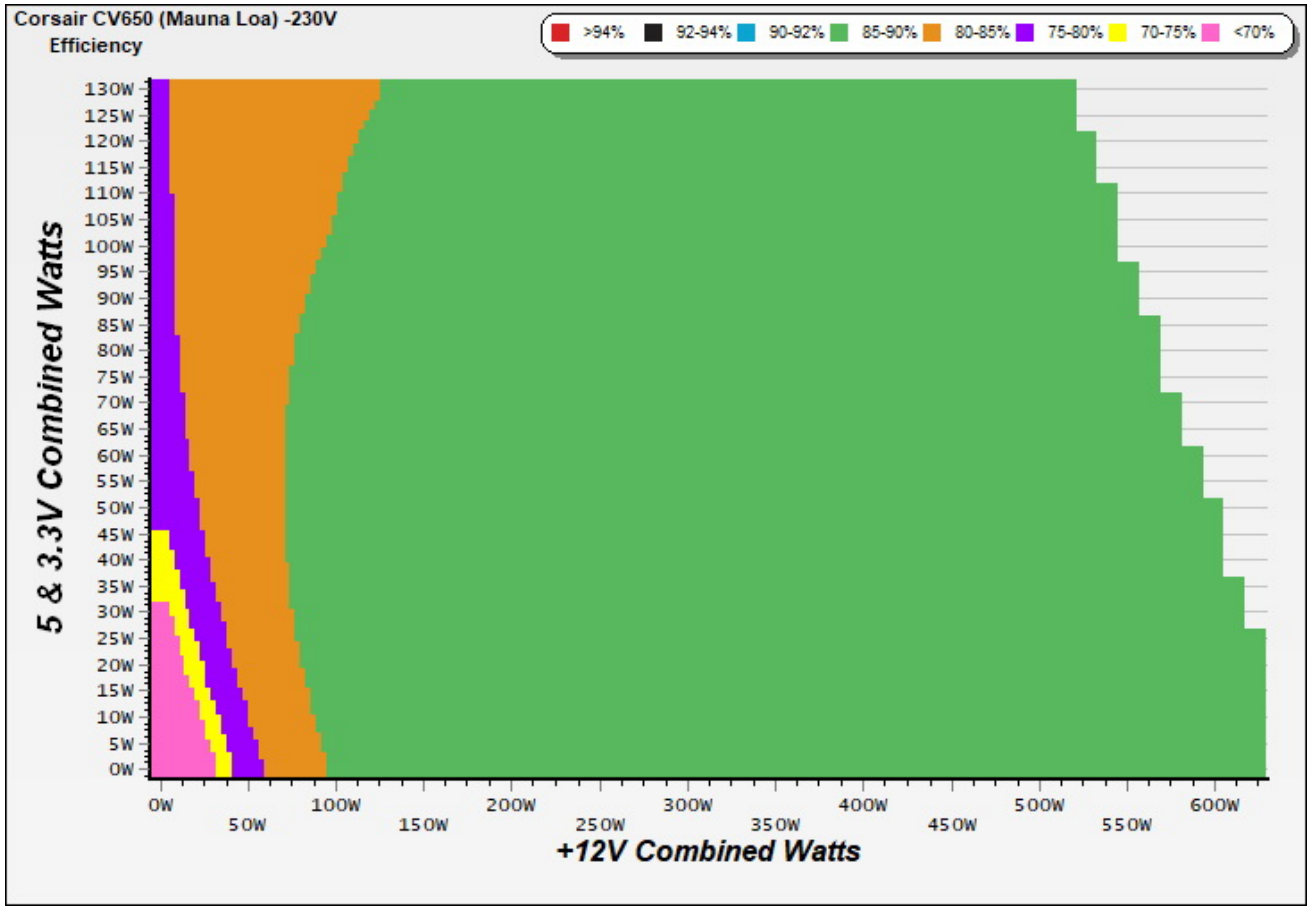
115V



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



