ENERMAX

Enermax Revolution D.F.2 1050W

Serial Number 230400200288

Lab ID EM10502237

Certification ID 252237

Test Result Report ID: 23PS2237A

Certificate Issue Date: Sep 13, 2023

Scheme: ETA-EMI PSU

115V



230V



Scheme: LAMBDA PSU

115V



230V





Outside Validation Scope



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	Enermax
Model	Revolution D.F.2 1050W
OEM/ODM	SANR
Serial Number	230400200288
Product Specifications	
Manufacturer-Provided Information	
Rated Voltage (Vrms)	100-240
Rated Current (Arms)	13-6.5

Rated Frequency (Hz)	47-63
Rated Power (W)	1050
Operating Temperature (Continuous Full Load) (°C)	
Type	ATX12V
Cable Design	Fully Modular
Warranty	-
Cybenetics Measurements	
Dimensions (W x H x D)	
Weight	
Cooling	120mm Double Ball Bearing Fan (PFERS-12M)
Semi-Passive Operation	✓
Cybenetics Testing Information	
Lab ID	EM10502237
Date of receipt	Aug 23, 2023
Testing Date	Sep 13, 2023
Report Issued Date	Sep 13, 2023
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 (650mm)	1	1	18-22AWG	No
4+4 pin EPS12V (600mm)	1	1	18AWG	No
4+4 pin EPS12V (700mm)	1	1	18AWG	No
6+2 pin PCIe (650mm+150mm)	3	6	18AWG	No
12+2 pin PCIe (610mm) (600W)	1	1	16-28AWG	No
SATA (500mm+150mm+150mm)	2	6	18AWG	No
SATA (500mm) / 4-pin Molex (+150mm+150mm)	2	2 / 4	18AWG	No

FDD Adapter (110mm)	1	1	20AWG	No
AC Power Cord (1100mm) - C13 coupler	1	1	18AWG	-

Power Specifications

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	20	20	87.5	2.5	0.3
	Watts	130		1050	12.5	3.6
Total Max. Power (W)		1050				

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	✓
ATX v3.0 Compliance	✓

Performance Summary

115V

Accredited	
Average Efficiency (>1450 load combinations)	89.817%
Average Noise Output (>1450 Load Combinations)	32.05dBA
Average PF (>1450 Load Combinations)	0.984
Efficiency With 10W (≤500W) or 2% (>500W) Load	77.148%
Standby Power Consumption	0.0714W
Non-Accredited	
12V Ripple (Full Load)	41.16mV
5V Ripple (Full Load)	33.08mV

3.3V Ripple (Full Load)	36.96mV
5VSB Ripple (Full Load)	32.77mV
12V Load Regulation	0.49%
5V Load Regulation	0.20%
3.3V Load Regulation	0.27%
5VSB Load Regulation	1.43%
Inrush Current	28.970A

230V

Accredited	
Average Efficiency (>1450 load combinations)	91.995%
Average Noise Output (>1450 Load Combinations)	32.01dBA
Average PF (>1450 Load Combinations)	0.946
Efficiency With 10W (≤500W) or 2% (>500W) Load	77.067%
Standby Power Consumption	0.1525W
Non-Accredited	
12V Ripple (Full Load)	32.77mV
5V Ripple (Full Load)	32.09mV
3.3V Ripple (Full Load)	31.61mV
5VSB Ripple (Full Load)	33.33mV
12V Load Regulation	0.39%
5V Load Regulation	0.20%
3.3V Load Regulation	0.27%
5VSB Load Regulation	1.41%
Inrush Current	47.660A
12V Transient Response (200%)	11.35V
5V Transient Response (200%)	4.942V
3.3V Transient Response (200%)	3.200V
5VSB Transient Response (200%)	4.800V
Hold-Up Time & PWR_OK Signal	20.10ms
AC Loss to PWR_OK Hold Up Time	18.50ms
PWR_OK Inactive to DC Loss Delay	1.60ms

PSU Timings: T1 (20% / 100%)	104.0ms	103.0ms
PSU Timings: T3 (20% / 100%)	122.0ms	123.0ms
OPP (29.98°C / 41.26°C)	134.88%	132.36%

Hold-Up Time & PWR_OK Signal

Hold-Up Time (ms)	20.1
AC Loss to PWR_OK Hold Up Time (ms)	18.5
PWR_OK Inactive to DC Loss Delay (ms)	1.6

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Tables

115V

Detailed Results						
	Average	Min	Limit Min	Max	Limit Max	Result
Mains Voltage RMS:	114.85 V	114.79 V	113.85 V	114.90 V	116.15 V	PASS
Mains Frequency:	60.00 Hz	59.98 Hz	59.40 Hz	60.01 Hz	60.60 Hz	PASS
Mains Voltage CF:	1.419	1.418	1.340	1.421	1.490	PASS
Mains Voltage THD:	0.15 %	0.10 %	N/A	0.26 %	2.00 %	PASS
Real Power:	0.071 W	0.057 W	N/A	0.087 W	N/A	N/A
Apparent Power:	10.813 W	10.791 W	N/A	10.835 W	N/A	N/A
Power Factor:	0.007	N/A	N/A	N/A	N/A	N/A

