Make It Yours.

Cooler Master MWE Gold 650

Serial Number MPY6501AFAAG1192800444

Lab ID CM19650126

Certification ID 25875

Test Result Report ID: 19PS875A

Certificate Issue Date: Oct 22, 2019

Scheme: ETA-EMI PSU

115V

230V

115V

230V

Scheme: LAMBDA PSU

Aristeidis Bitziopoulos, Certification Body General Manager

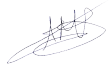
General Information

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	Cooler Master
Model	MWE Gold 650
OEM/ODM	Huizhou Xin Hui Yuan Tech.
Serial Number	MPY6501AFAAG1192800444
Product Specifications	
Manufacturer-Provided Information	
Rated Voltage (Vrms)	100-240
Rated Current (Arms)	8.5
Rated Frequency (Hz)	50-60

Rated Power (W)	650
Operating Temperature (Continuous Full Load) (°C)	
Type	ATX12V
Cable Design	Fully Modular
Warranty	-
Cybenetics Measurements	
Dimensions (W x H x D)	
Weight	
Cooling	120mm Rifle Bearing Fan (DF1202512RFLN)
Semi-Passive Operation	✓
Cybenetics Testing Information	
Lab ID	CM19650126
Date of receipt	Sep 26, 2019
Testing Date	Oct 10, 2019
Report Issued Date	Oct 22, 2019
Engineer Name	-
Authorized By the Laboratory Technical Manager	Aristeidis Bitziopoulos
Signature	

Cables and Connectors(Non-accredited measurements)

Modular Cables				
Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors
ATX connector 20+4 pin (610mm)	1	1	18-22AWG	No
8 pin EPS12V (660mm) / 4+4 pin EPS12V (120mm)	1	2	16-18AWG	No
6+2 pin PCIe (610mm+120mm)	2	4	16-18AWG	No
SATA (400mm+120mm+120mm+120mm)	2	8	18AWG	No
4-pin Molex (410mm+120mm+120mm)	1	3	18AWG	No
4-pin Molex (410mm+120mm+120mm) / FDD (+120mm)	1	3 / 1	18-22AWG	No
AC Power Cord (1380mm) - C13 coupler	1	1	18AWG	-

Power Specifications

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	15	15	54.1	2.5	0.3
	Watts	100		649.2	12.5	3.6
Total Max. Power (W)		650				

Parts Description

General Data	
Manufacturer (OEM)	Huizhou Xin Hui Yuan Tech
PCB Type	Double Sided
Primary Side	
Transient Filter	4x Y caps, 3x X caps, 2x CM chokes, 1x MOV
Inrush Protection	NTC Thermistor & Relay
Bridge Rectifier(s)	1x GBU15J (600V, 15A @ 100°C)
APFC MOSFETS	2x NCE Power NCE65T180F (650V, 13.2A @ 100°C, 0.18Ohm)
APFC Boost Diode	1x ON Semiconductor RHRP1560 (600V, 15A @ 140°C)
Hold-up Cap(s)	1x Elite (400V, 390uF, 2,000h @ 85°C, GM)
Main Switchers	4x Champion GPT10N50AD (500V, 9.7A, 0.7Ohm)
APFC Controller	ON Semiconductor NCP1654
Resonant Controllers	Champion CM6901T6
Topology	Primary side: Full-Bridge & LLC converter Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	
+12V MOSFETS	2x Excelliance MOS Corp EMP16N04HS (40V, 100A @ 100°C, 1.6mOhm)
5V & 3.3V	DC-DC Converters:4x Excelliance MOS Corp EMB06N03HR (30V, 45A @ 100°C, 6mOhm) PWM Controllers: uPI Semi uP3861P
Filtering Capacitors	Electrolytics: 13x Elite (4-10,000h @ 105°C, EY) Polymers: 10x Elite
Supervisor IC	Sitronix ST9S313-DAG (OVP, UVP, SCP)
Fan Model	CoolerMaster (A12025-25RB-3IN-F1) DF1202512RFLN (120mm, 12V, 0.16A, Rifle Bearing Fan)
5VSB Circuit	

Rectifier	1x ON Semiconductor MBR2045CTG SBR (45V, 20A @ 163°C)
Standby PWM Controller	Infineon ICE2QR4765

Test Results

Temperature & Compliance Info

Temperature Range (°C /°F)	28-32 / 82.4-89.6
ErP Lot 3/6 Ready	ErP Lot 6 2010: ✓ ErP Lot 6 2013: ✓ ErP Lot 3 2014 & CEC: Partially
(EU) No 617/2013 Compliance	✓

Performance Summary

115V

Accredited	
Average Efficiency (>1450 load combinations)	88.138%
Average Noise Output (>1450 Load Combinations)	35.29dBA
Average PF (>1450 Load Combinations)	0.990
Efficiency With 10W (≤500W) or 2% (>500W) Load	61.102%
Standby Power Consumption	0.0891W
Non-Accredited	
12V Ripple (Full Load)	51.27mV
5V Ripple (Full Load)	16.41mV
3.3V Ripple (Full Load)	21.17mV
5VSB Ripple (Full Load)	13.11mV
12V Load Regulation	0.88%
5V Load Regulation	1.69%
3.3V Load Regulation	2.60%
5VSB Load Regulation	3.01%
Inrush Current	32.742A