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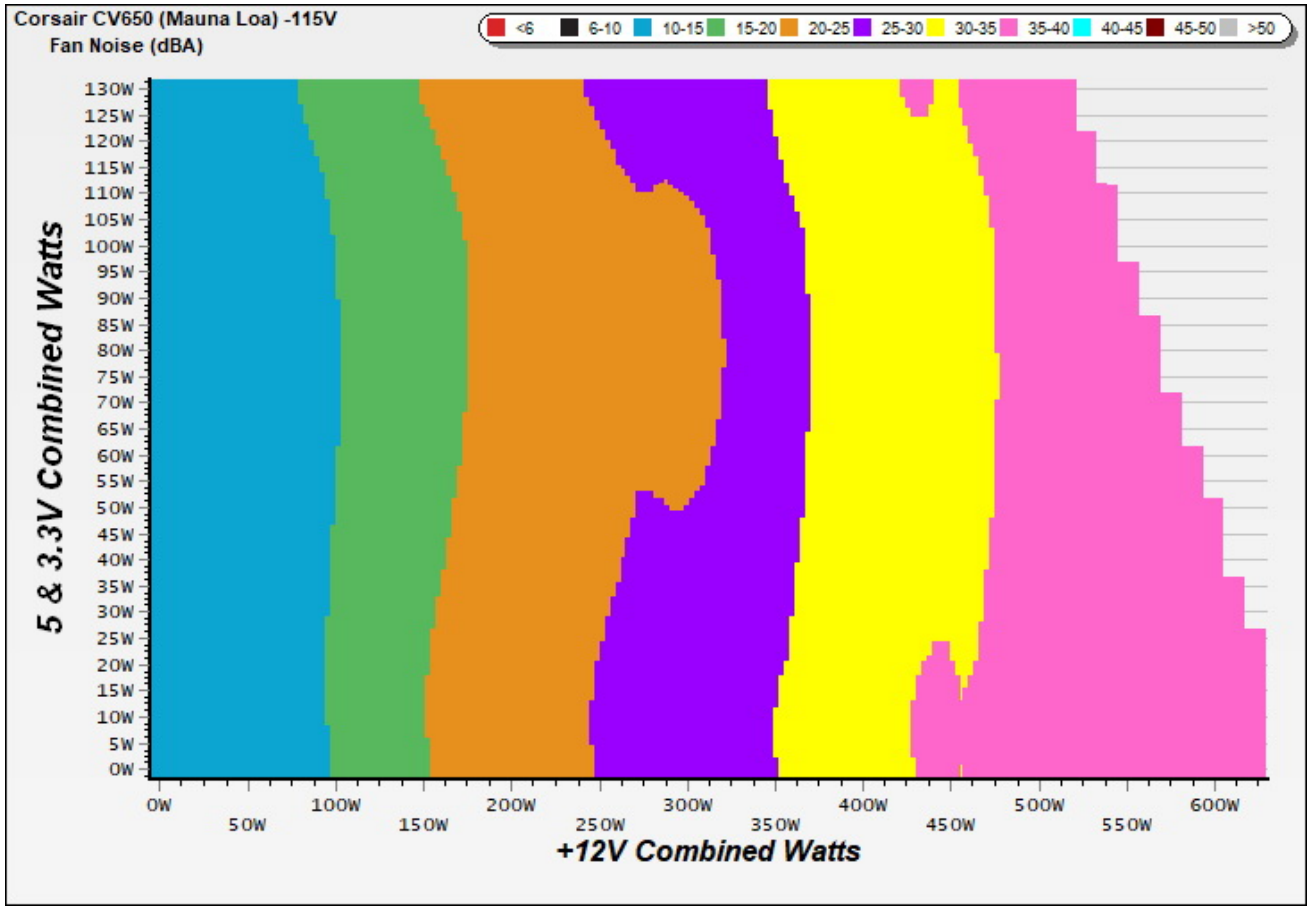
Noise Graph