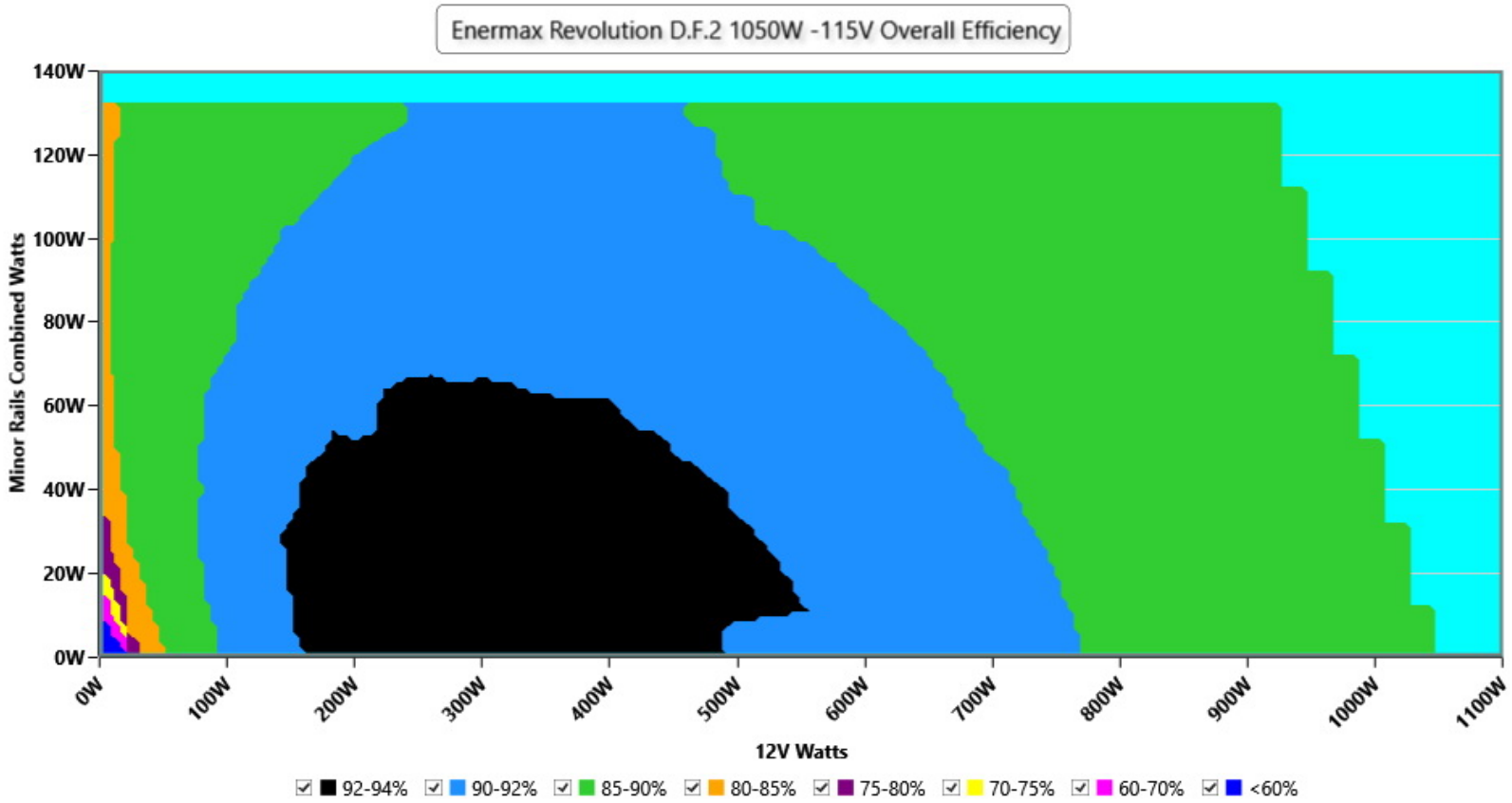
230V

Detailed Results						
	Average	Min	Limit Min	Max	Limit Max	Result
Mains Voltage RMS:	229.86 V	229.78 V	227.70 V	229.92 V	232.30 V	PASS
Mains Frequency:	50.00 Hz	49.99 Hz	49.50 Hz	50.01 Hz	50.50 Hz	PASS

Mains Voltage CF:	1.417	1.416	1.340	1.419	1.490	PASS
Mains Voltage THD:	0.13 %	0.09 %	N/A	0.17 %	2.00 %	PASS
Real Power:	0.153 W	0.116 W	N/A	0.190 W	N/A	N/A
Apparent Power:	37.038 W	36.991 W	N/A	37.082 W	N/A	N/A
Power Factor:	0.005	N/A	N/A	N/A	N/A	N/A

