Make It Yours.

Cooler Master MWE Bronze 650

Serial Number MPE6501ACAAB1191400013

Lab ID CM19650039

Certification ID 25726

Test Result Report ID: 20PS726A

Certificate Issue Date: Jun 21, 2019

115V 230V

Scheme: ETA-EMI PSU

CYBENETICS SILVER

115V 230V

CYBENETICS STANDARD+

CYBENETICS STANDARD+ 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	Cooler Master
Model	MWE Bronze 650
OEM/ODM	Gospower
Serial Number	MPE6501ACAAB1191400013
Product Specifications	
Manufacturer-Provided Information	
Rated Voltage (Vrms)	100-240
Rated Current (Arms)	10-5
Rated Frequency (Hz)	50-60

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 Fluid Dynamic Bearing Fan (HA1225H12F-Z)
Semi-Passive Operation	✓
Cybenetics Testing Information	
Lab ID	CM19650039
Date of receipt	Jul 5, 2019
Testing Date	May 21, 2019
Report Issued Date	Jun 21, 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 (610mm)	1	1	18-20AWG	No
8 pin EPS12V (630mm) / 4+4 pin EPS12V (120mm)	1	1 / 1	18AWG	No
6+2 pin PCIe (530mm+120mm)	2	4	16-18AWG	No
SATA (530mm+120mm+120mm+120mm)	2	8	18AWG	No
4-pin Molex (520mm+120mm+120mm+120mm)	1	4	18AWG	No
AC Power Cord (1400mm) - C13 coupler	1	1	18AWG	-

Power Specifications

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	20	20	54	3	0.3
	Watts	120		648	15	3.6
Total Max. Power (W)		650				

Parts Description

General Data	
Manufacturer (OEM)	Gospower
PCB Type	Single Sided
Primary Side	
Transient Filter	3x Y caps, 2x X caps, 2x CM chokes
Inrush Protection	NTC Thermistor & Relay
Bridge Rectifier(s)	1x GBU2508 (800V, 25A @ 100°C)
APFC MOSFETS	2x Sanrise Tech SRC60R140B (630V, 11.2A @ 125°C, 0.14Ohm)
APFC Boost Diode	1x Jilin Sino Microelectronics 15F60UHF (600V, 15A @ 100°C)
Hold-up Cap(s)	1x Elite (420V, 560uF, 2000h @ 85°C, GM)
Main Switchers	2x Jilin Sino Microelectronics JCS18N50FH (500V, 11A @ 100°C, 0.27Ohm)
APFC Controller	Champion CM6500UNX
Resonant Controllers	Champion CU6901V
Topology	Primary side: Half-Bridge & LLC converter Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	
+12V MOSFETS	4x Nce Power NCEP40T11K (40V, 85A @ 100°C, 2.8mOhm)
5V & 3.3V	DC-DC Converters: 4x IPS FTD05N03NA (30V, 75A @ 100°C, 6mOhm) PWM Controllers: ANPEC APW7159C
Filtering Capacitors	Electrolytics: 6x Elite (2-5,000h @ 105°C, ED), 4x Elite (2,000h @ 105°C, EL), 1x CapXon (2-5,000h @ 105°C, KF), 1x CapXon (3-10,000h @ 105°C, GH) Polymers: CapXon
Supervisor IC	IN1S313I-SAG
Fan Model	Hong Hua HA1225H12F-Z (120mm, 12V, 0.58A, Fluid Dynamic Bearing Fan)
5VSB Circuit	

Rectifier	-
Standby PWM Controller	On-Bright OB2365SP

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)	86.077%
Average Noise Output (>1450 Load Combinations)	38.27dBA
Average PF (>1450 Load Combinations)	0.976
Efficiency With 10W (≤500W) or 2% (>500W) Load	72.353%
Standby Power Consumption	0.0804W
Non-Accredited	
12V Ripple (Full Load)	33.40mV
5V Ripple (Full Load)	19.51mV
3.3V Ripple (Full Load)	17.19mV
5VSB Ripple (Full Load)	28.39mV
12V Load Regulation	0.97%
5V Load Regulation	1.86%
3.3V Load Regulation	2.07%
5VSB Load Regulation	2.70%
Inrush Current	66.030A