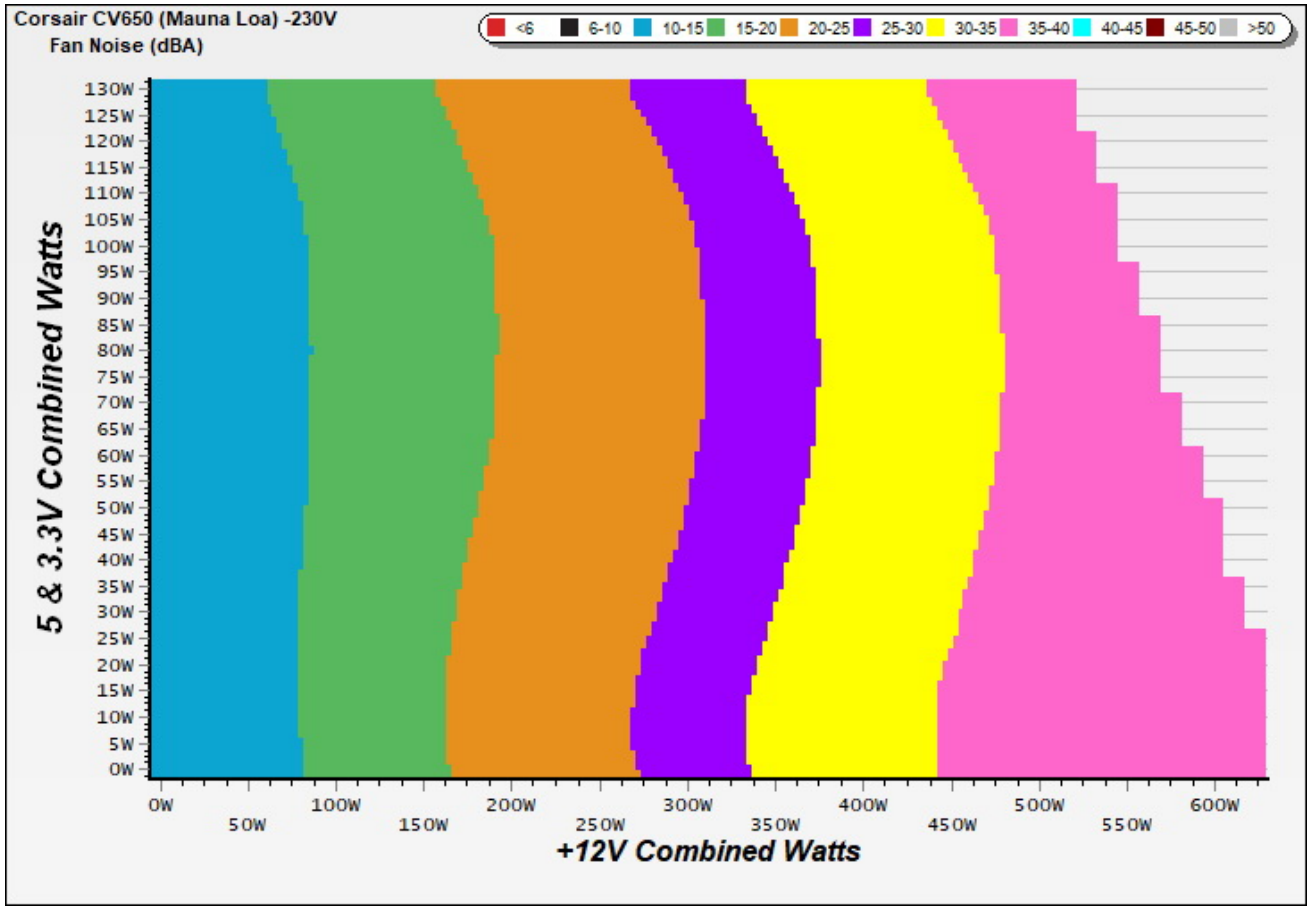
115V



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

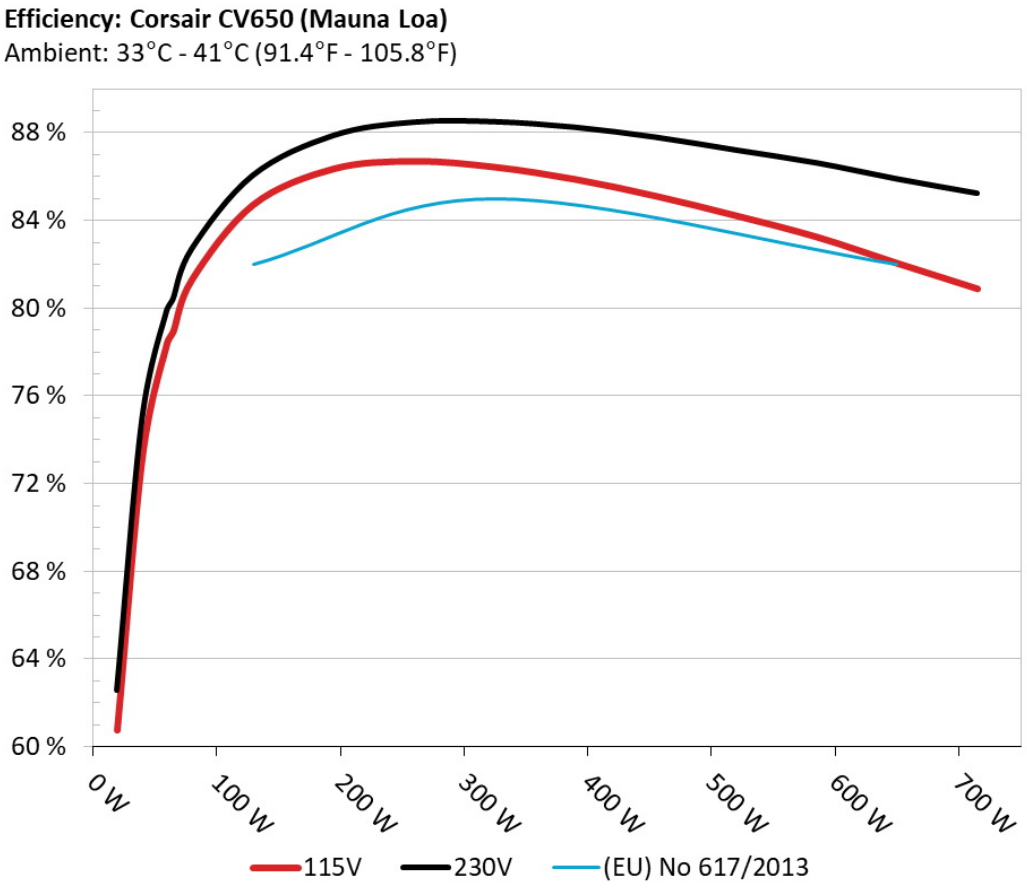