Efficiency Graph

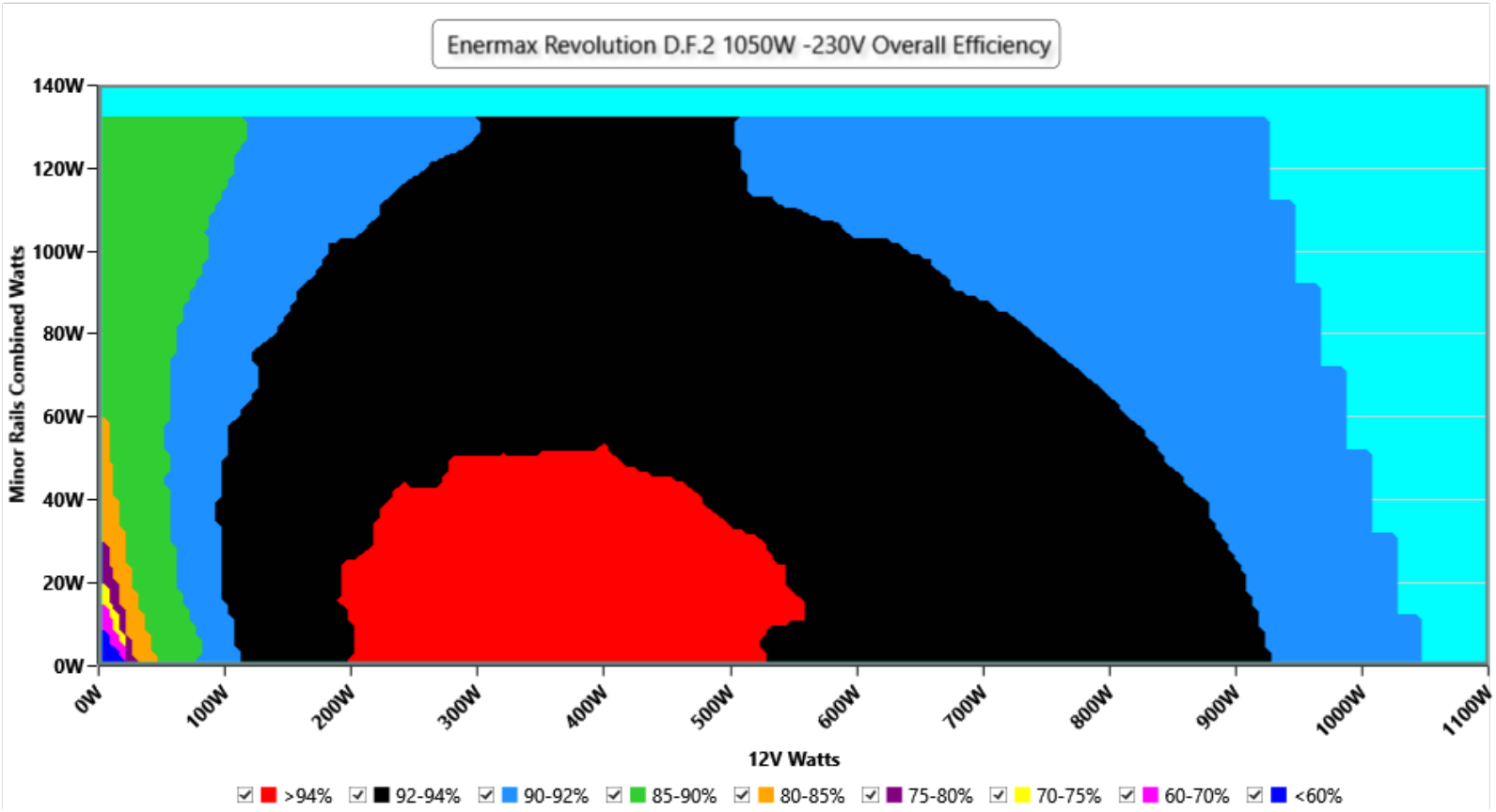
115V



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

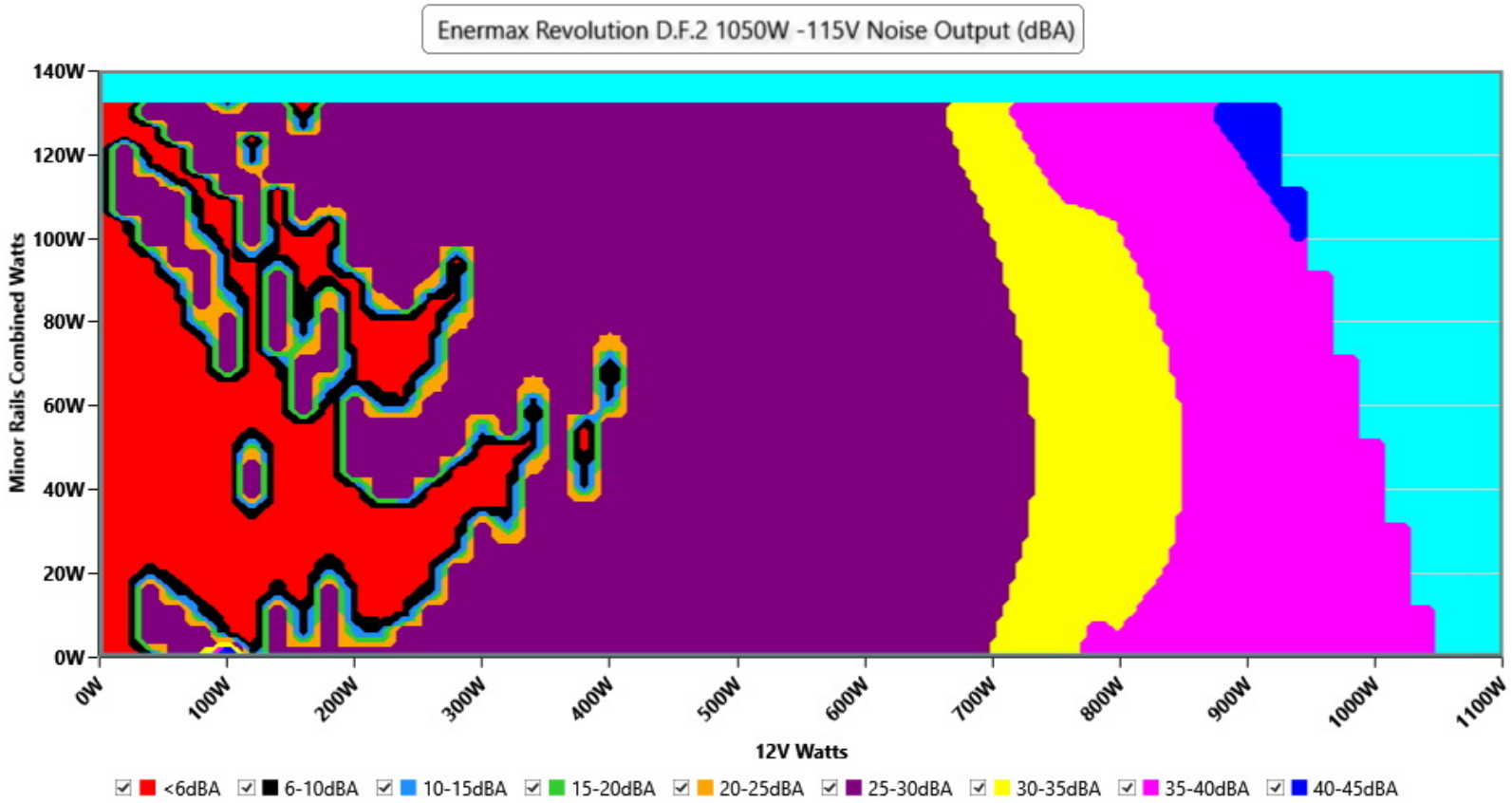