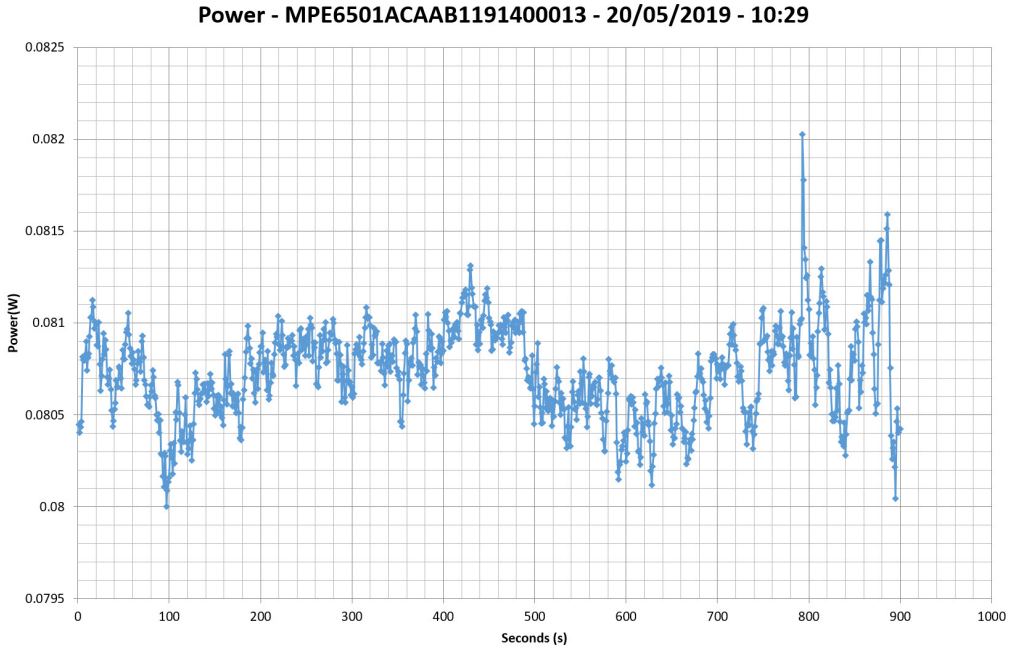
230V		
Accredited		
Average Efficiency (>1450 load combinations)	88.392%	
Average Noise Output (>1450 Load Combinations)	38.95dBA	
Average PF (>1450 Load Combinations)	0.905	
Efficiency With 10W (≤500W) or 2% (>500W) Load	-	
Standby Power Consumption	0.2063W	
Non-Accredited		
12V Ripple (Full Load)	33.26mV	
5V Ripple (Full Load)	19.81mV	
3.3V Ripple (Full Load)	16.75mV	
5VSB Ripple (Full Load)	27.45mV	
12V Load Regulation	0.97%	
5V Load Regulation	1.84%	
3.3V Load Regulation	2.04%	
5VSB Load Regulation	2.63%	
Inrush Current	95.150A	
Hold-Up Time & PWR_OK Signal	22.40ms	
AC Loss to PWR_OK Hold Up Time	20.40ms	
PWR_OK Inactive to DC Loss Delay	2.00ms	
OPP (0.00°C / 0.00°C)	-	-

Hold-Up Time & PWR_OK Signal

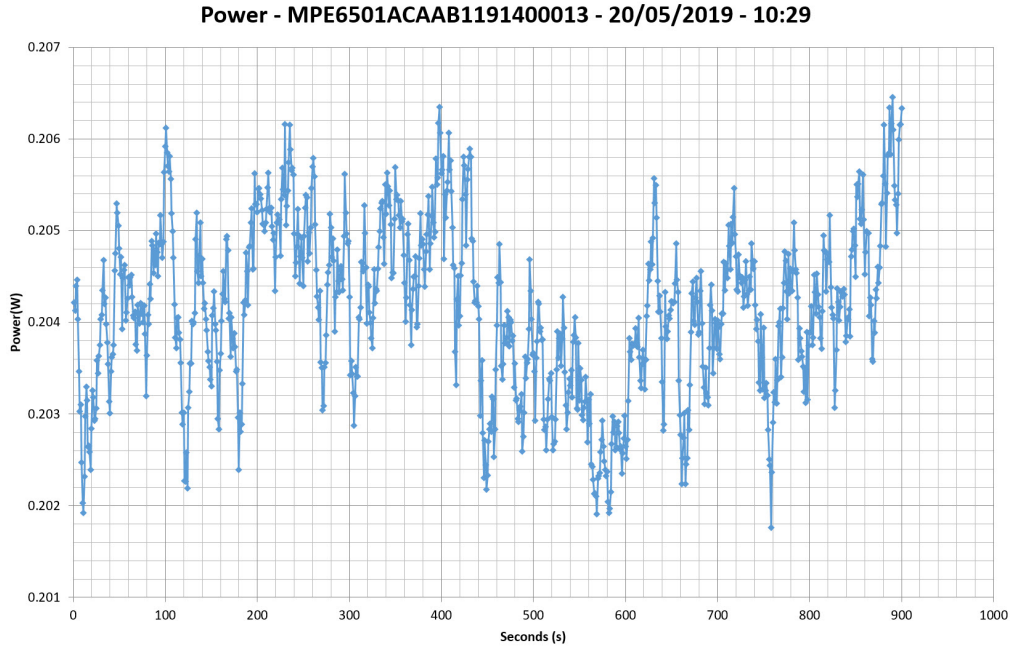
Hold-Up Time (ms)	22.4
AC Loss to PWR_OK Hold Up Time (ms)	20.4
PWR_OK Inactive to DC Loss Delay (ms)	2