INFO

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

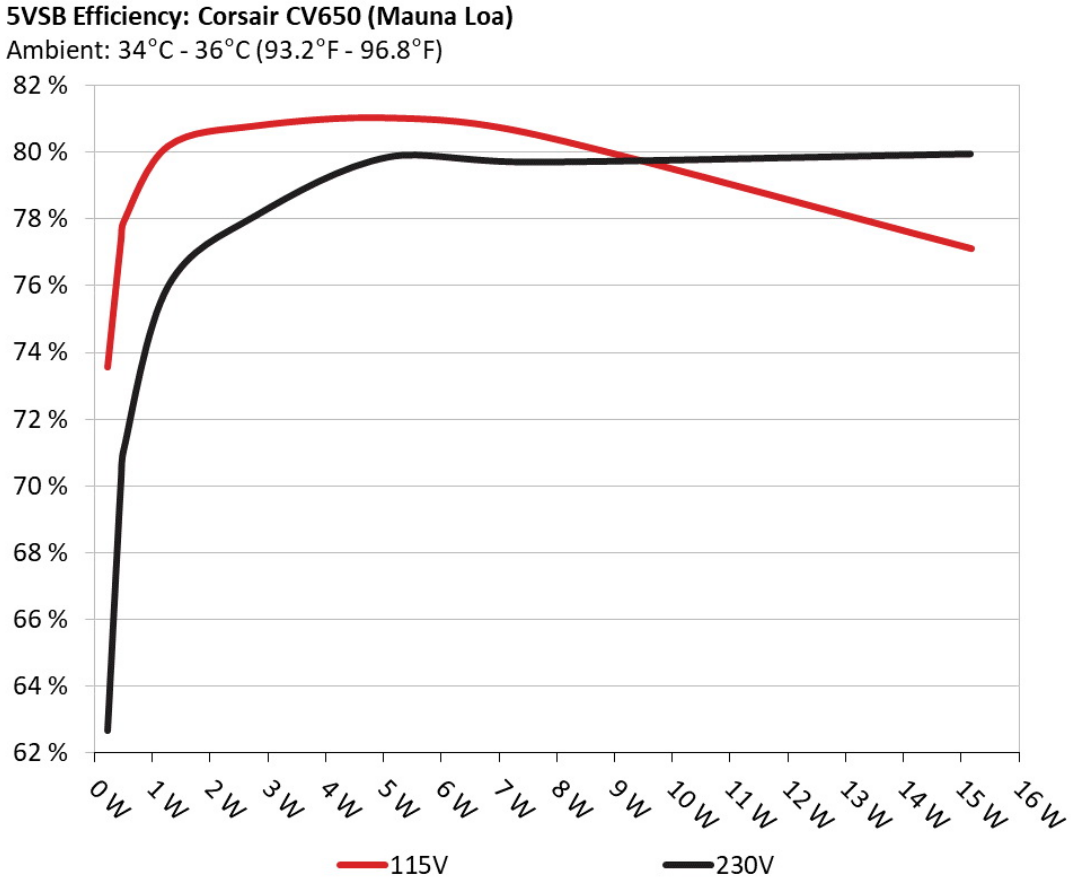
Efficiency under high ambient temperature



