



Make It Yours.

Cooler Master MWE 650 (#2)

Serial Number MPE6501ACABW1191400004

Lab ID CM19650028

Certification ID 25770

Test Result Report ID:

Certificate Issue Date: Nov 6, 2019

115V

230V

Scheme: ETA-EMI PSU



115V

230V



Scheme: LAMBDA PSU

A handwritten signature in blue ink, appearing to read "A. Bitziopoulos".

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 650 (#2)
OEM/ODM	Gospower
Serial Number	MPE6501ACABW1191400004
Product Specifications	
Manufacturer-Provided Information	
Rated Voltage (Vrms)	200-240
Rated Current (Arms)	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	CM19650028
Date of receipt	Jul 5, 2019
Testing Date	Oct 5, 2019
Report Issued Date	Nov 6, 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 (510mm)	1	1	18-20AWG	No
8 pin EPS12V (540mm) / 4+4 pin EPS12V (120mm)	1	1 / 1	18AWG	No
6+2 pin PCIe (490mm+100mm)	2	4	16-18AWG	No
SATA (420mm+150mm+150mm)	2	6	18-20AWG	No
4-pin Molex (420mm+150mm+150mm)	1	3	18-20AWG	No
AC Power Cord (1400mm) - C13 coupler	1	1	18AWG	-

Power Specifications

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	19	19	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 Diode Incorporated GBU608 (800V, 6A @ 100°C)
APFC MOSFETS	2x JILIN SINO-MICROELECTRONICS JCS13N50FC (500V, 8A @ 100°C, 0.490hm)
APFC Boost Diode	1x JILIN SINO-MICROELECTRONICS 10F60UHF (600V, 10A @ 100°C)
Hold-up Cap(s)	1x Elite (420V, 470uF, 2000h @ 85°C, GM)
Main Switchers	2x JILIN SINO-MICROELECTRONICS JCS18N50FH (500V, 11A @ 100°C, 0.270hm)
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 NCE4080 (40V, 56A @ 100°C, 6.5mOhm)
5V & 3.3V	DC-DC Converters: 4x IPS FTD05N03NA (30V, 75A @ 100°C, 6mOhm) PWM Controllers: ANPEC APW7159C
Filtering Capacitors	Electrolytics: 5x Elite (2-5,000h @ 105°C, ED), 4x Elite (2,000h @ 105°C, EL), 2x 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 230V

Accredited		
Average Efficiency (>1450 load combinations)	87.543%	
Average Noise Output (>1450 Load Combinations)	36.74dBA	
Average PF (>1450 Load Combinations)	0.939	
Efficiency With 10W (≤500W) or 2% (>500W) Load	-	
Standby Power Consumption	0.1829W	
Non-Accredited		
12V Ripple (Full Load)	42.51mV	
5V Ripple (Full Load)	24.90mV	
3.3V Ripple (Full Load)	27.68mV	
5VSB Ripple (Full Load)	28.56mV	
12V Load Regulation	1.27%	
5V Load Regulation	2.91%	
3.3V Load Regulation	2.83%	
5VSB Load Regulation	4.10%	
Inrush Current	-	
Hold-Up Time & PWR_OK Signal	22.00ms	
AC Loss to PWR_OK Hold Up Time	62.00ms	
PWR_OK Inactive to DC Loss Delay	-40.00ms	
OPP (0.00°C / 0.00°C)	-	-