Graphs

115V

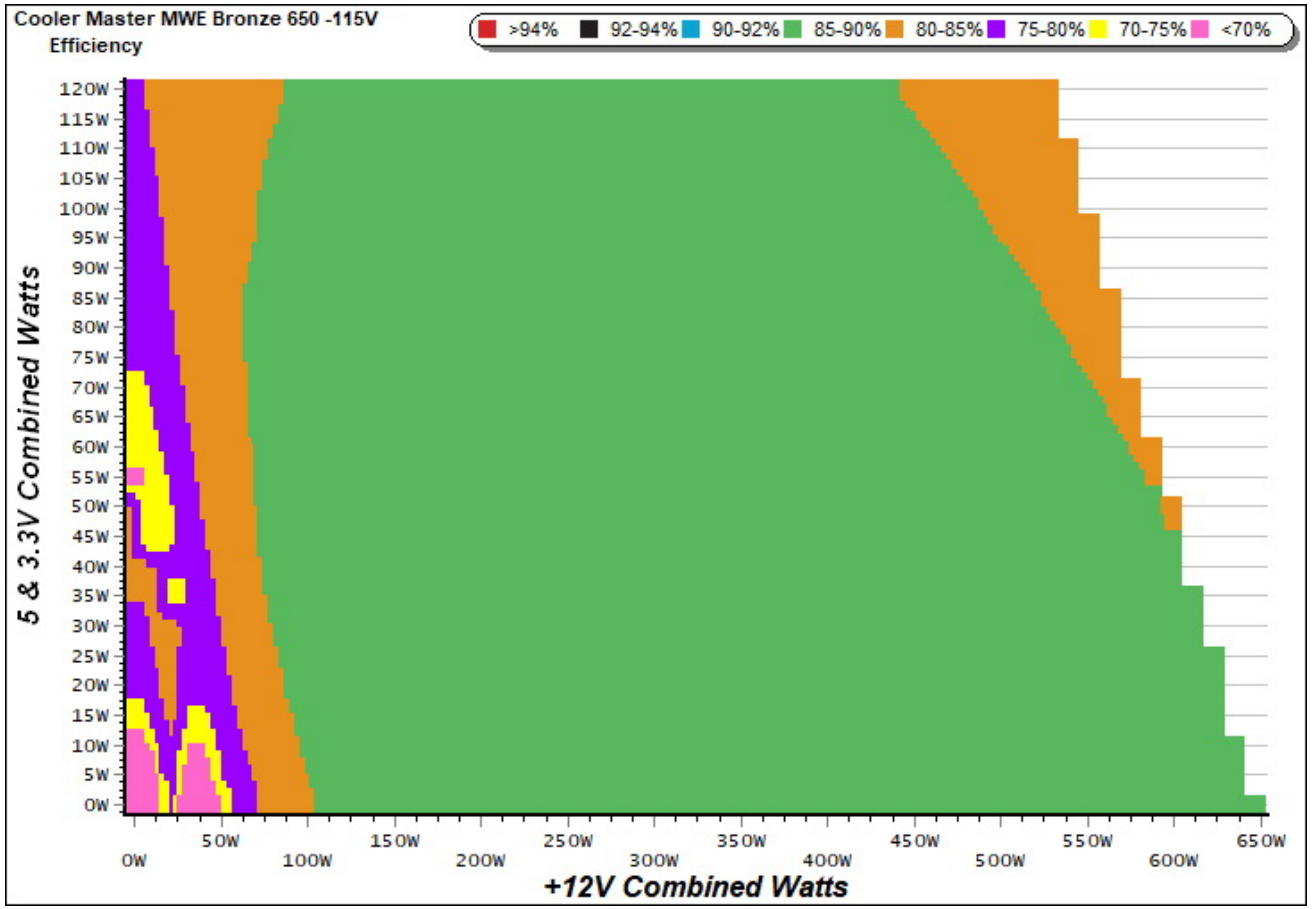


230V



Efficiency Graph

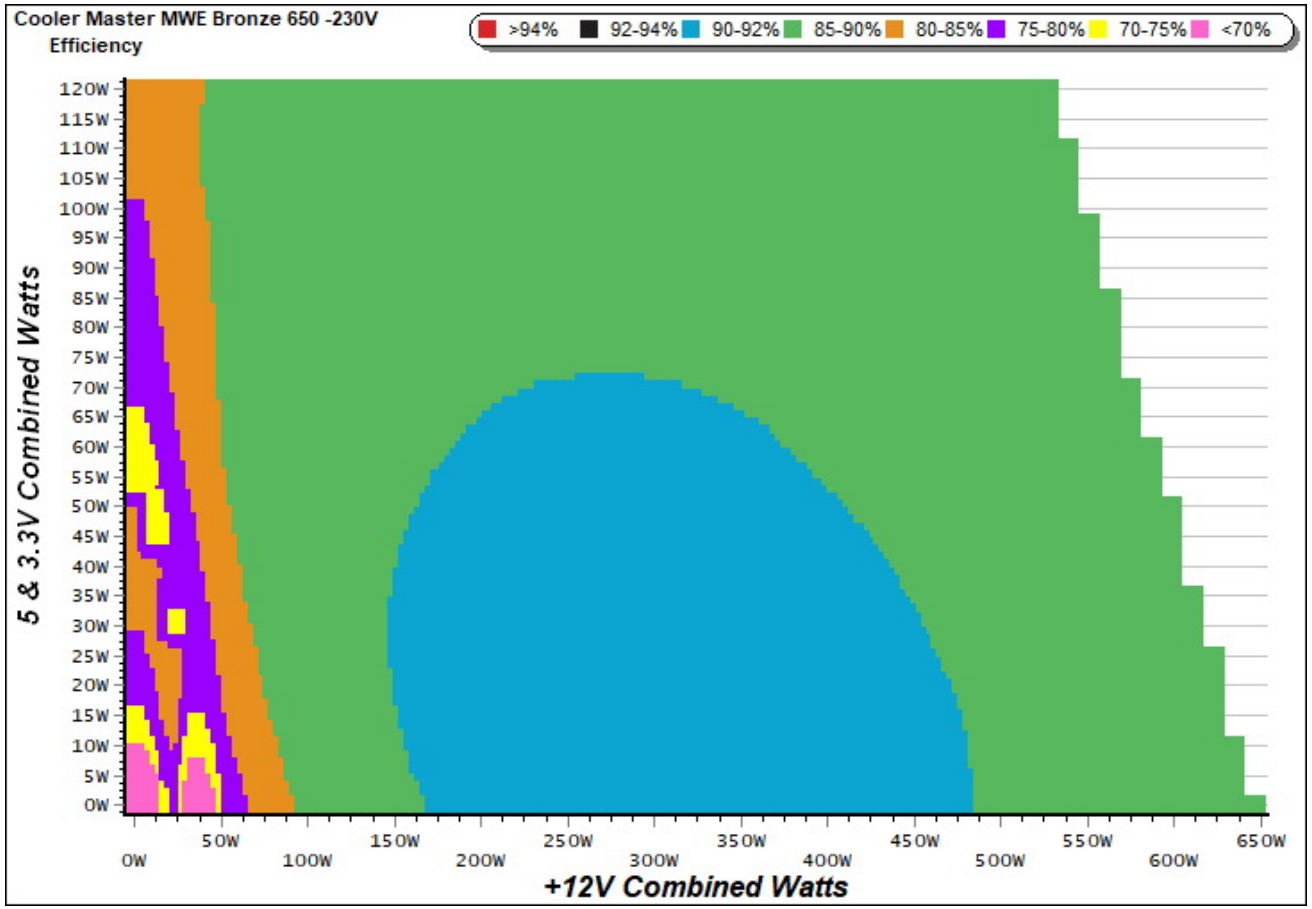
115V