230V		
Accredited		
Average Efficiency (>1450 load combinations)		90.259%
Average Noise Output (>1450 Load Combinations)		35.35dBA
Average PF (>1450 Load Combinations)		0.952
Efficiency With 10W (≤500W) or 2% (>500W) Load		-
Standby Power Consumption		0.1426W
Non-Accredited		
12V Ripple (Full Load)		51.22mV
5V Ripple (Full Load)		16.65mV
3.3V Ripple (Full Load)		20.56mV
5VSB Ripple (Full Load)		12.81mV
12V Load Regulation		0.86%
5V Load Regulation		1.75%
3.3V Load Regulation		2.58%
5VSB Load Regulation		2.95%
Inrush Current		79.619A
Hold-Up Time & PWR_OK Signal		14.60ms
AC Loss to PWR_OK Hold Up Time		13.50ms
PWR_OK Inactive to DC Loss Delay		1.10ms
PSU Timings: T1 (20% / 100%)	80.0ms	84.0ms
PSU Timings: T3 (20% / 100%)	268.0ms	264.0ms
OPP (0.00°C / 0.00°C)	116.16%	-

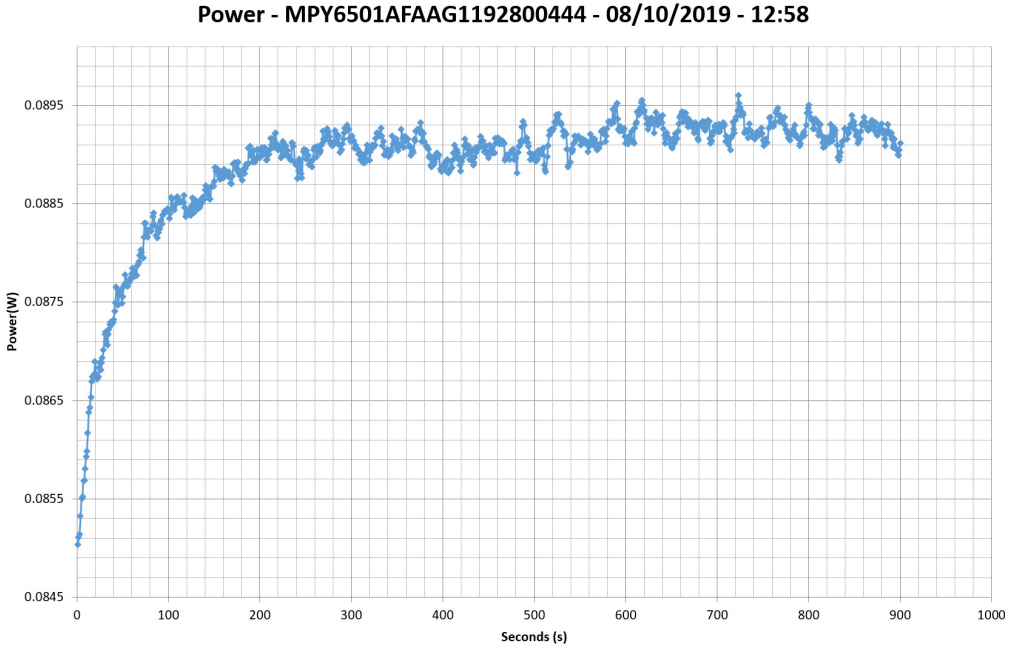
Hold-Up Time & PWR_OK Signal

Hold-Up Time (ms)	14.6
AC Loss to PWR_OK Hold Up Time (ms)	13.5
PWR_OK Inactive to DC Loss Delay (ms)	1.1