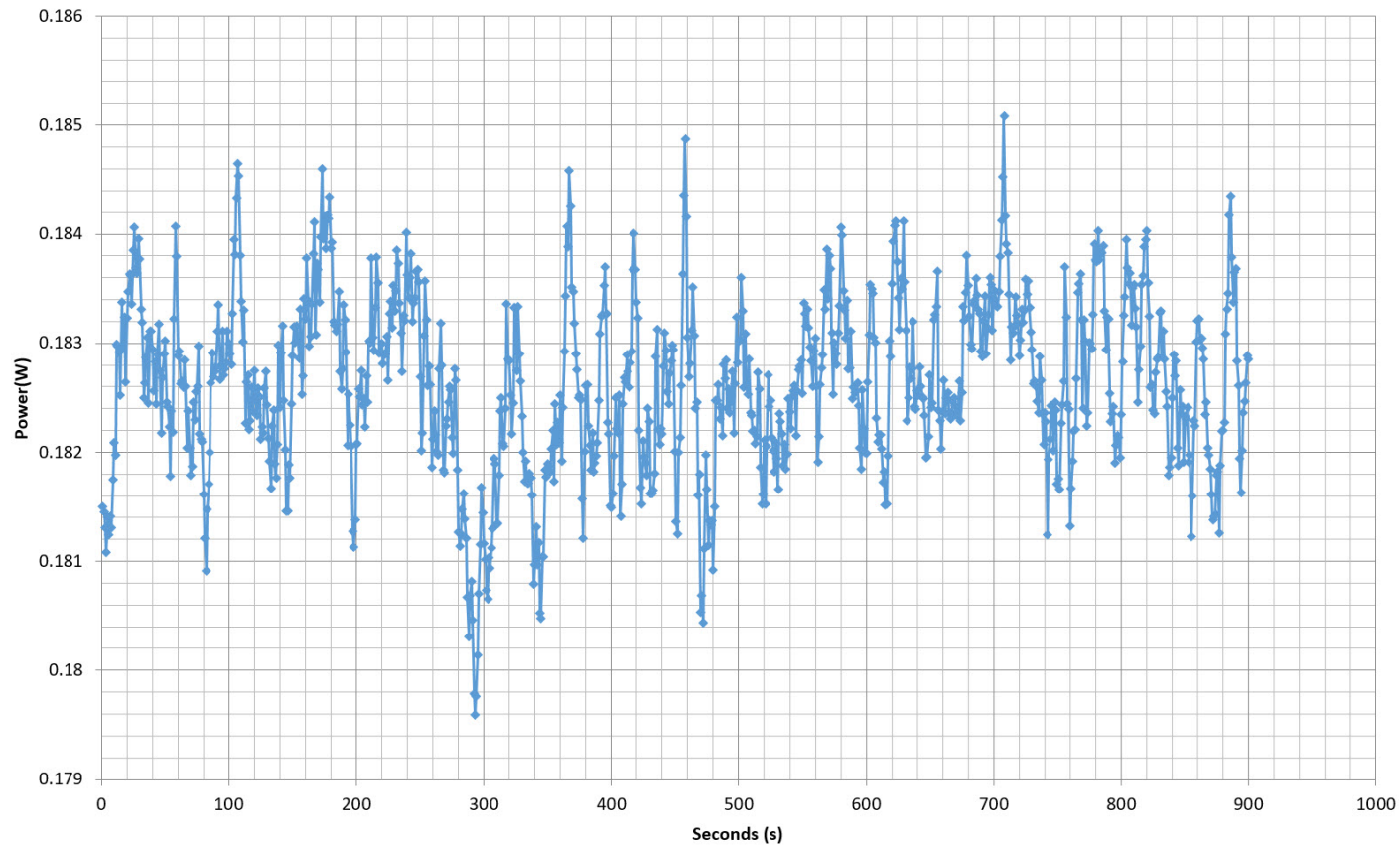
Hold-Up Time & PWR_OK Signal

Hold-Up Time (ms)	22
AC Loss to PWR_OK Hold Up Time (ms)	62
PWR_OK Inactive to DC Loss Delay (ms)	-40



