Anex

Corsair RM650x

Lab ID#: 77
Receipt Date: -
Test Date: -

Report:
Report Date: Jan 4, 2018

DUT INFORMATION

Brand	Corsair
Manufacturer (OEM)	Channel Well Technology
Series	RMx
Model Number	RM650x
Serial Number	16447126000018291897
DUT Notes	CP-9020091 - Retested on 11/10/2017

DUT SPECIFICATIONS

Rated Voltage (Vrms)	100-240
Rated Current (Arms)	10-5
Rated Frequency (Hz)	47-63
Rated Power (W)	650
Type	ATX12V
Cooling	135mm Rifle Bearing Fan (NR135L)
Semi-Passive Operation	✓
Cable Design	Fully Modular

POWER SPECIFICATIONS

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	25	25	54	3	0.8
	Watts	130		648	15	9.6
Total Max. Power (W)		650				

CABLES AND CONNECTORS

Modular Cables

Description	Cable Count	Connector Count (Total)	Gauge
ATX connector 20+4 pin (600mm)	1	1	18-20AWG
4+4 pin EPS12V (650mm)	1	1	18AWG
6+2 pin PCIe (600mm+150mm)	2	4	18AWG
SATA (515mm+120mm+120mm)	3	9	18AWG
4 pin Molex (450mm+100mm+100mm+100mm)	1	4	18AWG
FDD Adapter (+100mm)	1	1	20AWG

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Primary Side	
Transient Filter	4x Y caps, 2x X caps, 2x CM chokes, 1x MOV
Inrush Protection	NTC Thermistor
Bridge Rectifier(s)	1x GBU1506 (600V, 15A @ 100°C)
APFC MOSFETS	1x Infineon IPW60R125P6 (650V, 19A @ 100°C, 0.125 Ohm)
APFC Boost Diode	1x Vishay 8S2TH061 (600V, 8A @ 120°C)
Hold-up Cap(s)	1x Nippon Chemi-Con (400V, 680uF, 2000h @ 105°C, KMR)
Main Switchers	2x Toshiba TK18A60V (600V, 18A, 0.19 Ohm)
APFC Controller	Infineon ICE3PCS01G - CM03X
Switching Controller	Infineon ICE2HS01G
Topology	Primary side: Half-Bridge & LLC Resonant Converter Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	
+12V MOSFETS	4x SinopowerSM4021NAKP (40V, 100A @ 100°C, 2.7 mOhm @ VGS=6V)
5V & 3.3V	DC-DC Converters: 2x QM3006D & 4x QM3004D FETs PWM Controller: APW7159
Filtering Capacitors	Electrolytics: Chemi-Con (105°C, KZE & KZH series) Polymers: Nippon Chemi-Con
Supervisor IC	Weltrend WT7502
Fan Model	NR135L (12 V, 0.22 A, Rifle Bearing)
5VSB Circuit	
Rectifier	PFR20V45CT (45V, 20A, VF: 0.42V max @ 125°C)
Standby PWM Controller	On-Bright OB5269

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RESULTS	
Temperature Range (°C /°F)	30-32 / 86-89.6
Average Efficiency	88.365
Efficiency With 10W (≤500W) or 2% (>500W) Load -115V	0.000
Average Efficiency 5VSB	80.485
Standby Power Consumption (W) -115V	0.0417362
Standby Power Consumption (W) -230V	0.0764834
Average PF	0.992
ErP Lot 3/6 Ready	✓
(EU) No 617/2013 Compliance	✓
Avg Noise Output	13.11
Efficiency Rating (ETA)	PLATINUM
Noise Rating (LAMBDA)	A++

TEST EQUIPMENT		
Electronic Loads	Chroma 6314A x2 63123A x6 63102A 63101A	Chroma 63601-5 x2 Chroma 63600-2 63640-80-80 x10 63610-80-20
AC Sources	Chroma 6530, Chroma 61604	
Power Analyzers	N4L PPA1530, N4L PPA5530	
Oscilloscopes	Picoscope 4444 & 3424, Keysight DSOX3024A, Rigol DS2072A	
Voltmeter	Keithley 2015 THD 6.5 Digit	
Sound Analyzer	Bruel & Kjaer 2250-L G4	
Microphone	Bruel & Kjaer Type 4189	
Data Loggers	Picoscope TC-08 x2, Labjack U3-HV x2	