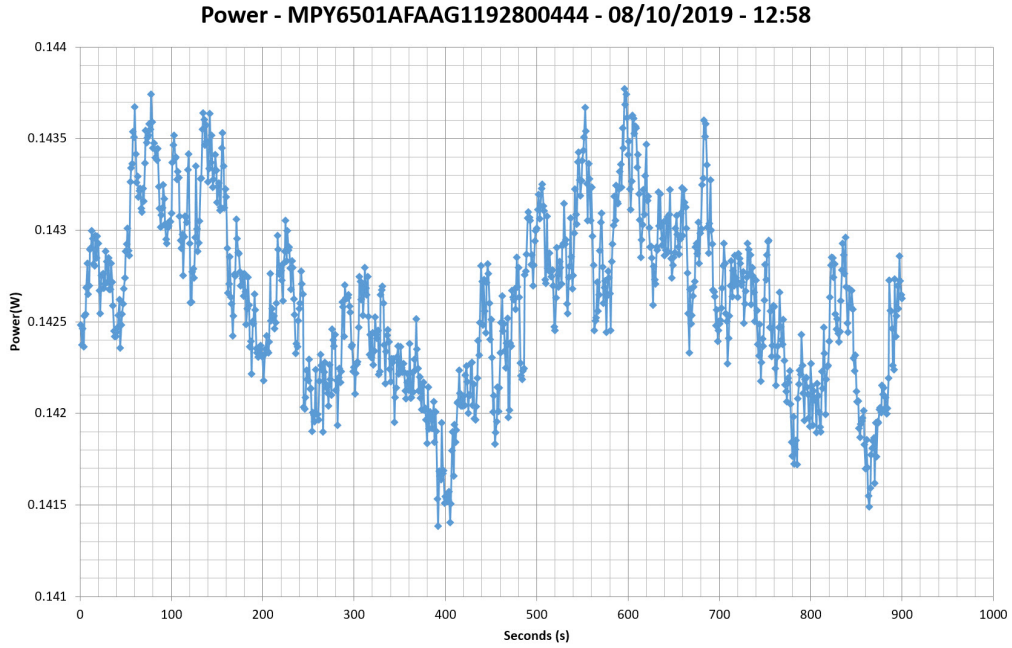
Vampire Power

Graphs

115V

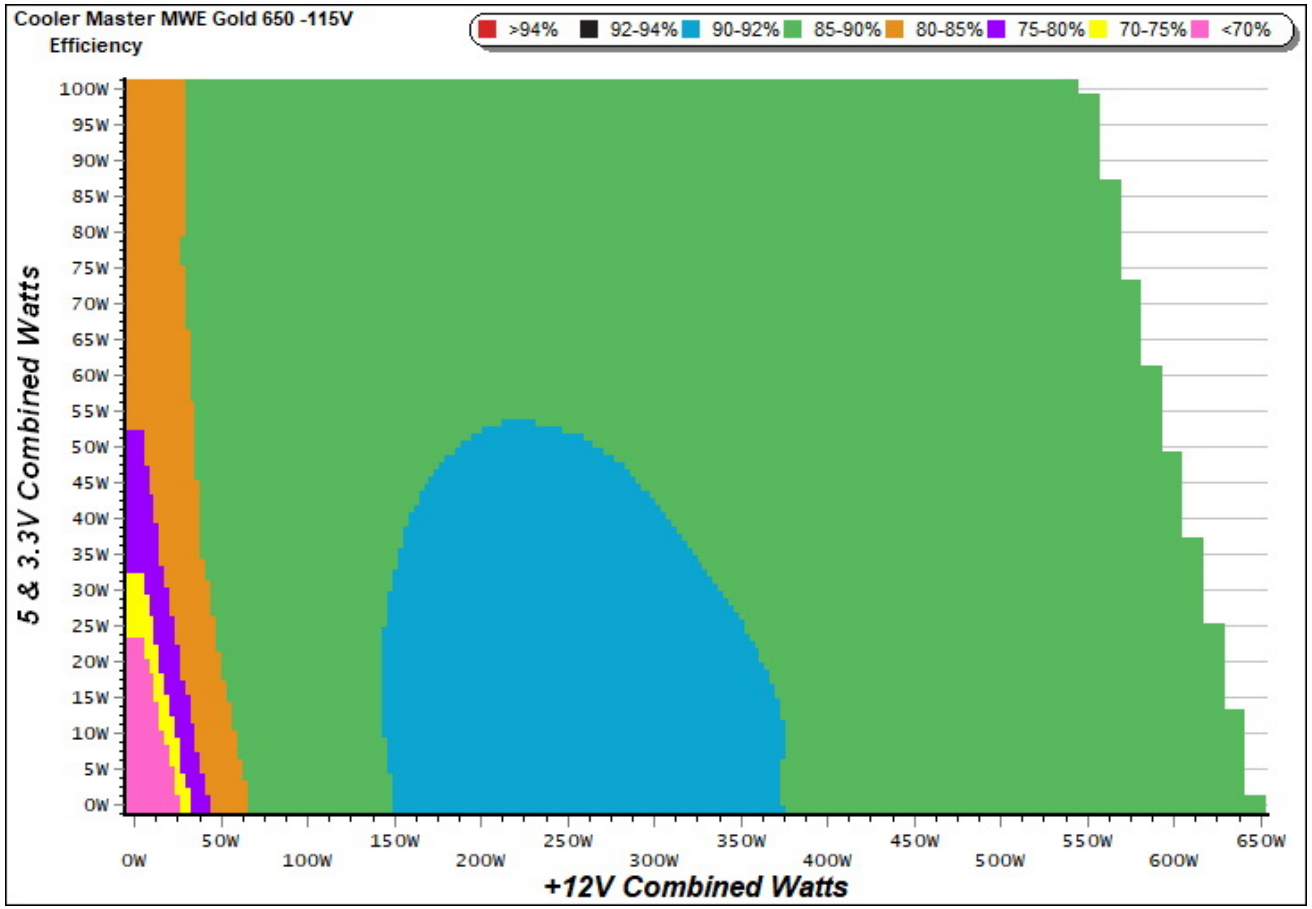


230V



Efficiency Graph

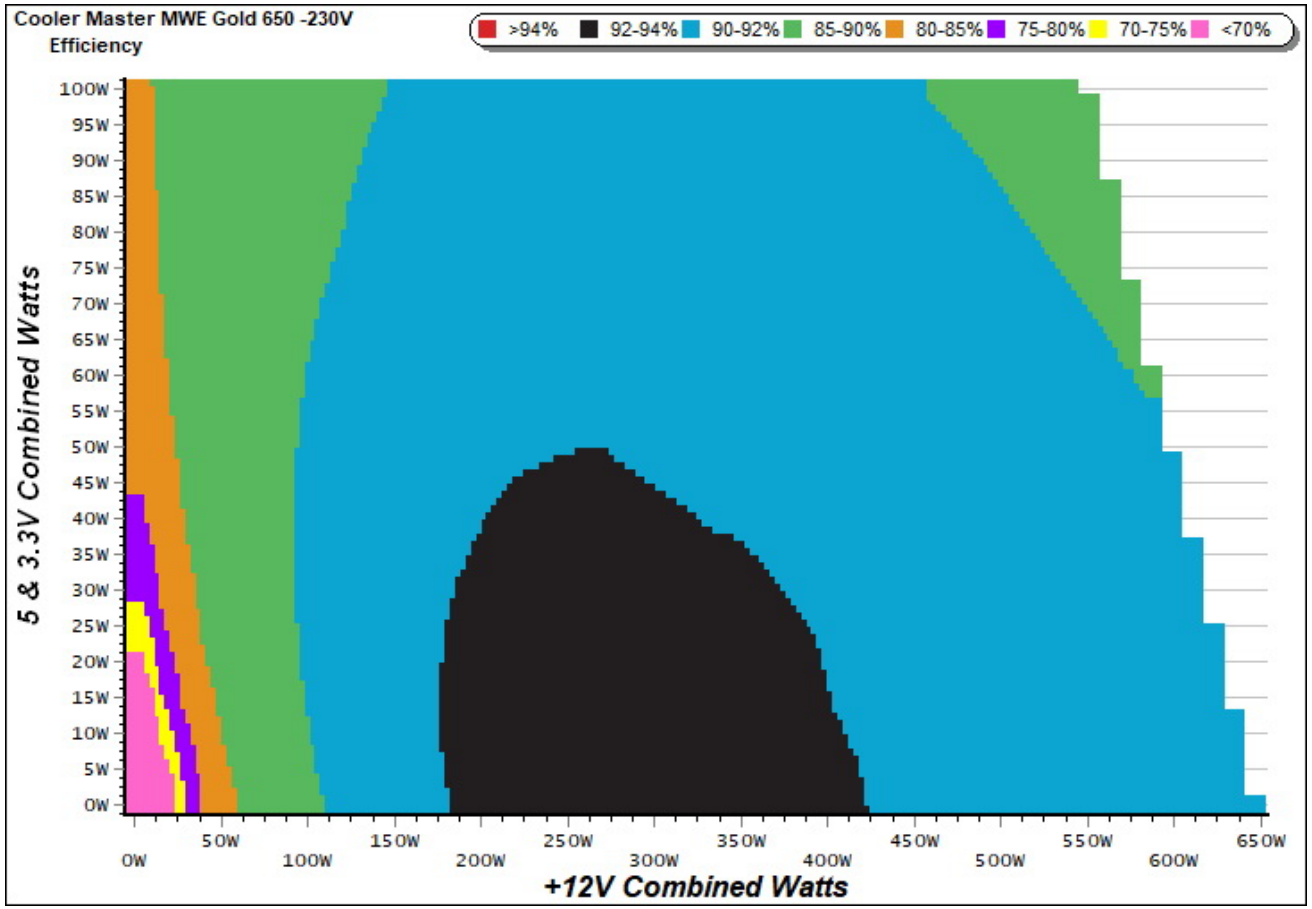