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Noise Graph

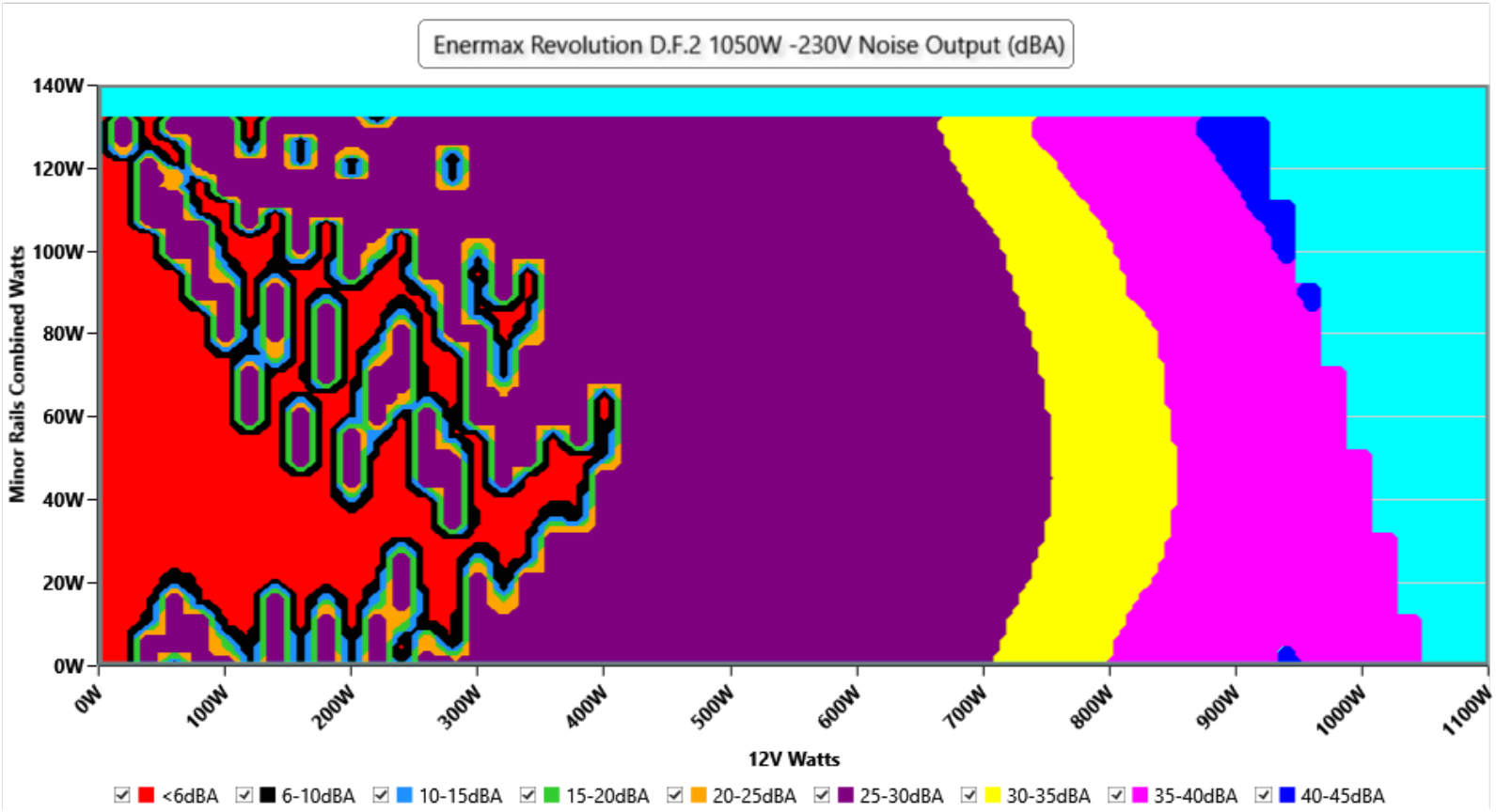
115V



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

Noise under high ambient temperature (indicative)