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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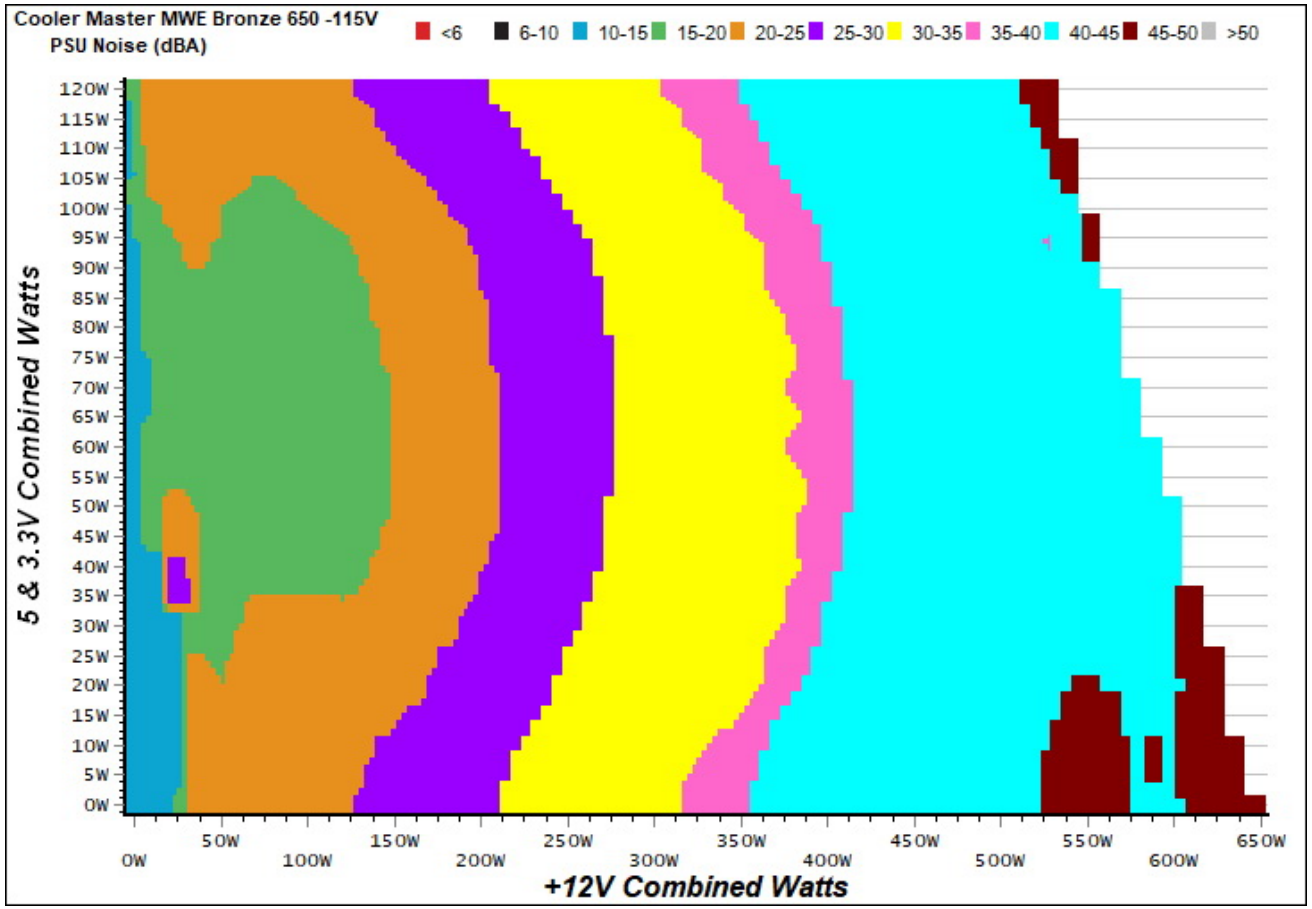
Noise Graph