115V



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



INFO

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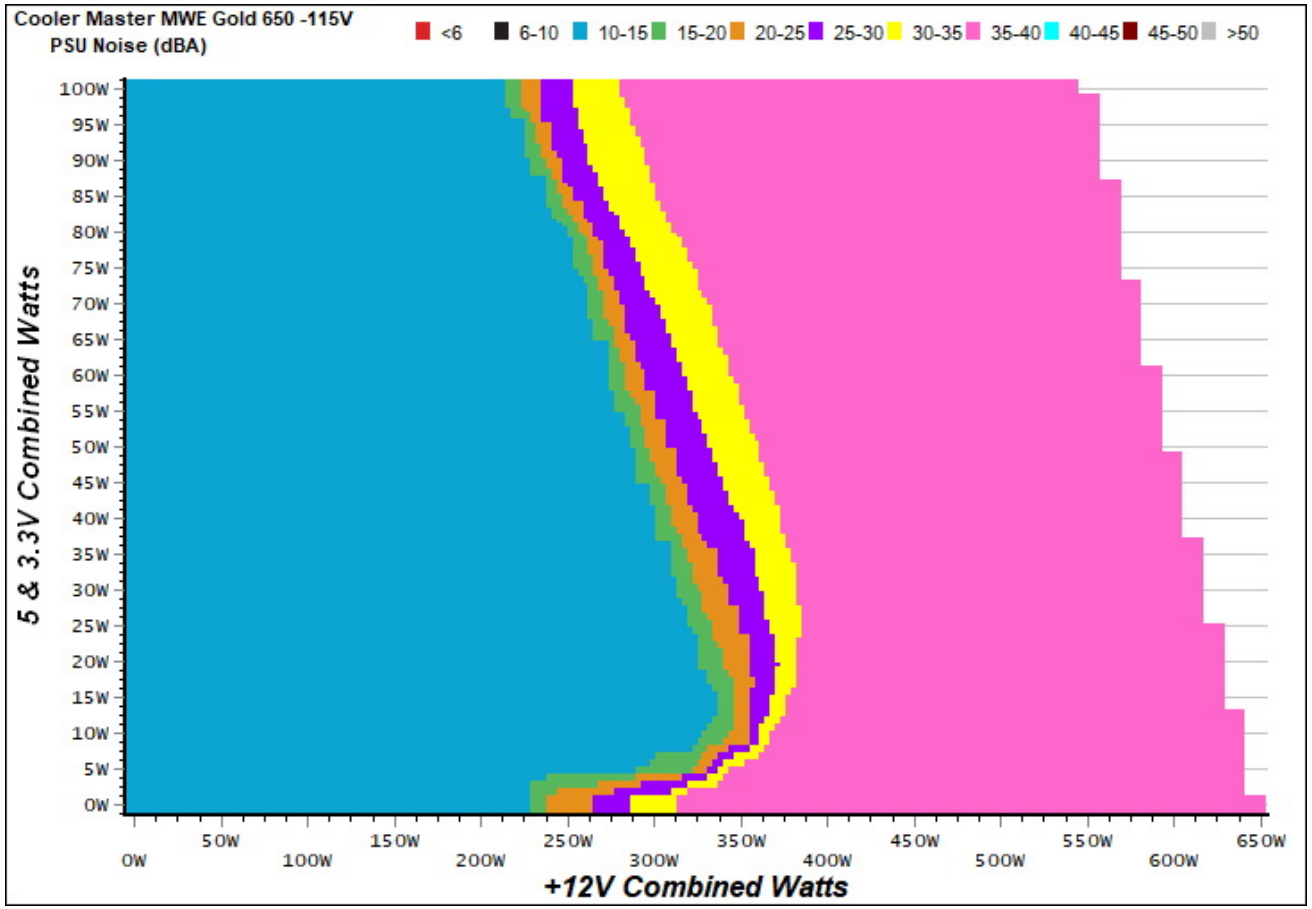
Noise Graph