115V

Load	Normal ambient fan · noise · intake	High ambient fan · noise · intake	Noise change
10%	0 RPM · <6.0 dB(A) · 44.6 °C	0 RPM · <6.0 dB(A) · 44.6 °C	fan off in both
20%	1091 RPM · 26.3 dB(A) · 40.6 °C	1091 RPM · 26.3 dB(A) · 40.6 °C	**+0.0 dB(A)**
50%	1108 RPM · 27.1 dB(A) · 42.1 °C	1108 RPM · 27.1 dB(A) · 42.1 °C	**+0.0 dB(A)**
100%	2159 RPM · 46.6 dB(A) · 45.7 °C	2159 RPM · 46.6 dB(A) · 45.7 °C	**+0.0 dB(A)**

230V

Load	Normal ambient fan · noise · intake	High ambient fan · noise · intake	Noise change
10%	1088 RPM · 26.2 dB(A) · 40.0 °C	1088 RPM · 26.2 dB(A) · 40.0 °C	**+0.0 dB(A)**
20%	1092 RPM · 26.3 dB(A) · 40.7 °C	1092 RPM · 26.3 dB(A) · 40.7 °C	**+0.0 dB(A)**
50%	1107 RPM · 27.1 dB(A) · 42.1 °C	1107 RPM · 27.1 dB(A) · 42.1 °C	**+0.0 dB(A)**
100%	2158 RPM · 46.6 dB(A) · 45.3 °C	2158 RPM · 46.6 dB(A) · 45.3 °C	**+0.0 dB(A)**

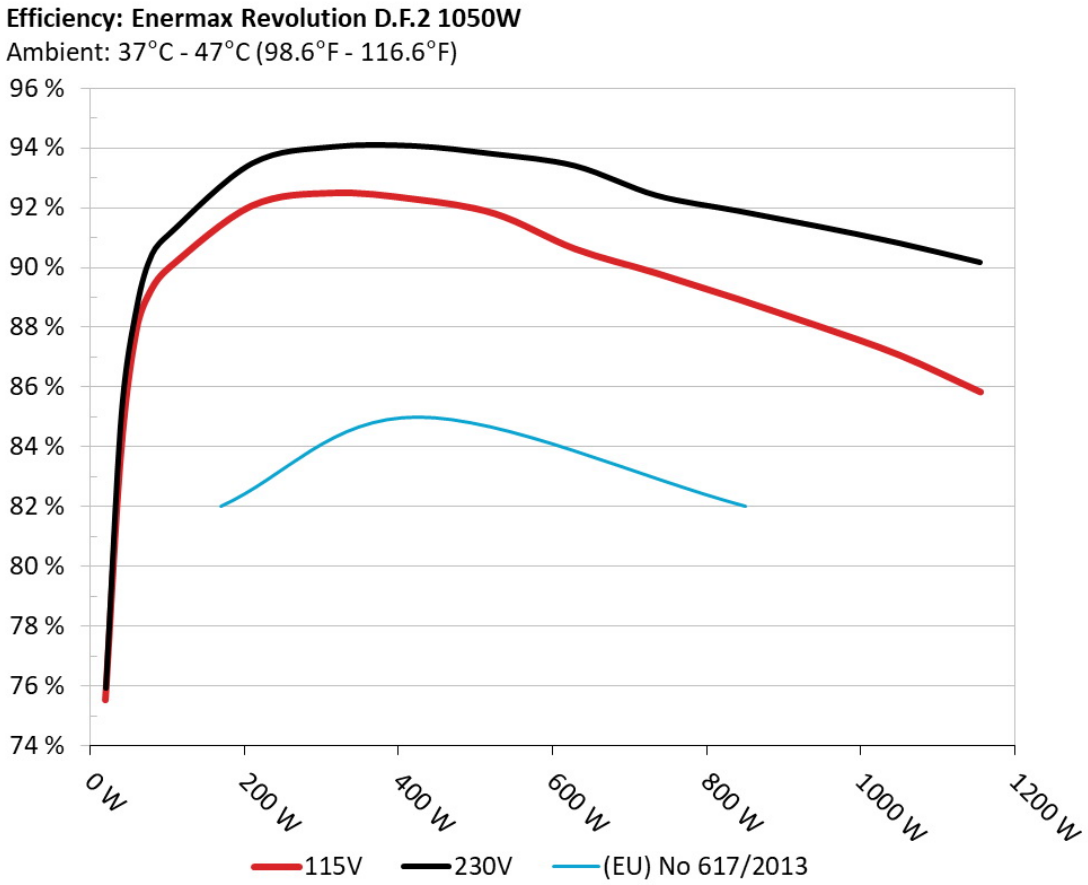
INFO

Fan speed, noise and the measured intake temperature at 10, 20, 50 and 100 % load, from the two load regulation tests: at normal ambient (about 30-32 °C) and at high ambient (about 40-47 °C). These are stabilized readings at fixed loads, not averages over the certification sweep, so they are indicative of how the fan behaves when it is hot. "<6.0" is the floor of our sound meter: the fan is stopped or too quiet to measure (the fan speed column says which); with the fan stopped, the intake sensor can read higher than the chamber air.

Informational. Not part of the ETA or LAMBDA rating.