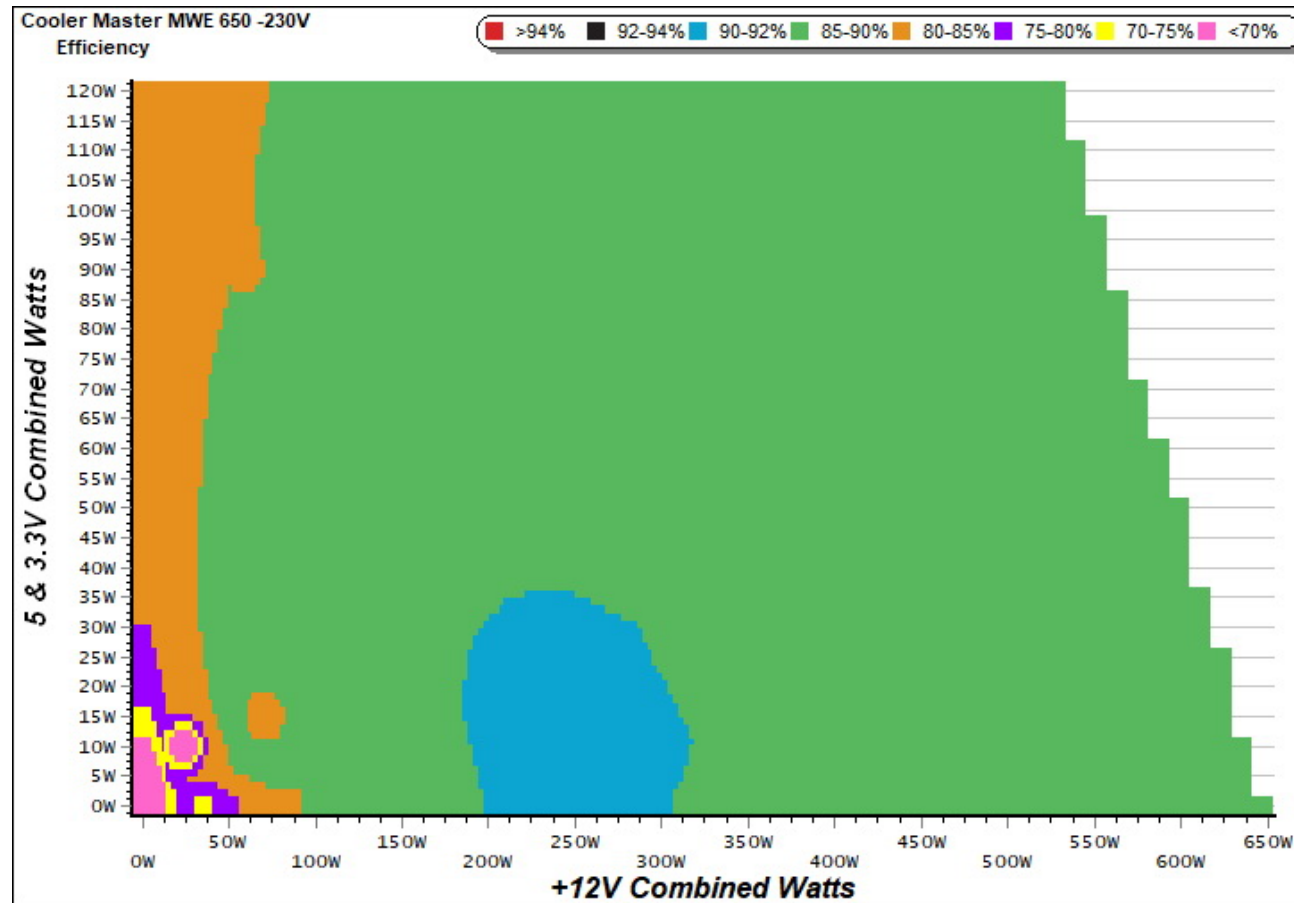
Graphs 230V

Power - MPE6501ACBW1191400004 - 09/05/2019 - 18:24



Efficiency Graph

230V

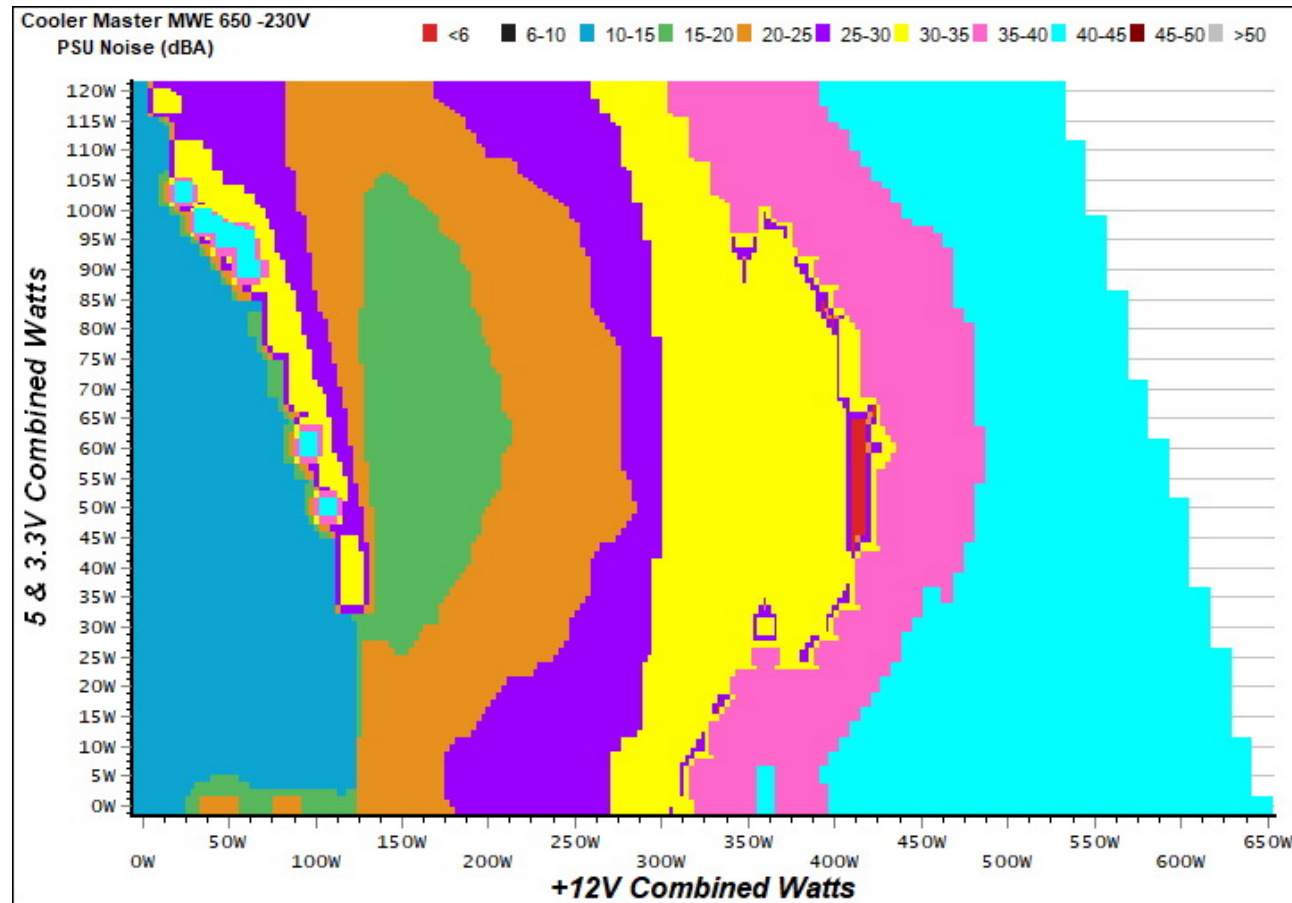


INFO