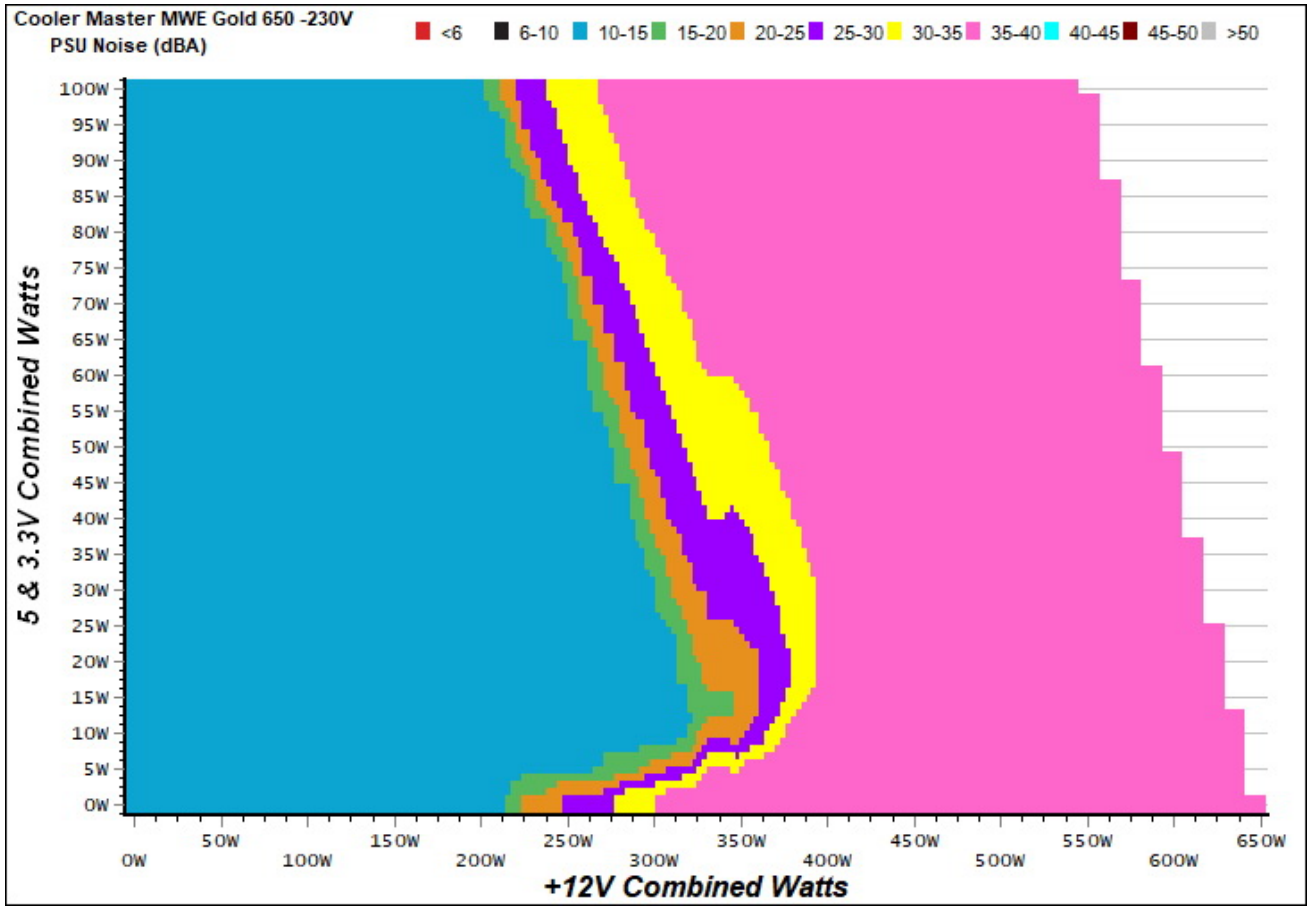
115V



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

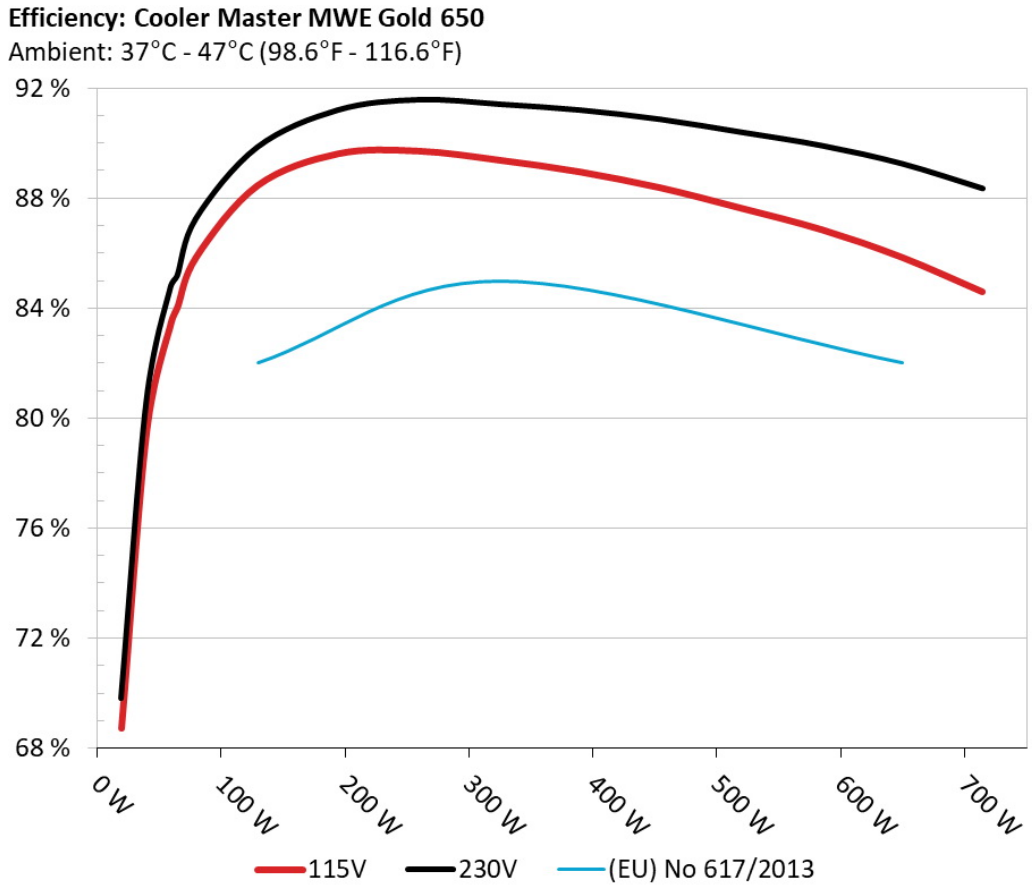