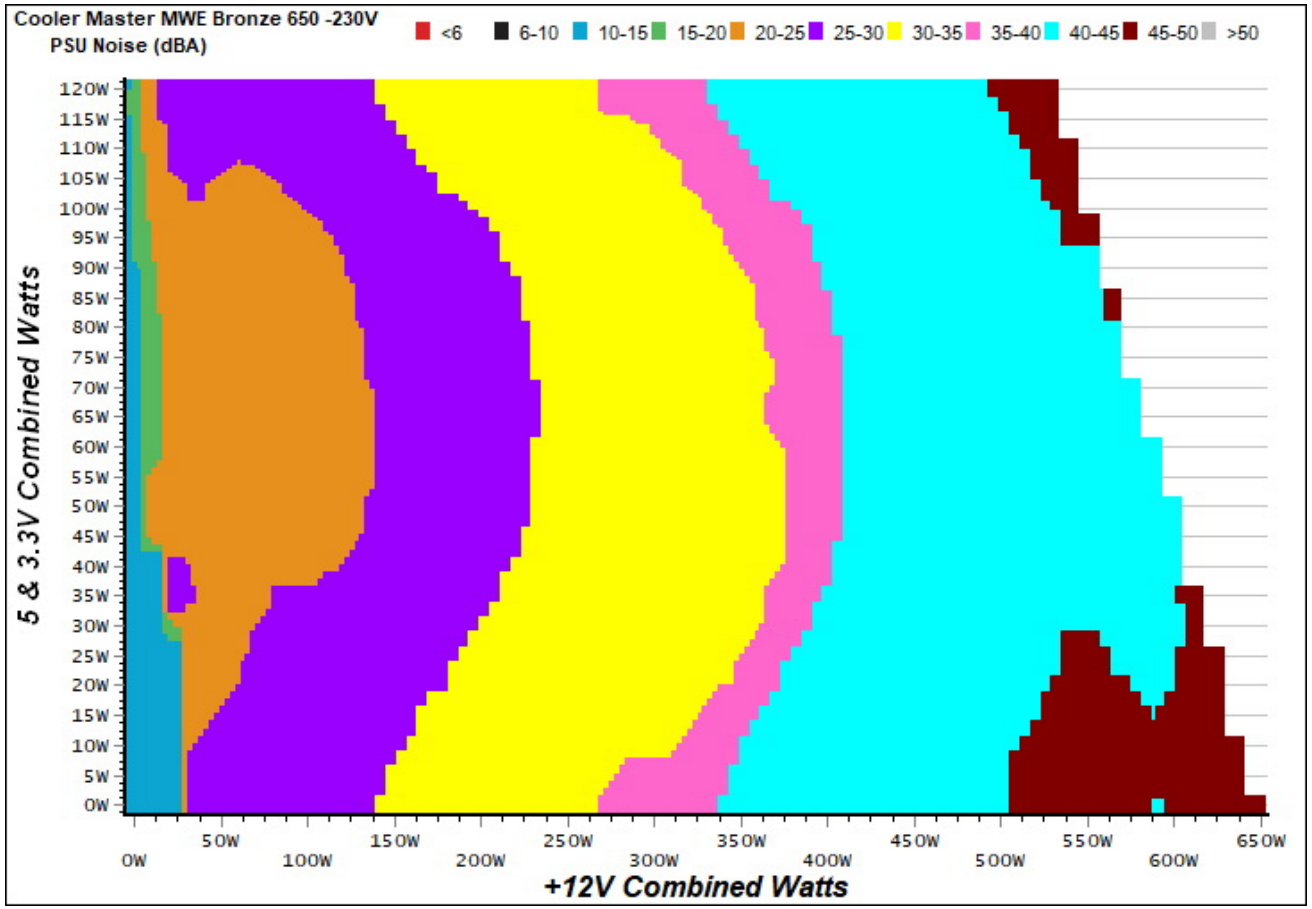
115V



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



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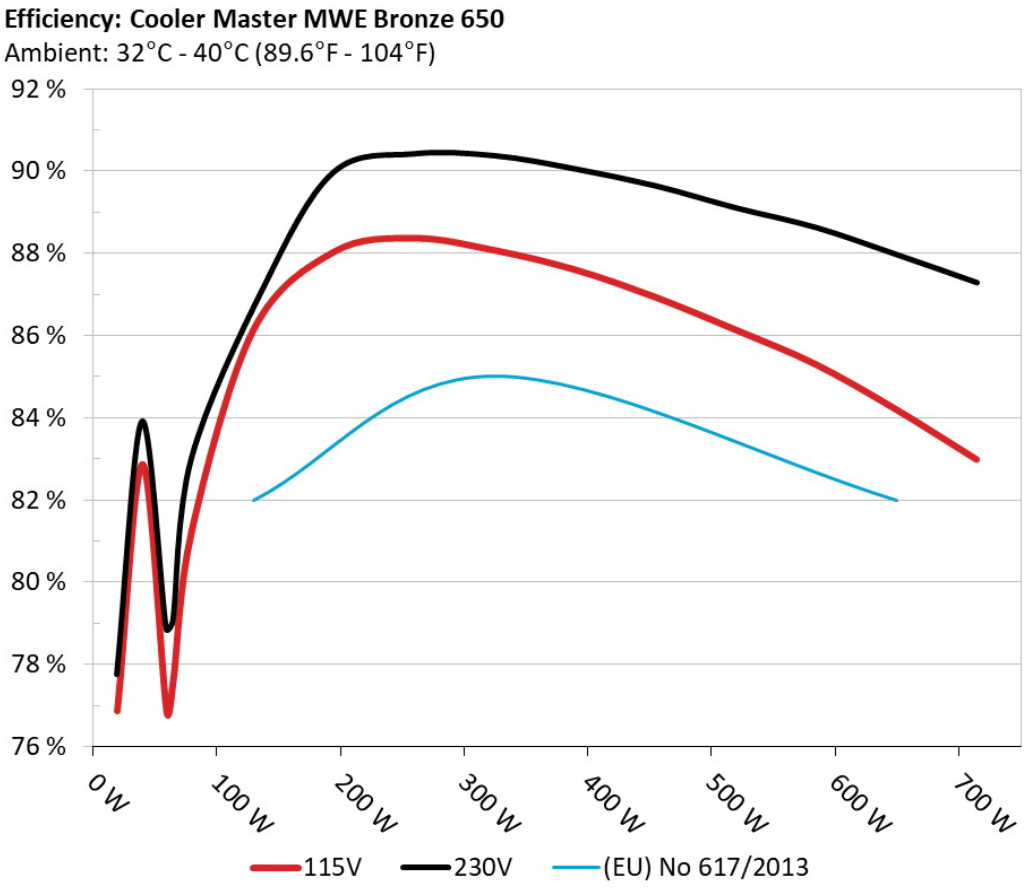
The PSU`s noise in its entire operational range and under 30-32 °C ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails.