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

230V



INFO

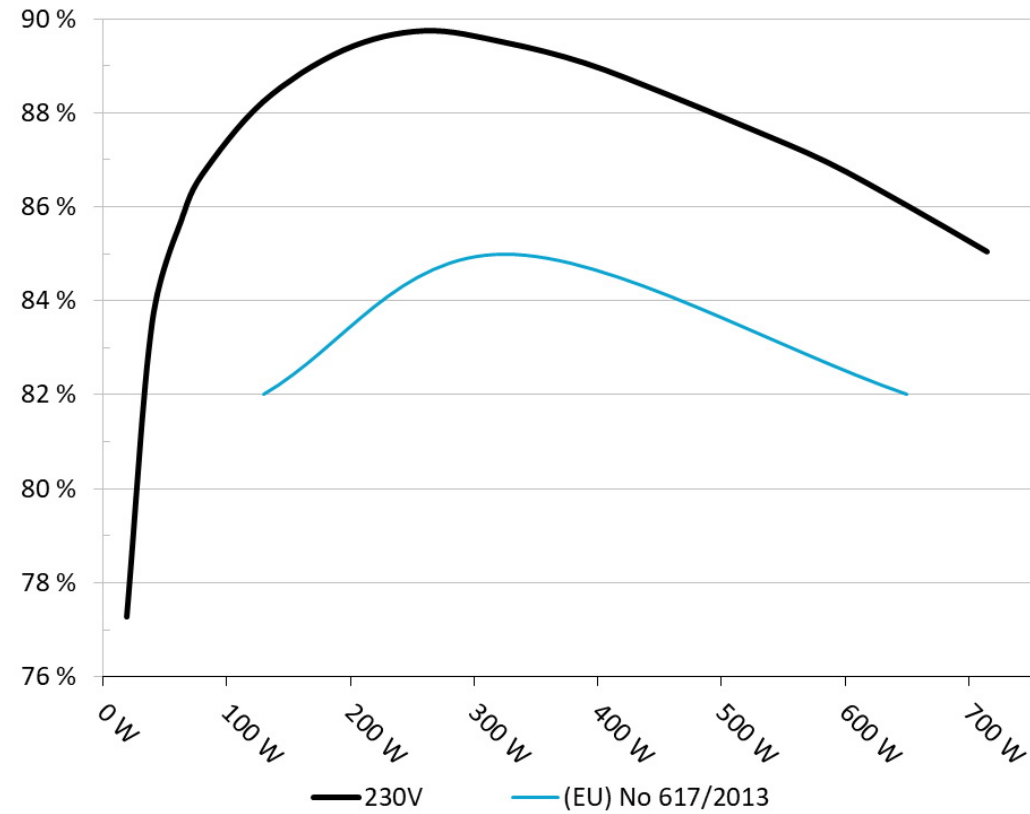
The PSU's noise in its entire operational range and under 30-32 °C ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails.

Indicative Performance

Efficiency under high ambient temperature

Efficiency: Cooler Master MWE 650

Ambient: 32°C - 40°C (89.6°F - 104°F)