Indicative Performance

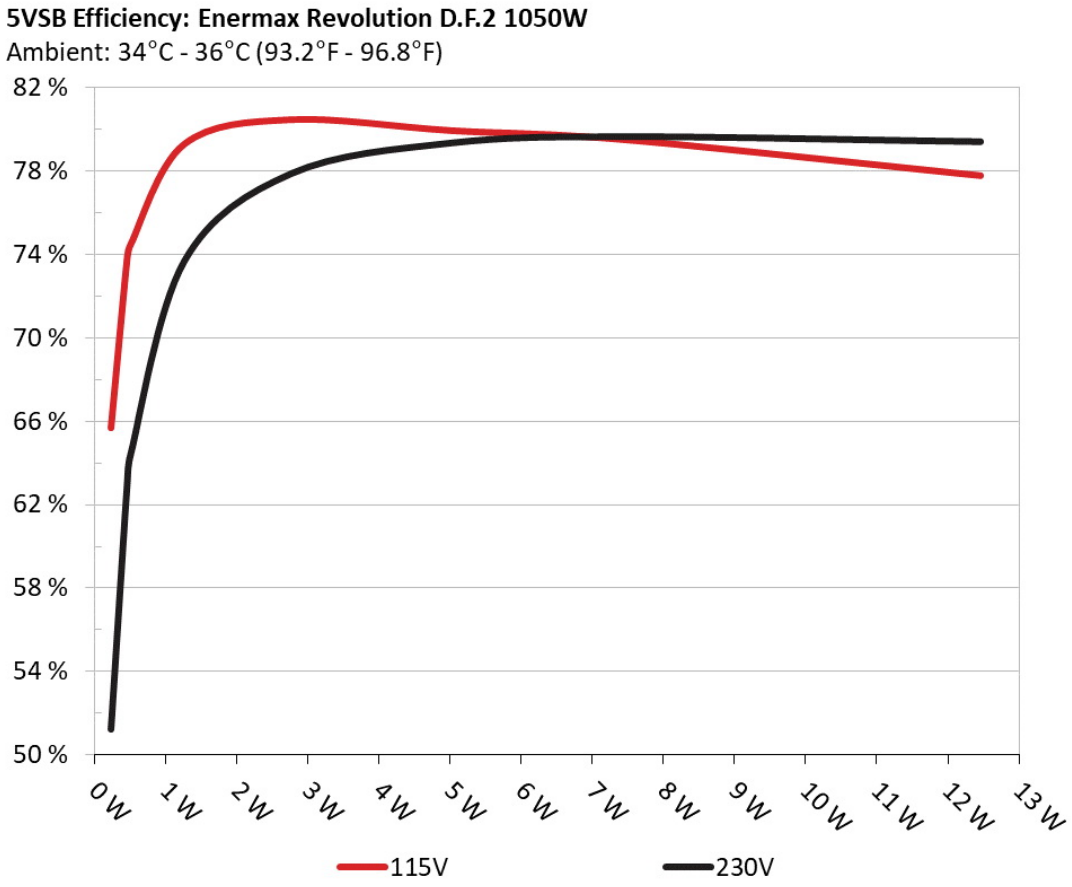
Efficiency under high ambient temperature



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	0.226W	65.202%	0.034
	5.028V	0.347W		114.85V
2	0.09A	0.453W	73.315%	0.059
	5.027V	0.618W		114.85V
3	0.55A	2.76W	79.981%	0.274
	5.018V	3.451W		114.85V
4	1A	5.01W	79.455%	0.394
	5.01V	6.305W		114.84V
5	1.5A	7.502W	79.003%	0.456
	5V	9.495W		114.84V
6	2.5A	12.456W	77.297%	0.523
	4.981V	16.114W		114.84V

230V

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.226W	50.745%	0.013
	5.028V	0.446W		229.86V
2	0.09A	0.453W	62.459%	0.021
	5.027V	0.725W		229.86V
3	0.55A	2.76W	77.378%	0.099
	5.018V	3.567W		229.86V
4	1A	5.01W	78.846%	0.167
	5.01V	6.354W		229.86V
5	1.5A	7.502W	79.147%	0.232
	5.001V	9.478W		229.86V
6	2.5A	12.455W	78.907%	0.313
	4.982V	15.785W		229.86V