INFO

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

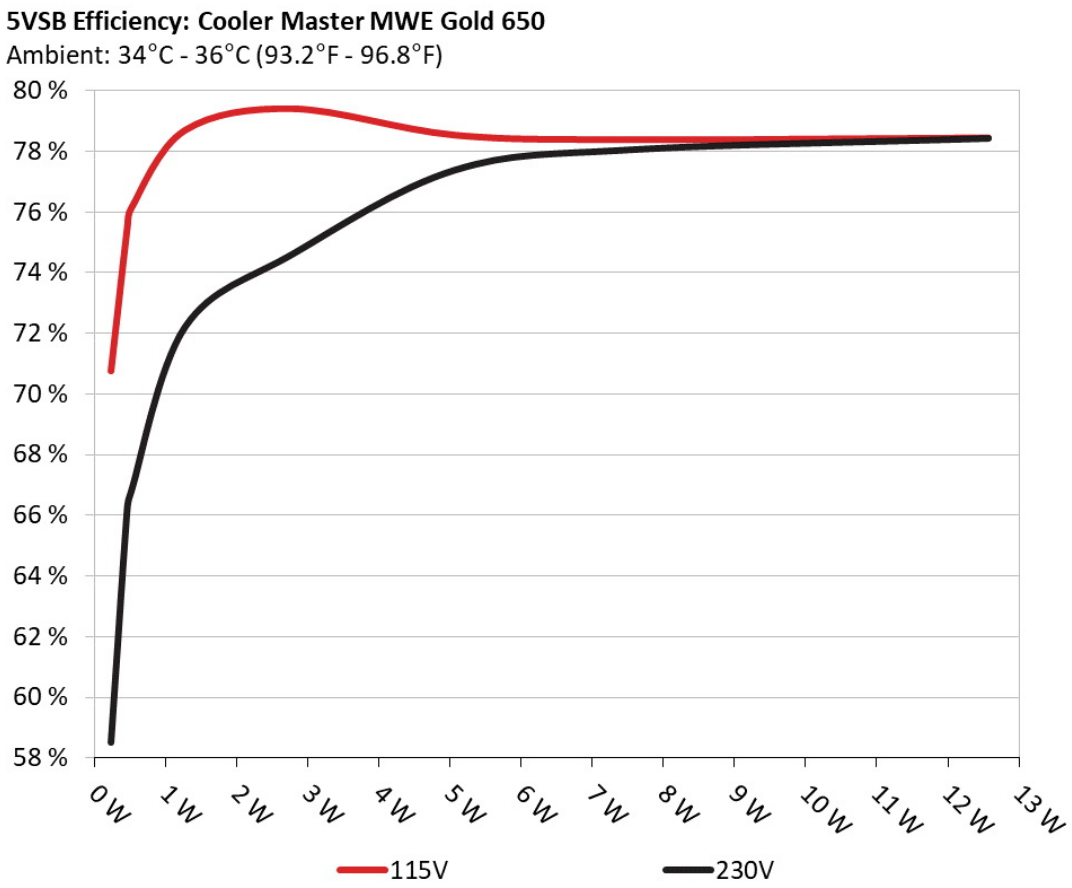
Efficiency under high ambient temperature