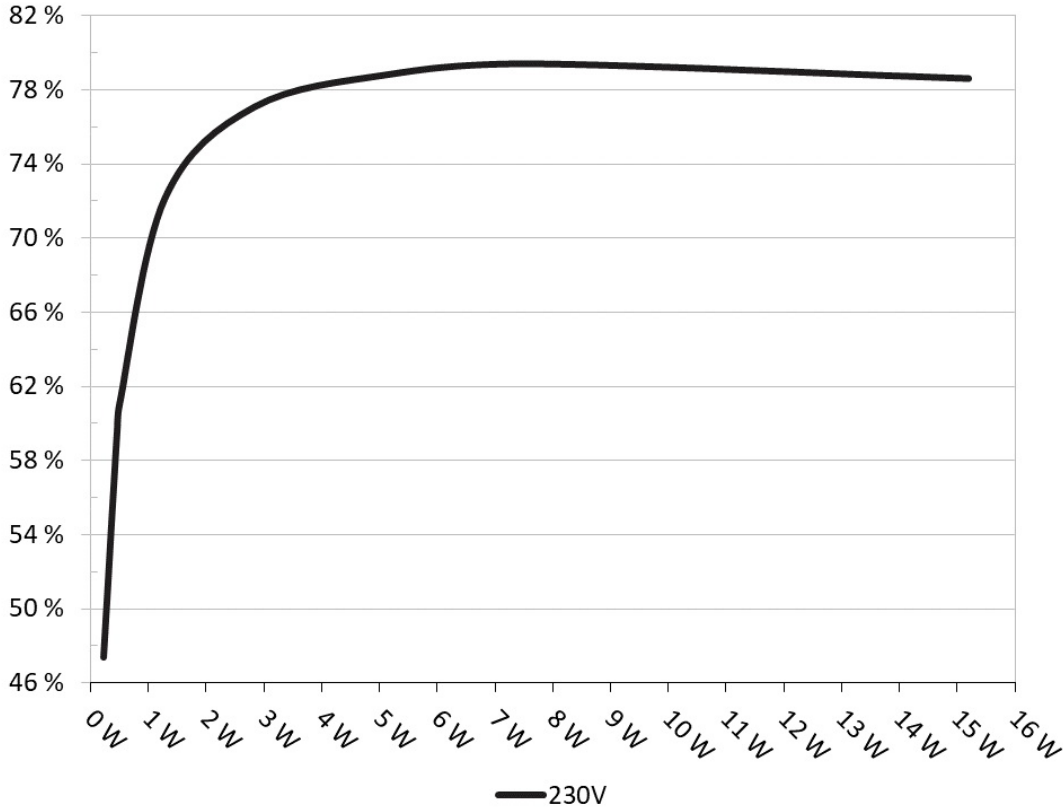
INFO

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

5VSB Efficiency: Cooler Master MWE 650

Ambient: 28°C - 32°C (82.4°F - 89.6°F)



INFO

This graph depicts the efficiency levels of the 5VSB rail with 115V and 230V input.

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.234	47.368%	0.010
	5.182V	0.494		230.33V

2	0.090A	0.467	59.566%	0.015
	5.181V	0.784		230.33V
3	0.550A	2.840	77.048%	0.069
	5.163V	3.686		230.32V
4	1.000A	5.147	78.797%	0.119
	5.146V	6.532		230.32V
5	1.500A	7.690	79.377%	0.167
	5.126V	9.688		230.32V
6	3.000A	15.199	78.588%	0.275
	5.066V	19.340		230.32V

Supplementary Tests (For Reference)

Typical Load Tests 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	3.572A	2.008A	1.963A	0.975A	64.764	85.598%	0	<6.0	40.43°C	0.719
	12.087V	4.980V	3.355V	5.131V	75.661				34.03°C	230.31V
2	8.166A	3.021A	2.958A	1.174A	129.294	88.239%	0	<6.0	41.57°C	0.868
	12.050V	4.964V	3.345V	5.113V	146.527				34.73°C	230.31V
3	13.143A	3.536A	3.445A	1.374A	194.414	89.345%	0	<6.0	42.45°C	0.923
	12.054V	4.948V	3.335V	5.097V	217.600				35.48°C	230.31V
4	18.151A	4.051A	3.968A	1.575A	259.633	89.759%	1216	26.8	35.69°C	0.947
	12.035V	4.935V	3.325V	5.080V	289.257				43.58°C	230.31V
5	22.835A	5.084A	4.977A	1.779A	324.931	89.510%	1463	32.7	36.11°C	0.961
	12.018V	4.918V	3.314V	5.061V	363.011				44.29°C	230.31V
6	27.472A	6.121A	5.991A	1.983A	389.458	89.073%	1784	38.3	36.52°C	0.968
	12.000V	4.901V	3.304V	5.043V	437.236				45.12°C	230.31V
7	32.185A	7.168A	7.014A	2.190A	454.779	88.417%	1315	28.9	37.34°C	0.973
	11.983V	4.884V	3.293V	5.023V	514.358				46.32°C	230.32V
8	36.908A	8.220A	8.043A	2.399A	520.084	87.707%	2279	43.4	37.91°C	0.977
	11.967V	4.867V	3.282V	5.003V	592.981				47.45°C	230.34V

9	42.051A	8.757A	8.555A	2.404A	585.017	86.965%	2383	44.4	38.88°C	0.980
	11.950V	4.854V	3.273V	4.992V	672.706				48.95°C	230.32V
10	46.937A	9.297A	9.099A	3.028A	649.850	86.039%	2381	44.4	39.75°C	0.982
	11.934V	4.841V	3.263V	4.956V	755.300				50.39°C	230.32V
11	52.435A	9.313A	9.120A	3.034A	714.671	85.053%	2385	44.4	40.45°C	0.983
	11.919V	4.833V	3.255V	4.945V	840.266				51.93°C	230.33V
CL1	0.143A	14.002A	14.000A	0.000A	116.395	80.091%	1853	38.3	36.24°C	0.868
	12.060V	4.876V	3.314V	5.132V	145.329				44.48°C	230.39V
CL2	54.008A	1.001A	0.998A	1.000A	658.380	86.769%	2380	44.4	39.56°C	0.982
	11.945V	4.911V	3.290V	5.055V	758.769				50.62°C	230.32V