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%	6.831A	1.977A	1.959A	0.999A	104.966	90.05%	0	<6.0	44.61°C	0.975
	12.204V	5.058V	3.369V	5.008V	116.565				40.34°C	114.81V
20%	14.673A	2.967A	2.941A	1.2A	209.959	92.068%	1091	26.3	40.59°C	0.971
	12.204V	5.055V	3.367V	5.001V	228.049				45.21°C	114.78V
30%	22.854A	3.463A	3.432A	1.402A	314.978	92.496%	1097	26.5	41.06°C	0.98
	12.204V	5.054V	3.366V	4.995V	340.534				46.21°C	114.75V
40%	30.998A	3.958A	3.922A	1.604A	419.613	92.293%	1101	26.8	41.72°C	0.985
	12.208V	5.054V	3.366V	4.988V	454.653				47.31°C	114.71V
50%	38.848A	4.947A	4.904A	1.807A	524.97	91.805%	1108	27.1	42.11°C	0.988
	12.213V	5.054V	3.365V	4.981V	571.835				48.17°C	114.67V
60%	46.594A	5.938A	5.886A	2A	629.458	90.624%	1244	30.5	42.81°C	0.991
	12.227V	5.053V	3.365V	4.975V	694.583				49.33°C	114.63V
70%	54.417A	6.93A	6.869A	2.215A	734.841	89.814%	1558	37.2	43.14°C	0.992
	12.234V	5.052V	3.364V	4.967V	818.178				50.15°C	114.6V
80%	62.254A	7.922A	7.852A	2.318A	839.687	88.956%	1833	42.2	43.76°C	0.993
	12.237V	5.05V	3.362V	4.963V	943.926				51.81°C	114.55V
90%	70.469A	8.417A	8.33A	2.421A	945.054	88.043%	2112	46.2	44.65°C	0.994
	12.240V	5.05V	3.362V	4.958V	1073.405				54.01°C	114.51V
100%	78.604A	8.913A	8.837A	2.524A	1049.738	87.078%	2159	46.6	45.74°C	0.994
	12.246V	5.049V	3.361V	4.953V	1205.52				55.76°C	114.48V
110%	86.424A	9.904A	9.908A	2.525A	1155.13	85.842%	2190	47.1	46.96°C	0.994
	12.258V	5.048V	3.361V	4.951V	1345.655				57.9°C	114.43V
CL1	0.114A	15.517A	15.364A	0A	131.306	83.608%	1125	27.2	40.07°C	0.972
	12.263V	5.047V	3.358V	5.029V	157.053				45.51°C	114.8V

Test	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
CL2	0.113A	19.792A	0A	0A	101.336	82.491%	1132	27.5	40.26°C	0.976
	12.237V	5.05V	3.369V	5.029V	122.848				47.27°C	114.82V
CL3	0.113A	0A	19.651A	0A	67.385	79.136%	1091	26.3	40.82°C	0.953
	12.227V	5.057V	3.359V	5.029V	85.151				49.84°C	114.83V
CL4	85.887A	0A	0A	0.002A	1049.542	87.964%	2032	45.3	46.46°C	0.994
	12.220V	5.06V	3.371V	5.002V	1193.152				57.41°C	114.49V

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%	6.828A	1.977A	1.959A	0.998A	104.944	91.185%	1088	26.2	40.04°C	0.823
	12.206V	5.058V	3.368V	5.009V	115.091				44.32°C	229.83V
20%	14.670A	2.967A	2.941A	1.199A	209.933	93.482%	1092	26.3	40.7°C	0.915
	12.204V	5.055V	3.367V	5.003V	224.572				45.28°C	229.82V
30%	22.852A	3.462A	3.431A	1.401A	314.942	94.035%	1097	26.5	41.48°C	0.945
	12.204V	5.054V	3.366V	4.997V	334.921				46.53°C	229.8V
40%	30.992A	3.957A	3.922A	1.603A	419.494	94.066%	1101	26.8	41.64°C	0.957
	12.206V	5.054V	3.365V	4.99V	445.958				47.25°C	229.78V
50%	38.837A	4.947A	4.903A	1.806A	524.848	93.791%	1107	27.1	42.11°C	0.965
	12.214V	5.054V	3.365V	4.984V	559.592				48.19°C	229.77V
60%	46.607A	5.936A	5.885A	2A	629.327	93.397%	1123	27.5	42.93°C	0.971
	12.221V	5.054V	3.365V	4.977V	673.819				49.44°C	229.74V
70%	54.415A	6.928A	6.868A	2.213A	734.693	92.412%	1517	36.5	43.05°C	0.976
	12.232V	5.053V	3.364V	4.97V	795.017				50.11°C	229.73V
80%	62.246A	7.92A	7.851A	2.316A	839.543	91.898%	1810	41.7	43.81°C	0.979
	12.236V	5.051V	3.362V	4.966V	913.565				52.01°C	229.71V
90%	70.466A	8.416A	8.329A	2.419A	944.926	91.376%	2072	45.9	44.11°C	0.981
	12.239V	5.05V	3.362V	4.961V	1034.103				53.21°C	229.69V

Test	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
100%	78.604A	8.912A	8.836A	2.522A	1049.651	90.817%	2158	46.6	45.25°C	0.982
	12.245V	5.049V	3.361V	4.956V	1155.785				55.31°C	229.67V
110%	86.442A	9.903A	9.909A	2.524A	1155.066	90.172%	2186	47.1	46.69°C	0.984
	12.254V	5.049V	3.36V	4.953V	1280.952				57.62°C	229.65V
CL1	0.114A	15.516A	15.364A	0A	131.305	84.898%	1128	27.3	40.18°C	0.875
	12.264V	5.047V	3.358V	5.03V	154.662				45.63°C	229.83V
CL2	0.113A	19.79A	0A	0A	101.335	83.672%	1134	27.8	40.1°C	0.833
	12.238V	5.05V	3.37V	5.03V	121.111				47.19°C	229.83V
CL3	0.113A	0A	19.656A	0A	67.382	80.286%	1089	26.2	40.32°C	0.756
	12.224V	5.055V	3.358V	5.03V	83.928				49.38°C	229.84V
CL4	85.894A	0A	0A	0.002A	1049.512	91.567%	2018	45.0	45.61°C	0.982
	12.218V	5.059V	3.37V	5.004V	1146.168				56.56°C	229.68V