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	0.231	73.567%	0.038
	5.113V	0.314		115.15V
2	0.090A	0.461	77.349%	0.071
	5.112V	0.596		115.15V
3	0.550A	2.808	80.783%	0.280
	5.103V	3.476		115.15V
4	1.000A	5.096	81.017%	0.358
	5.094V	6.290		115.16V
5	1.500A	7.629	80.517%	0.400
	5.085V	9.475		115.15V
6	3.000A	15.173	77.110%	0.457
	5.057V	19.677		115.15V

230V

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.230	62.670%	0.013
	5.112V	0.367		230.39V
2	0.090A	0.460	70.122%	0.024
	5.111V	0.656		230.39V
3	0.550A	2.807	78.102%	0.121
	5.103V	3.594		230.37V
4	1.000A	5.095	79.846%	0.191
	5.094V	6.381		230.38V
5	1.500A	7.629	79.693%	0.248
	5.085V	9.573		230.38V
6	3.000A	15.169	79.938%	0.336
	5.056V	18.976		230.39V

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
1	3.543A	1.968A	1.973A	0.984A	64.835	78.921%	695	16.6	35.49°C	0.970
	12.206V	5.078V	3.342V	5.083V	82.152				39.50°C	115.14V
2	8.080A	2.964A	2.968A	1.184A	129.354	84.693%	723	16.9	35.81°C	0.975
	12.184V	5.063V	3.336V	5.067V	152.732				40.17°C	115.14V
3	13.037A	3.466A	3.453A	1.386A	194.466	86.331%	821	20.3	36.64°C	0.982
	12.155V	5.049V	3.330V	5.053V	225.255				41.39°C	115.13V
4	18.026A	3.974A	3.969A	1.588A	259.704	86.675%	974	23.8	36.77°C	0.988
	12.121V	5.036V	3.325V	5.038V	299.630				42.47°C	115.13V
5	22.700A	4.985A	4.972A	1.793A	325.008	86.406%	1148	28.5	37.41°C	0.991
	12.092V	5.019V	3.318V	5.021V	376.142				43.72°C	115.13V
6	27.322A	5.997A	5.979A	1.999A	389.532	85.853%	1316	32.6	38.15°C	0.993
	12.068V	5.003V	3.312V	5.005V	453.721				45.20°C	115.13V
7	32.027A	7.020A	6.990A	2.206A	454.865	85.088%	1474	35.1	38.59°C	0.994
	12.045V	4.985V	3.305V	4.988V	534.579				46.63°C	115.12V
8	36.731A	8.054A	8.005A	2.415A	520.172	84.185%	1628	37.8	39.01°C	0.995
	12.027V	4.967V	3.298V	4.970V	617.888				47.73°C	115.12V
9	41.873A	8.581A	8.504A	2.421A	585.109	83.223%	1798	40.3	39.45°C	0.995
	12.003V	4.954V	3.292V	4.957V	703.058				48.81°C	115.13V
10	46.749A	9.115A	9.039A	3.042A	649.962	82.026%	1925	42.7	40.15°C	0.995
	11.984V	4.938V	3.286V	4.934V	792.390				50.26°C	115.15V
11	52.224A	9.134A	9.056A	3.049A	714.789	80.864%	2000	42.8	40.57°C	0.995
	11.969V	4.927V	3.281V	4.921V	883.935				51.13°C	115.13V
CL1	0.151A	16.000A	16.000A	0.000A	134.511	78.260%	1043	28.4	38.52°C	0.977
	12.176V	4.975V	3.317V	5.052V	171.878				44.80°C	115.16V