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	0.230	70.769%	0.046
	5.092V	0.325		115.11V
2	0.090A	0.459	75.493%	0.085
	5.092V	0.608		115.11V
3	0.550A	2.794	79.420%	0.323
	5.080V	3.518		115.11V
4	1.000A	5.068	78.549%	0.408
	5.068V	6.452		115.11V
5	1.500A	7.582	78.399%	0.450
	5.054V	9.671		115.11V
6	2.500A	12.570	78.460%	0.493
	5.028V	16.021		115.11V

230V

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.230	58.524%	0.017
	5.093V	0.393		230.24V
2	0.090A	0.459	66.234%	0.029
	5.092V	0.693		230.24V
3	0.550A	2.795	74.613%	0.144
	5.080V	3.746		230.24V
4	1.000A	5.069	77.366%	0.222
	5.068V	6.552		230.23V
5	1.500A	7.583	78.038%	0.282
	5.055V	9.717		230.24V
6	2.500A	12.571	78.407%	0.353
	5.028V	16.033		230.24V

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	3.572A	1.992A	1.979A	0.990A	64.918	84.036%	916	12.4	40.04°C	0.967
	12.126V	5.022V	3.335V	5.052V	77.250				42.55°C	115.11V
2	8.130A	2.993A	2.977A	1.191A	129.399	88.440%	920	12.4	40.24°C	0.988
	12.115V	5.013V	3.325V	5.038V	146.312				43.34°C	115.11V
3	13.093A	3.496A	3.466A	1.393A	194.487	89.595%	928	12.4	41.68°C	0.987
	12.105V	5.005V	3.318V	5.024V	217.074				44.97°C	115.11V
4	18.066A	4.003A	3.987A	1.597A	259.714	89.691%	1856	31.7	42.24°C	0.991
	12.095V	4.998V	3.310V	5.011V	289.565				46.21°C	115.11V
5	22.719A	5.012A	4.998A	1.802A	324.987	89.361%	2404	39.1	42.84°C	0.994
	12.082V	4.988V	3.300V	4.996V	363.678				47.61°C	115.11V
6	27.317A	6.028A	6.017A	2.008A	389.508	88.937%	2416	39.2	43.01°C	0.995
	12.069V	4.979V	3.291V	4.982V	437.959				48.19°C	115.11V
7	31.991A	7.046A	7.039A	2.215A	454.826	88.356%	2428	39.4	43.22°C	0.996
	12.057V	4.969V	3.281V	4.968V	514.767				49.05°C	115.10V
8	36.671A	8.068A	8.073A	2.424A	520.121	87.617%	2435	39.5	44.68°C	0.997
	12.045V	4.959V	3.271V	4.952V	593.628				51.00°C	115.10V
9	41.759A	8.586A	8.582A	2.429A	585.028	86.838%	2437	39.5	45.53°C	0.997
	12.034V	4.950V	3.262V	4.942V	673.699				52.55°C	115.10V
10	46.789A	9.109A	9.129A	2.536A	649.759	85.835%	2407	39.1	46.09°C	0.997
	12.023V	4.942V	3.253V	4.930V	756.989				53.78°C	115.10V
11	52.227A	9.123A	9.152A	2.541A	714.570	84.585%	2400	39.1	46.53°C	0.998
	12.012V	4.934V	3.245V	4.922V	844.798				55.16°C	115.10V
CL1	0.144A	11.999A	11.999A	0.000A	101.335	83.257%	1818	31.2	42.96°C	0.990
	12.103V	4.993V	3.307V	5.052V	121.713				47.12°C	115.12V

CL2	54.097A	1.001A	0.999A	1.000A	664.439	86.461%	2400	39.1	45.88°C	0.997
	12.038V	4.961V	3.272V	4.986V	768.484				53.18°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	3.576A	1.993A	1.978A	0.990A	64.956	85.189%	917	12.4	40.21°C	0.788
	12.125V	5.017V	3.335V	5.052V	76.249				42.47°C	230.25V
2	8.134A	2.996A	2.975A	1.191A	129.439	89.853%	921	12.4	40.85°C	0.911
	12.115V	5.008V	3.325V	5.038V	144.057				43.58°C	230.25V
3	13.097A	3.500A	3.467A	1.393A	194.525	91.207%	927	12.4	41.00°C	0.949
	12.104V	5.000V	3.317V	5.024V	213.278				44.36°C	230.26V
4	18.073A	4.008A	3.987A	1.597A	259.760	91.583%	1585	28.3	41.78°C	0.964
	12.093V	4.992V	3.309V	5.011V	283.632				45.53°C	230.25V
5	22.725A	5.019A	5.001A	1.801A	325.031	91.420%	2399	39.1	42.05°C	0.977
	12.080V	4.983V	3.300V	4.997V	355.535				46.26°C	230.25V
6	27.324A	6.037A	6.019A	2.007A	389.546	91.207%	2414	39.2	42.79°C	0.980
	12.067V	4.973V	3.290V	4.984V	427.100				47.64°C	230.25V
7	31.997A	7.054A	7.045A	2.215A	454.876	90.867%	2429	39.4	43.68°C	0.985
	12.056V	4.963V	3.280V	4.968V	500.593				49.06°C	230.25V
8	36.681A	8.079A	8.075A	2.424A	520.173	90.400%	2438	39.5	43.81°C	0.986
	12.043V	4.953V	3.270V	4.952V	575.410				49.70°C	230.25V
9	41.766A	8.598A	8.588A	2.429A	585.099	89.912%	2444	39.5	44.49°C	0.987
	12.033V	4.945V	3.261V	4.943V	650.746				51.00°C	230.25V
10	46.802A	9.123A	9.132A	2.536A	649.831	89.255%	2447	39.6	45.23°C	0.988
	12.021V	4.935V	3.252V	4.931V	728.065				52.45°C	230.26V
11	52.242A	9.135A	9.155A	2.541A	714.649	88.357%	2450	39.6	46.66°C	0.989
	12.010V	4.928V	3.244V	4.922V	808.822				55.35°C	230.26V
CL1	0.147A	12.003A	11.999A	0.000A	101.330	84.577%	1696	29.3	42.45°C	0.876
	12.102V	4.988V	3.307V	5.053V	119.808				46.58°C	230.26V