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	1.218A	0.494A	0.49A	0.199A	20.002	75.548%	0	<6.0	39.75°C	0.794
	12.186V	5.057V	3.368V	5.024V	26.476				36.69°C	114.85V
40W	2.682A	0.692A	0.686A	0.299A	40.003	83.767%	0	<6.0	40.49°C	0.912
	12.191V	5.058V	3.369V	5.022V	47.755				37.28°C	114.84V
60W	4.144A	0.89A	0.882A	0.398A	60.003	87.892%	0	<6.0	42.29°C	0.943
	12.195V	5.058V	3.369V	5.02V	68.275				38.5°C	114.83V
80W	5.601A	1.087A	1.077A	0.498A	79.954	89.285%	0	<6.0	43.62°C	0.955
	12.199V	5.059V	3.37V	5.018V	89.552				39.66°C	114.82V

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	1.217A	0.494A	0.49A	0.199A	19.996	75.94%	0	<6.0	39.97°C	0.42
	12.197V	5.058V	3.37V	5.026V	26.336				36.87°C	229.85V
40W	2.680A	0.692A	0.685A	0.299A	39.996	85.06%	0	<6.0	40.79°C	0.586
	12.199V	5.059V	3.37V	5.024V	47.019				37.55°C	229.84V
60W	4.141A	0.889A	0.881A	0.398A	59.996	88.659%	0	<6.0	41.71°C	0.695
	12.202V	5.059V	3.37V	5.022V	67.669				38.19°C	229.84V
80W	5.597A	1.087A	1.077A	0.498A	79.935	90.449%	0	<6.0	42.85°C	0.768
	12.204V	5.059V	3.37V	5.019V	88.374				39.13°C	229.83V

The results above are not used in the certification process

Ripple Measurements

115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	16.06mV	10.42mV	16.32mV	8.57mV	Pass
20% Load	19.95mV	13.14mV	17.70mV	9.29mV	Pass
30% Load	19.44mV	14.42mV	17.18mV	11.24mV	Pass
40% Load	20.15mV	14.01mV	19.60mV	12.11mV	Pass
50% Load	20.67mV	15.29mV	21.55mV	14.21mV	Pass
60% Load	20.00mV	19.35mV	23.65mV	16.93mV	Pass
70% Load	21.23mV	24.74mV	27.55mV	21.96mV	Pass
80% Load	21.18mV	27.15mV	29.40mV	21.86mV	Pass
90% Load	21.94mV	28.79mV	31.81mV	23.19mV	Pass
100% Load	41.16mV	33.08mV	36.96mV	32.77mV	Pass
110% Load	41.96mV	33.65mV	40.03mV	37.94mV	Pass
Crossload1	30.08mV	19.32mV	30.87mV	12.00mV	Pass
Crossload2	17.14mV	19.86mV	21.80mV	10.11mV	Pass

Test	12V	5V	3.3V	5VSB	Pass/Fail
Crossload3	14.88mV	13.19mV	17.60mV	9.19mV	Pass
Crossload4	38.77mV	28.37mV	42.06mV	27.37mV	Pass

The results above are not used in the certification process

230V

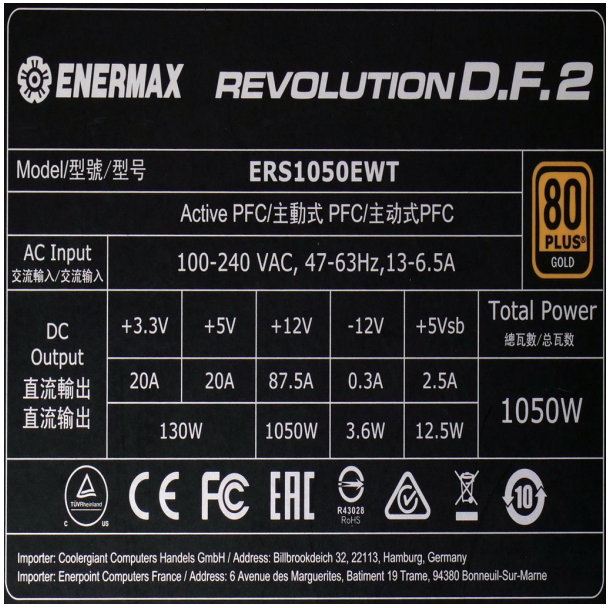
Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	17.08mV	9.39mV	13.49mV	8.16mV	Pass
20% Load	19.75mV	12.42mV	14.88mV	9.08mV	Pass
30% Load	19.80mV	14.73mV	15.39mV	10.16mV	Pass
40% Load	20.77mV	13.19mV	26.94mV	12.16mV	Pass
50% Load	22.15mV	15.45mV	18.67mV	13.60mV	Pass
60% Load	24.86mV	16.83mV	20.11mV	20.11mV	Pass
70% Load	22.20mV	24.74mV	26.88mV	18.88mV	Pass
80% Load	21.28mV	26.28mV	28.88mV	20.78mV	Pass
90% Load	22.10mV	28.43mV	37.25mV	22.53mV	Pass
100% Load	32.77mV	32.09mV	31.61mV	33.33mV	Pass
110% Load	35.14mV	32.90mV	32.82mV	38.55mV	Pass
Crossload1	23.67mV	18.15mV	26.76mV	12.02mV	Pass
Crossload2	16.93mV	20.58mV	28.27mV	9.54mV	Pass
Crossload3	13.20mV	11.91mV	17.03mV	8.16mV	Pass
Crossload4	31.86mV	26.88mV	27.38mV	25.69mV	Pass

The results above are not used in the certification process

Enermax Revolution D.F.2 1050W



Top side



Power specifications label