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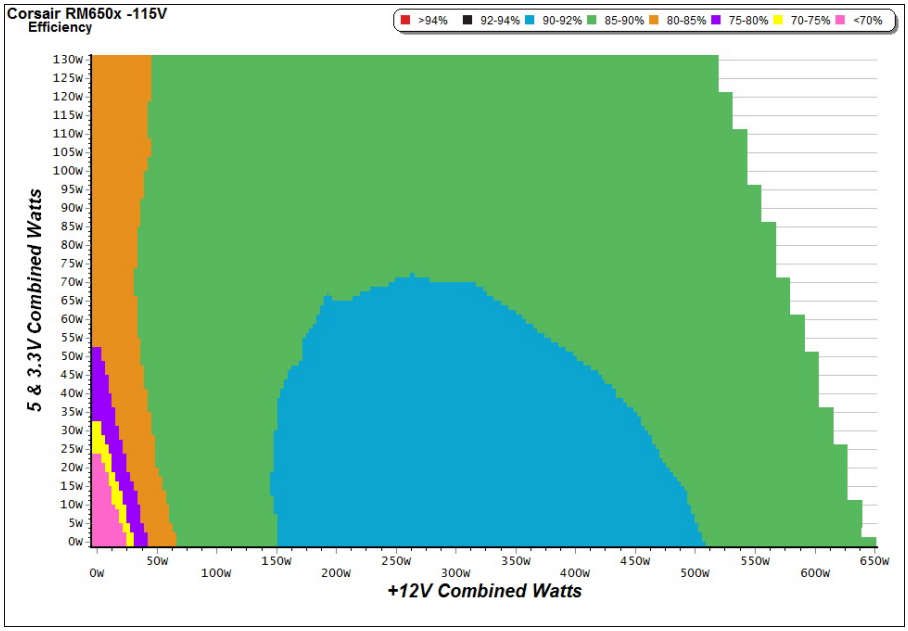
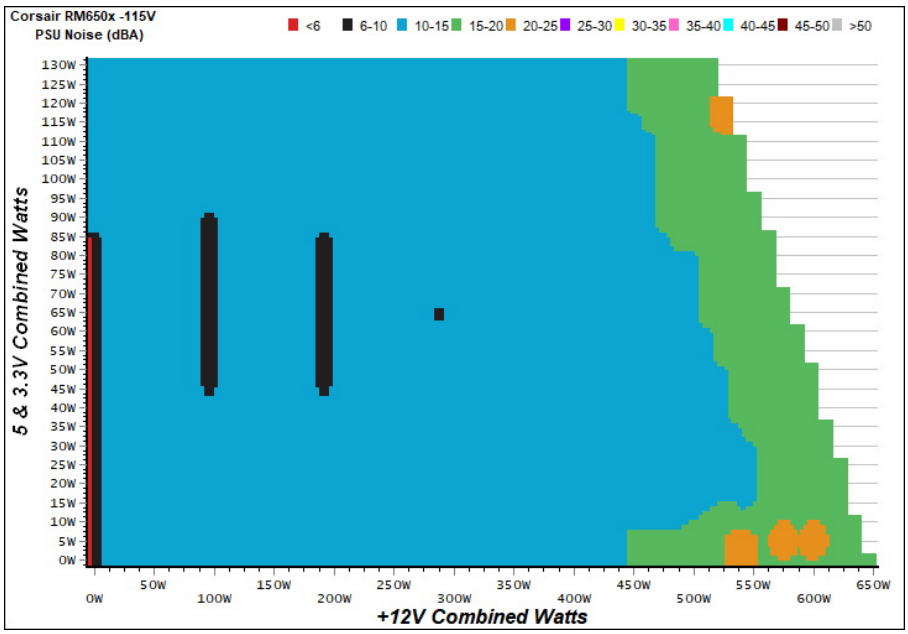
EFFICIENCY GRAPH



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



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

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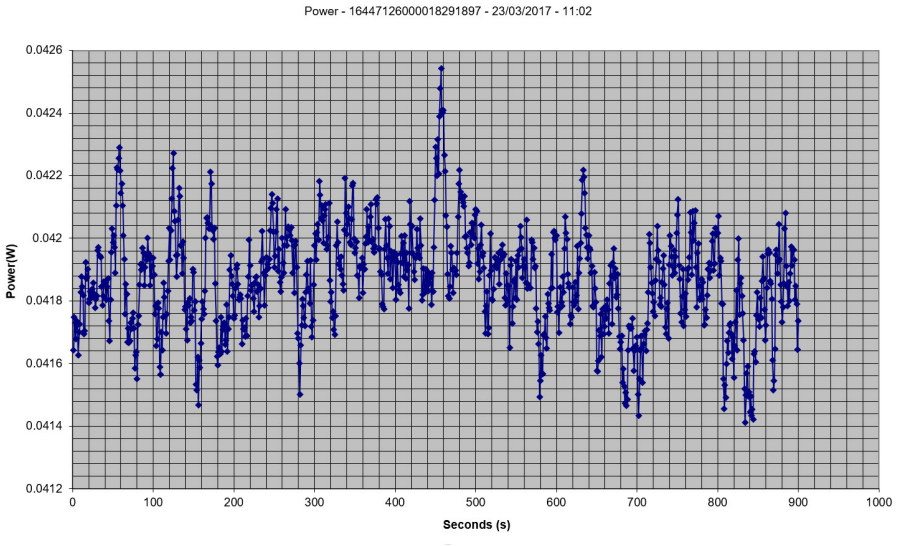
5VSB EFFICIENCY -115V (ERP LOT 3/6 & CEC)