Indicative Performance

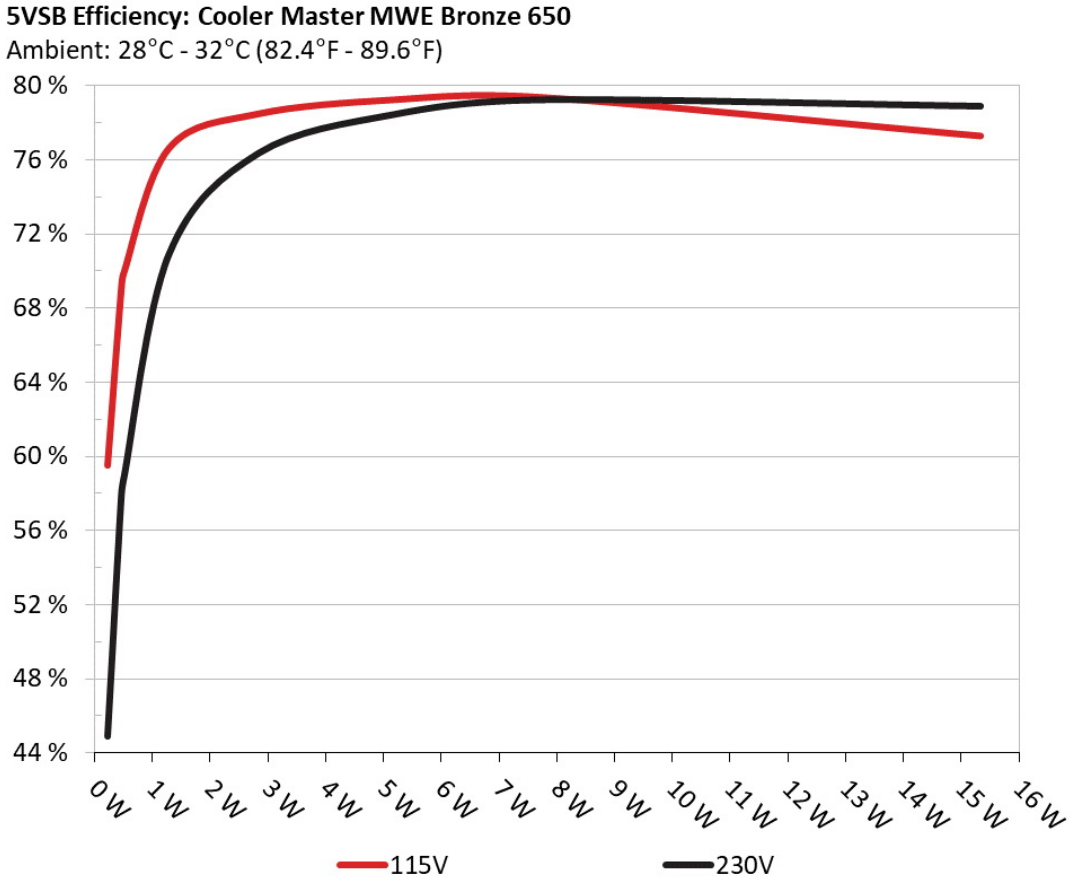
Efficiency under high ambient temperature



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	0.234	59.542%	0.025
	5.188V	0.393		115.15V
2	0.090A	0.468	68.925%	0.043
	5.187V	0.679		115.15V
3	0.550A	2.848	78.457%	0.203
	5.176V	3.630		115.15V
4	1.000A	5.166	79.209%	0.305
	5.165V	6.522		115.15V
5	1.500A	7.730	79.347%	0.372
	5.152V	9.742		115.16V
6	3.000A	15.343	77.267%	0.453
	5.114V	19.857		115.16V

230V

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.234	44.914%	0.010
	5.188V	0.521		230.29V
2	0.090A	0.468	57.707%	0.015
	5.187V	0.811		230.29V
3	0.550A	2.848	76.354%	0.069
	5.176V	3.730		230.33V
4	1.000A	5.166	78.427%	0.117
	5.165V	6.587		230.32V
5	1.500A	7.729	79.231%	0.165
	5.152V	9.755		230.33V
6	3.000A	15.343	78.888%	0.272
	5.114V	19.449		230.30V