CL2	54.100A	1.003A	0.999A	1.000A	664.426	89.934%	2447	39.6	45.48°C	0.988
	12.037V	4.955V	3.271V	4.986V	738.797				52.46°C	230.26V

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	1.198A	0.495A	0.479A	0.197A	19.626	68.738%	903	12.7	0.820
	12.132V	5.030V	3.342V	5.083V	28.552				115.12V
2	2.448A	0.995A	0.988A	0.394A	39.996	79.535%	909	12.5	0.927
	12.130V	5.027V	3.340V	5.074V	50.287				115.12V
3	3.637A	1.492A	1.469A	0.593A	59.507	83.434%	913	12.4	0.959
	12.127V	5.024V	3.337V	5.065V	71.322				115.12V
4	4.890A	1.992A	1.982A	0.791A	79.894	85.840%	915	12.4	0.974
	12.124V	5.021V	3.333V	5.056V	93.073				115.11V

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	1.200A	0.498A	0.478A	0.197A	19.664	69.835%	910	12.5	0.542
	12.134V	5.028V	3.342V	5.081V	28.158				230.26V
2	2.451A	0.996A	0.988A	0.394A	40.032	80.622%	911	12.5	0.677
	12.129V	5.025V	3.340V	5.073V	49.654				230.25V
3	3.640A	1.495A	1.469A	0.593A	59.549	84.771%	913	12.4	0.766
	12.126V	5.019V	3.337V	5.065V	70.247				230.26V
4	4.895A	1.993A	1.981A	0.791A	79.941	87.258%	915	12.4	0.830
	12.123V	5.016V	3.333V	5.056V	91.615				230.26V

The results above are not used in the certification process

Ripple Measurements

115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	11.8 mV	6.5 mV	6.8 mV	6.0 mV	Pass
20% Load	16.5 mV	7.5 mV	7.8 mV	6.5 mV	Pass
30% Load	19.3 mV	8.5 mV	8.8 mV	7.5 mV	Pass
40% Load	18.6 mV	9.3 mV	10.2 mV	9.6 mV	Pass
50% Load	20.7 mV	10.1 mV	11.4 mV	10.1 mV	Pass
60% Load	24.1 mV	10.9 mV	13.2 mV	9.8 mV	Pass
70% Load	27.3 mV	12.2 mV	15.9 mV	10.8 mV	Pass
80% Load	30.0 mV	13.6 mV	16.4 mV	11.4 mV	Pass
90% Load	32.6 mV	14.0 mV	17.7 mV	11.7 mV	Pass
100% Load	51.3 mV	16.4 mV	21.2 mV	13.1 mV	Pass
110% Load	55.1 mV	17.0 mV	20.8 mV	14.6 mV	Pass
Crossload 1	20.1 mV	9.6 mV	12.1 mV	21.0 mV	Pass
Crossload 2	51.8 mV	15.8 mV	17.2 mV	14.3 mV	Pass

The results above are not used in the certification process

230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	12.0 mV	7.0 mV	7.4 mV	6.3 mV	Pass
20% Load	16.6 mV	7.5 mV	7.7 mV	6.9 mV	Pass
30% Load	20.9 mV	8.2 mV	8.6 mV	8.3 mV	Pass
40% Load	18.0 mV	8.9 mV	10.3 mV	9.7 mV	Pass
50% Load	21.1 mV	10.2 mV	11.8 mV	10.1 mV	Pass
60% Load	23.7 mV	11.2 mV	13.3 mV	10.0 mV	Pass
70% Load	26.7 mV	12.5 mV	14.3 mV	11.1 mV	Pass
80% Load	29.2 mV	13.0 mV	16.6 mV	12.2 mV	Pass

Test	12V	5V	3.3V	5VSB	Pass/Fail
90% Load	33.0 mV	13.9 mV	16.9 mV	13.3 mV	Pass
100% Load	51.2 mV	16.7 mV	20.6 mV	12.8 mV	Pass
110% Load	55.5 mV	16.9 mV	21.0 mV	13.7 mV	Pass
Crossload 1	22.2 mV	10.5 mV	12.4 mV	21.0 mV	Pass
Crossload 2	51.7 mV	14.6 mV	16.8 mV	12.8 mV	Pass

The results above are not used in the certification process

Cooler Master MWE Gold 650

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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