CL2	52.020A	1.002A	0.999A	1.000A	637.083	83.071%	1919	42.6	40.91°C	0.996
	11.991V	5.004V	3.304V	4.997V	766.910				50.83°C	115.15V

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
1	3.536A	1.971A	1.974A	0.984A	64.763	80.428%	696	16.6	35.34°C	0.871
	12.206V	5.077V	3.341V	5.082V	80.523				39.42°C	230.32V
2	8.075A	2.964A	2.966A	1.184A	129.278	86.082%	724	16.9	35.98°C	0.923
	12.184V	5.061V	3.335V	5.067V	150.180				40.62°C	230.31V
3	13.029A	3.466A	3.454A	1.386A	194.385	87.903%	797	18.8	36.28°C	0.946
	12.156V	5.049V	3.330V	5.053V	221.136				41.24°C	230.31V
4	18.016A	3.974A	3.969A	1.588A	259.618	88.512%	962	23.7	36.38°C	0.959
	12.123V	5.036V	3.325V	5.038V	293.313				42.23°C	230.31V
5	22.690A	4.980A	4.972A	1.793A	324.909	88.531%	1159	31.5	37.56°C	0.967
	12.094V	5.019V	3.318V	5.022V	366.999				44.20°C	230.31V
6	27.312A	5.998A	5.977A	1.998A	389.426	88.280%	1295	32.3	37.75°C	0.973
	12.069V	5.002V	3.312V	5.005V	441.127				44.89°C	230.31V
7	32.014A	7.022A	6.991A	2.206A	454.746	87.827%	1452	34.5	38.06°C	0.978
	12.046V	4.984V	3.305V	4.988V	517.774				45.77°C	230.31V
8	36.715A	8.053A	8.006A	2.415A	520.051	87.238%	1637	37.9	38.84°C	0.981
	12.029V	4.967V	3.298V	4.970V	596.128				47.25°C	230.30V
9	41.855A	8.581A	8.504A	2.421A	584.979	86.655%	1772	40.1	39.47°C	0.984
	12.005V	4.954V	3.292V	4.958V	675.067				48.80°C	230.30V
10	46.730A	9.114A	9.038A	3.041A	649.818	85.924%	1908	42.6	39.69°C	0.986
	11.986V	4.938V	3.286V	4.935V	756.274				49.60°C	230.32V
11	52.195A	9.133A	9.052A	3.048A	714.635	85.270%	1994	42.8	40.52°C	0.987
	11.973V	4.927V	3.281V	4.923V	838.085				51.03°C	230.32V
CL1	0.142A	16.000A	15.999A	0.000A	134.366	79.639%	1047	26.1	37.51°C	0.932
	12.177V	4.974V	3.316V	5.053V	168.718				44.40°C	230.30V

CL2	52.007A	1.002A	0.997A	1.000A	637.023	86.880%	1877	42.5	39.06°C	0.985
	11.993V	5.003V	3.303V	4.998V	733.219				49.85°C	230.31V

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])	PF/AC Volts
1	1.182A	0.491A	0.477A	0.196A	19.545	60.750%	689	16.2	0.924
	12.223V	5.093V	3.347V	5.107V	32.173				115.14V
2	2.427A	0.979A	0.986A	0.392A	39.920	73.249%	694	16.5	0.949
	12.213V	5.088V	3.345V	5.100V	54.499				115.14V
3	3.606A	1.475A	1.465A	0.589A	59.411	78.310%	706	16.8	0.968
	12.207V	5.082V	3.343V	5.092V	75.866				115.14V
4	4.856A	1.970A	1.973A	0.787A	79.841	81.274%	697	16.6	0.972
	12.201V	5.076V	3.341V	5.084V	98.237				115.14V