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	3.569A	2.004A	1.955A	0.970A	64.893	77.606%	1115	24.1	35.08°C	0.912
	12.131V	4.991V	3.373V	5.156V	83.618				40.81°C	115.12V
2	8.126A	3.012A	2.939A	1.166A	129.381	86.115%	1225	27.2	35.86°C	0.958
	12.120V	4.981V	3.366V	5.145V	150.242				42.13°C	115.12V
3	13.105A	3.519A	3.425A	1.364A	194.475	88.026%	1297	28.7	36.49°C	0.965
	12.092V	4.973V	3.360V	5.133V	220.929				43.17°C	115.11V
4	18.086A	4.030A	3.938A	1.562A	259.692	88.363%	1443	32.1	36.80°C	0.974
	12.080V	4.965V	3.353V	5.122V	293.892				44.17°C	115.11V
5	22.742A	5.046A	4.932A	1.762A	324.972	88.067%	1887	38.4	37.40°C	0.983
	12.069V	4.954V	3.345V	5.110V	369.005				45.28°C	115.11V
6	27.342A	6.070A	5.932A	1.962A	389.495	87.601%	2095	41.2	37.86°C	0.987
	12.058V	4.944V	3.337V	5.097V	444.626				46.36°C	115.11V
7	32.018A	7.098A	6.938A	2.164A	454.804	86.931%	2406	45.1	38.51°C	0.989
	12.046V	4.933V	3.329V	5.085V	523.176				47.65°C	115.11V
8	36.698A	8.129A	7.948A	2.367A	520.110	86.131%	2455	45.9	38.88°C	0.991
	12.036V	4.922V	3.321V	5.072V	603.860				48.74°C	115.11V
9	41.788A	8.649A	8.444A	2.370A	585.014	85.290%	2454	45.9	39.46°C	0.992
	12.025V	4.915V	3.316V	5.065V	685.913				49.83°C	115.10V
10	46.624A	9.172A	8.977A	2.976A	649.858	84.194%	2453	45.9	39.85°C	0.993
	12.014V	4.907V	3.309V	5.042V	771.858				50.78°C	115.10V
11	52.067A	9.183A	8.991A	2.980A	714.680	82.981%	2452	45.9	40.28°C	0.993
	12.003V	4.902V	3.303V	5.036V	861.260				51.78°C	115.10V
CL1	0.139A	14.001A	13.999A	0.000A	117.437	78.674%	2185	42.8	37.01°C	0.956
	12.109V	4.924V	3.344V	5.159V	149.271				45.89°C	115.12V

CL2	54.005A	1.002A	1.002A	1.000A	662.490	84.869%	2457	45.9	39.70°C	0.993
	12.019V	4.955V	3.330V	5.103V	780.603				50.81°C	115.10V

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	3.565A	2.004A	1.955A	0.970A	64.841	79.060%	1047	22.1	34.01°C	0.649
	12.130V	4.991V	3.373V	5.156V	82.015				39.74°C	230.25V
2	8.122A	3.014A	2.943A	2.942A	138.335	87.198%	1064	22.8	34.41°C	0.832
	12.119V	4.978V	3.363V	5.100V	158.645				40.49°C	230.24V
3	13.103A	3.520A	3.422A	1.364A	194.429	89.978%	1131	24.9	35.24°C	0.870
	12.091V	4.973V	3.359V	5.133V	216.085				41.79°C	230.25V
4	18.085A	4.027A	3.937A	1.562A	259.662	90.432%	1340	29.9	35.71°C	0.907
	12.080V	4.965V	3.353V	5.122V	287.134				42.67°C	230.25V
5	22.742A	5.048A	4.931A	1.761A	324.951	90.386%	1609	33.1	36.04°C	0.935
	12.068V	4.954V	3.345V	5.110V	359.515				43.82°C	230.25V
6	27.344A	6.071A	5.933A	1.962A	389.468	90.067%	2007	41.2	36.98°C	0.945
	12.056V	4.943V	3.337V	5.098V	432.421				45.23°C	230.26V
7	32.020A	7.098A	6.940A	2.163A	454.792	89.653%	2212	42.8	37.16°C	0.953
	12.045V	4.932V	3.329V	5.086V	507.278				45.83°C	230.25V
8	36.703A	8.129A	7.948A	2.366A	520.084	89.114%	2456	45.9	37.80°C	0.960
	12.034V	4.921V	3.321V	5.073V	583.619				47.17°C	230.25V
9	41.795A	8.651A	8.447A	2.369A	585.014	88.635%	2452	45.9	38.34°C	0.964
	12.023V	4.914V	3.315V	5.066V	660.029				48.63°C	230.26V
10	46.628A	9.175A	8.977A	2.975A	649.854	87.979%	2452	45.9	39.66°C	0.967
	12.013V	4.906V	3.308V	5.043V	738.646				50.82°C	230.26V
11	52.066A	9.183A	8.993A	2.980A	714.675	87.296%	2448	45.9	40.30°C	0.969
	12.003V	4.902V	3.303V	5.036V	818.676				52.19°C	230.26V
CL1	0.144A	14.004A	13.998A	0.000A	117.481	80.031%	2226	42.9	35.99°C	0.811
	12.110V	4.923V	3.343V	5.158V	146.795				43.35°C	230.27V