The results above are not used in the certification process

Light Load Tests 230V

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	PF/AC Volts
1	1.193A	0.499A	0.475A	0.193A	19.492	77.276%	0	<6.0	0.375
	12.072V	4.998V	3.365V	5.171V	25.224				230.31V
2	2.452A	1.001A	0.978A	0.388A	39.915	83.536%	0	<6.0	0.575
	12.084V	4.991V	3.361V	5.160V	47.782				230.30V
3	3.637A	1.505A	1.457A	0.583A	59.361	85.820%	0	<6.0	0.694
	12.089V	4.984V	3.357V	5.149V	69.169				230.30V
4	4.904A	2.008A	1.967A	0.779A	79.789	86.674%	0	<6.0	0.770
	12.071V	4.978V	3.353V	5.137V	92.056				230.30V

The results above are not used in the certification process

Ripple Measurements 230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	59.2 mV	19.8 mV	14.3 mV	13.9 mV	Pass
20% Load	72.9 mV	20.2 mV	15.2 mV	15.0 mV	Pass
30% Load	29.0 mV	16.8 mV	16.1 mV	19.2 mV	Pass
40% Load	27.9 mV	18.2 mV	15.8 mV	17.3 mV	Pass

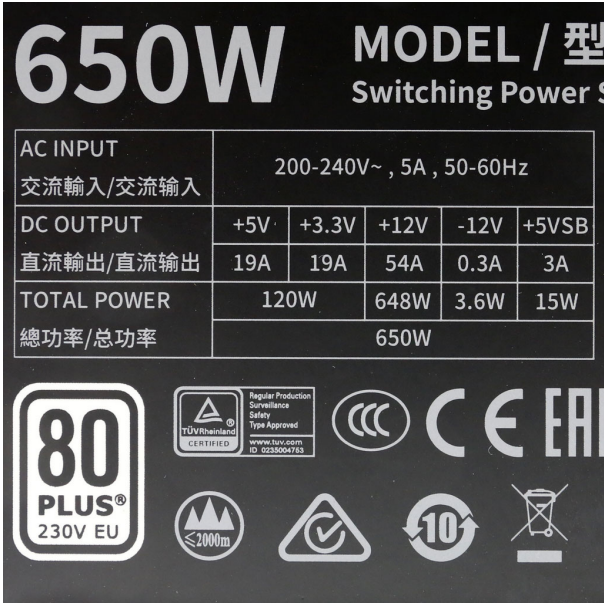
Test	12V	5V	3.3V	5VSB	Pass/Fail
50% Load	26.5 mV	18.3 mV	16.3 mV	17.6 mV	Pass
60% Load	25.4 mV	18.8 mV	18.6 mV	19.5 mV	Pass
70% Load	24.9 mV	19.7 mV	20.0 mV	19.9 mV	Pass
80% Load	26.6 mV	20.9 mV	23.6 mV	21.9 mV	Pass
90% Load	26.5 mV	22.2 mV	23.9 mV	24.4 mV	Pass
100% Load	42.5 mV	24.9 mV	27.7 mV	28.6 mV	Pass
110% Load	43.9 mV	24.6 mV	25.9 mV	29.1 mV	Pass
Crossload 1	75.2 mV	29.3 mV	28.6 mV	16.4 mV	Pass
Crossload 2	41.5 mV	21.3 mV	16.5 mV	24.1 mV	Pass

The results above are not used in the certification process

Cooler Master MWE 650 (#2)



Top side



Power specifications label

Cybenetics ████████████████████ ETA██████ LAMBDA██████ SAFE████████████████████ DELTA████████ PHI██████████