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])	PF/AC Volts
1	1.181A	0.490A	0.473A	0.196A	19.519	62.599%	683	15.9	0.689
	12.225V	5.095V	3.347V	5.107V	31.181				230.33V
2	2.423A	0.983A	0.985A	0.392A	39.891	74.987%	677	15.6	0.812
	12.214V	5.088V	3.345V	5.099V	53.197				230.33V
3	3.602A	1.476A	1.465A	0.589A	59.365	79.841%	687	16.1	0.862
	12.207V	5.081V	3.342V	5.092V	74.354				230.33V
4	4.851A	1.970A	1.974A	0.787A	79.779	82.712%	696	16.6	0.890
	12.201V	5.075V	3.340V	5.084V	96.454				230.32V

The results above are not used in the certification process

Ripple Measurements

115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	10.4 mV	15.8 mV	14.8 mV	11.7 mV	Pass
20% Load	15.4 mV	17.1 mV	15.8 mV	13.6 mV	Pass
30% Load	16.5 mV	18.4 mV	17.5 mV	13.8 mV	Pass
40% Load	20.2 mV	19.7 mV	17.9 mV	13.5 mV	Pass
50% Load	23.6 mV	21.0 mV	18.3 mV	14.8 mV	Pass
60% Load	24.3 mV	23.0 mV	20.1 mV	15.7 mV	Pass
70% Load	27.1 mV	24.0 mV	21.2 mV	18.3 mV	Pass
80% Load	31.1 mV	26.1 mV	24.0 mV	23.4 mV	Pass
90% Load	32.3 mV	26.5 mV	23.7 mV	23.4 mV	Pass
100% Load	50.1 mV	30.7 mV	23.9 mV	21.0 mV	Pass
110% Load	56.5 mV	31.0 mV	24.3 mV	23.4 mV	Pass
Crossload 1	25.0 mV	31.3 mV	25.3 mV	19.4 mV	Pass
Crossload 2	49.8 mV	22.6 mV	20.3 mV	16.8 mV	Pass

The results above are not used in the certification process

230V

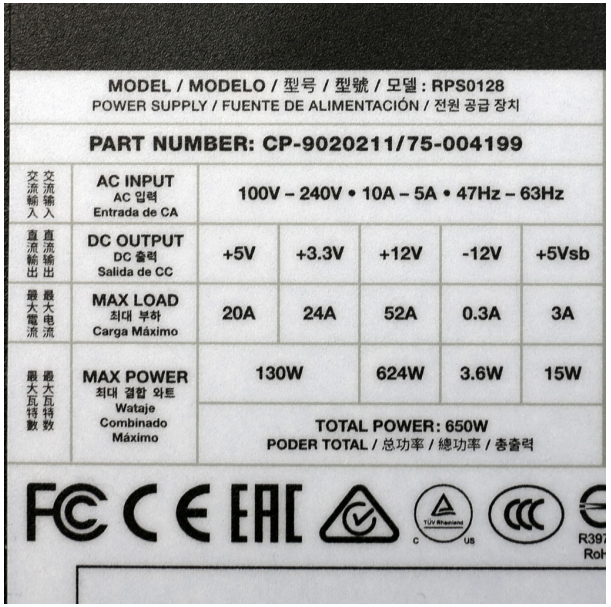
Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	11.60mV	15.80mV	15.40mV	12.00mV	Pass
20% Load	17.20mV	16.90mV	16.00mV	13.40mV	Pass
30% Load	16.70mV	18.60mV	17.40mV	14.50mV	Pass
40% Load	21.40mV	20.10mV	17.40mV	14.40mV	Pass
50% Load	21.90mV	21.00mV	18.40mV	16.10mV	Pass
60% Load	24.30mV	23.50mV	20.00mV	16.10mV	Pass
70% Load	27.80mV	24.40mV	21.30mV	17.70mV	Pass
80% Load	29.10mV	26.00mV	24.80mV	20.90mV	Pass

Test	12V	5V	3.3V	5VSB	Pass/Fail
90% Load	31.70mV	27.70mV	26.90mV	23.80mV	Pass
100% Load	54.00mV	32.20mV	27.50mV	24.90mV	Pass
110% Load	57.70mV	32.10mV	27.80mV	24.90mV	Pass
Crossload1	41.60mV	32.40mV	27.30mV	20.60mV	Pass
Crossload2	51.70mV	24.30mV	21.00mV	18.60mV	Pass

The results above are not used in the certification process

Corsair CV650

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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