CL2	54.016A	1.002A	1.000A	1.000A	662.507	88.503%	2455	45.9	39.91°C	0.967
	12.017V	4.954V	3.329V	5.103V	748.569				50.78°C	230.28V

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	1.197A	0.498A	0.473A	0.193A	19.588	76.864%	0	<6.0	0.693
	12.111V	5.004V	3.381V	5.182V	25.484				115.12V
2	2.447A	1.001A	0.975A	0.387A	39.965	82.862%	0	<6.0	0.868
	12.122V	5.000V	3.379V	5.175V	48.231				115.12V
3	3.634A	1.502A	1.450A	0.581A	59.489	76.855%	1018	21.2	0.919
	12.132V	4.996V	3.376V	5.167V	77.404				115.12V
4	4.887A	2.004A	1.957A	0.775A	79.867	81.256%	1091	23.9	0.948
	12.128V	4.990V	3.372V	5.160V	98.290				115.12V

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	1.194A	0.500A	0.472A	0.193A	19.560	77.761%	0	<6.0	0.329
	12.112V	5.006V	3.383V	5.181V	25.154				230.25V
2	2.444A	0.999A	0.977A	0.387A	39.930	83.922%	0	<6.0	0.494
	12.123V	5.002V	3.380V	5.174V	47.580				230.25V
3	3.631A	1.502A	1.449A	0.581A	59.444	78.874%	972	20.1	0.627
	12.131V	4.995V	3.376V	5.167V	75.366				230.25V
4	4.884A	2.004A	1.954A	0.775A	79.817	83.021%	1077	23.3	0.699
	12.127V	4.990V	3.372V	5.160V	96.141				230.25V

The results above are not used in the certification process

Ripple Measurements

115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	13.6 mV	15.7 mV	9.1 mV	18.2 mV	Pass
20% Load	9.0 mV	15.8 mV	9.7 mV	16.8 mV	Pass
30% Load	25.7 mV	15.5 mV	10.0 mV	17.4 mV	Pass
40% Load	24.5 mV	15.9 mV	10.9 mV	17.1 mV	Pass
50% Load	24.1 mV	16.0 mV	11.0 mV	18.1 mV	Pass
60% Load	21.9 mV	16.9 mV	13.4 mV	21.0 mV	Pass
70% Load	24.0 mV	16.7 mV	14.6 mV	21.7 mV	Pass
80% Load	23.2 mV	17.0 mV	16.6 mV	23.5 mV	Pass
90% Load	22.5 mV	18.3 mV	17.9 mV	24.2 mV	Pass
100% Load	33.4 mV	19.5 mV	17.2 mV	28.4 mV	Pass
110% Load	33.9 mV	19.7 mV	18.6 mV	30.6 mV	Pass
Crossload 1	21.7 mV	24.3 mV	18.2 mV	17.5 mV	Pass
Crossload 2	31.8 mV	18.5 mV	11.8 mV	25.7 mV	Pass

The results above are not used in the certification process

230V

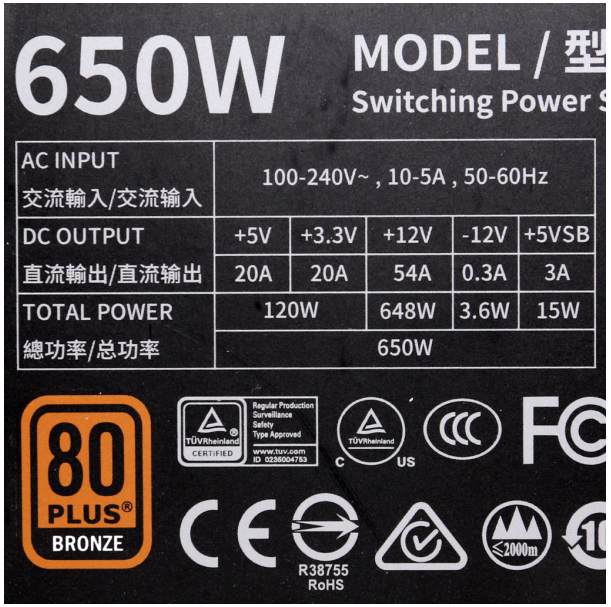
Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	12.6 mV	16.3 mV	9.8 mV	18.8 mV	Pass
20% Load	7.9 mV	15.8 mV	9.4 mV	19.4 mV	Pass
30% Load	26.4 mV	15.9 mV	10.5 mV	17.3 mV	Pass
40% Load	24.1 mV	15.8 mV	10.7 mV	17.0 mV	Pass
50% Load	23.0 mV	16.5 mV	11.4 mV	17.9 mV	Pass
60% Load	21.8 mV	16.5 mV	13.2 mV	18.2 mV	Pass
70% Load	22.6 mV	16.4 mV	14.1 mV	21.0 mV	Pass
80% Load	22.6 mV	17.4 mV	16.4 mV	21.1 mV	Pass

Test	12V	5V	3.3V	5VSB	Pass/Fail
90% Load	22.1 mV	18.5 mV	16.6 mV	23.4 mV	Pass
100% Load	33.3 mV	19.8 mV	16.8 mV	27.5 mV	Pass
110% Load	33.6 mV	20.7 mV	18.0 mV	26.8 mV	Pass
Crossload 1	24.6 mV	25.3 mV	18.3 mV	17.4 mV	Pass
Crossload 2	33.3 mV	18.3 mV	11.8 mV	22.2 mV	Pass

The results above are not used in the certification process

Cooler Master MWE Bronze 650

Top side



Power specifications label