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.102A	0.505	76.631%	0.065
	4.974V	0.659		115.06V
2	0.252A	1.250	79.618%	0.144
	4.971V	1.570		115.06V
3	1.002A	4.961	80.549%	0.348
	4.952V	6.159		115.08V
4	3.002A	14.711	79.765%	0.459
	4.901V	18.443		115.07V

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.042A	0.207	61.062%	0.010
	4.975V	0.339		230.13V
2	0.087A	0.433	70.407%	0.018
	4.974V	0.615		230.25V
3	0.532A	2.639	78.894%	0.095
	4.962V	3.345		230.25V
4	3.002A	14.706	79.725%	0.318
	4.899V	18.446		230.26V

VAMPIRE POWER -115V



INFO

This graph is generated by the PPA Standby Power Analysis software which takes full control of the power analyzer during the whole procedure. This application features all of the EN50564 & IEC62301 test limits for standby power software testing

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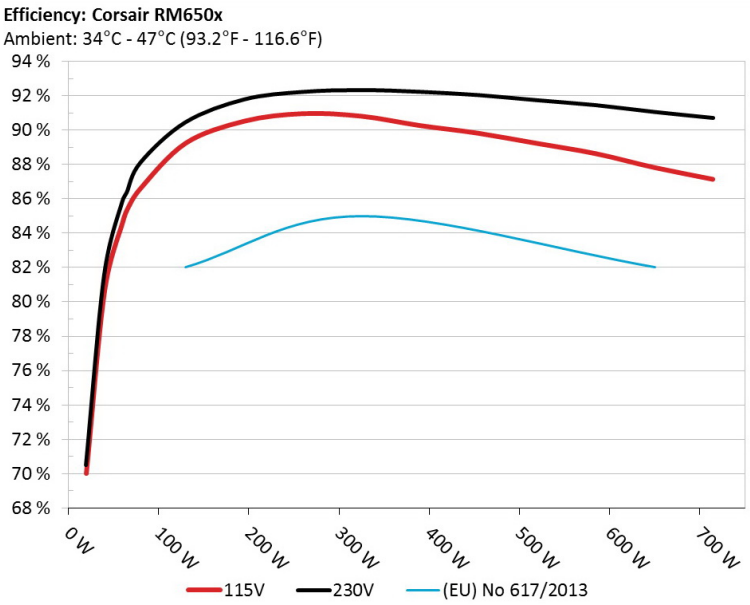
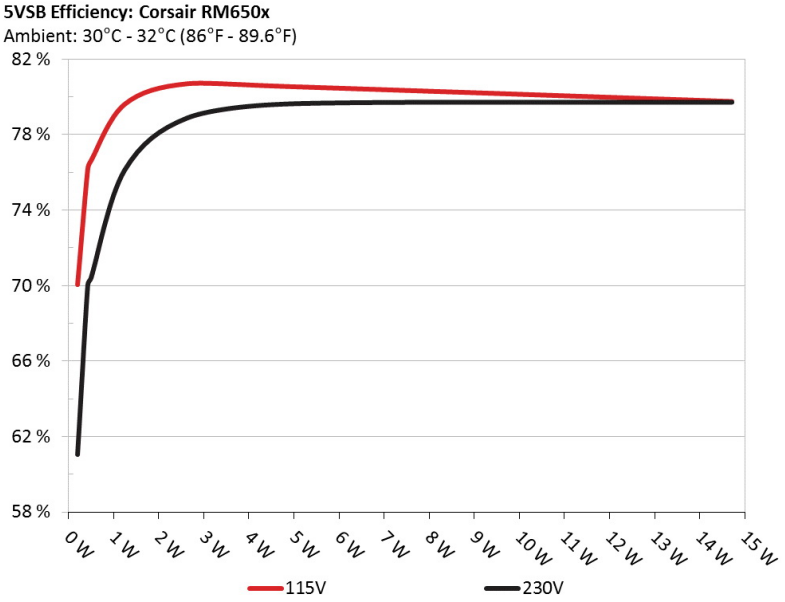
EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE



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

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10-110% LOAD TESTS

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
1	3.584A	1.985A	1.993A	0.997A	64.856	85.342%	0	<6.0	42.41°C	0.966
	12.077V	5.031V	3.307V	5.009V	75.995				36.78°C	115.10V
2	8.204A	2.980A	2.998A	1.199A	129.835	89.228%	0	<6.0	43.31°C	0.988
	12.064V	5.024V	3.300V	5.001V	145.509				37.37°C	115.09V
3	13.180A	3.487A	3.518A	1.400A	194.901	90.510%	0	<6.0	44.94°C	0.992
	12.050V	5.020V	3.294V	4.992V	215.336				38.20°C	115.09V
4	18.166A	3.984A	4.008A	1.604A	259.825	90.949%	0	<6.0	45.49°C	0.994
	12.037V	5.015V	3.290V	4.984V	285.683				39.44°C	115.09V
5	22.819A	4.987A	5.019A	1.806A	324.761	90.802%	0	<6.0	46.81°C	0.995
	12.021V	5.009V	3.285V	4.976V	357.658				40.99°C	115.09V
6	27.488A	5.995A	6.038A	2.010A	389.764	90.256%	610	10.2	41.12°C	0.996
	12.005V	5.003V	3.278V	4.968V	431.845				51.07°C	115.09V
7	32.164A	7.011A	7.056A	2.216A	454.759	89.805%	610	10.2	41.55°C	0.996
	11.991V	4.994V	3.271V	4.958V	506.387				52.06°C	115.09V
8	36.860A	8.022A	8.084A	2.422A	519.738	89.215%	633	10.9	42.76°C	0.997
	11.974V	4.986V	3.265V	4.948V	582.566				54.07°C	115.09V
9	41.989A	8.533A	8.618A	2.425A	584.760	88.621%	714	16.5	44.26°C	0.997
	11.960V	4.980V	3.259V	4.945V	659.847				55.09°C	115.09V
10	46.878A	9.052A	9.130A	3.044A	649.653	87.811%	980	25.7	45.98°C	0.997
	11.945V	4.972V	3.253V	4.924V	739.829				56.32°C	115.08V
11	52.381A	9.064A	9.142A	3.049A	714.620	87.126%	1172	31.4	47.47°C	0.997
	11.930V	4.968V	3.248V	4.917V	820.210				58.14°C	115.08V
CL1	0.101A	16.025A	16.002A	0.004A	133.704	82.361%	591	9.7	45.21°C	0.990
	12.038V	4.995V	3.276V	5.049V	162.339				55.85°C	115.11V
CL2	53.975A	1.003A	1.003A	1.001A	658.110	88.488%	955	24.8	45.92°C	0.997
	11.947V	4.995V	3.271V	4.974V	743.726				56.68°C	115.09V

Anex

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20-80W LOAD TESTS

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	PF/AC Volts
1	1.211A	0.491A	0.482A	0.196A	19.671	69.989%	0	<6.0	0.850
	12.093V	5.036V	3.312V	5.031V	28.106				115.09V
2	2.446A	0.990A	0.995A	0.396A	39.797	80.575%	0	<6.0	0.933
	12.087V	5.034V	3.310V	5.026V	49.391				115.10V
3	3.680A	1.485A	1.509A	0.596A	59.892	84.603%	0	<6.0	0.962
	12.082V	5.031V	3.307V	5.020V	70.792				115.09V
4	4.905A	1.985A	1.995A	0.796A	79.798	86.591%	0	<6.0	0.973
	12.076V	5.030V	3.305V	5.013V	92.155				115.10V

RIPPLE MEASUREMENTS

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	4.7 mV	5.6 mV	5.6 mV	5.1 mV	Pass
20% Load	5.6 mV	5.9 mV	5.7 mV	5.3 mV	Pass
30% Load	7.0 mV	6.1 mV	5.6 mV	5.5 mV	Pass
40% Load	7.4 mV	6.0 mV	5.7 mV	6.0 mV	Pass
50% Load	7.9 mV	6.3 mV	5.4 mV	6.0 mV	Pass
60% Load	8.0 mV	6.2 mV	6.4 mV	5.9 mV	Pass
70% Load	8.3 mV	6.5 mV	6.6 mV	5.8 mV	Pass
80% Load	8.7 mV	7.2 mV	6.9 mV	6.9 mV	Pass
90% Load	9.6 mV	7.4 mV	8.0 mV	7.1 mV	Pass
100% Load	10.9 mV	8.5 mV	8.5 mV	8.5 mV	Pass
110% Load	11.6 mV	8.5 mV	9.3 mV	10.0 mV	Pass
Crossload 1	7.4 mV	9.6 mV	7.5 mV	6.9 mV	Pass
Crossload 2	11.0 mV	7.6 mV	8.6 mV	7.7 mV	Pass

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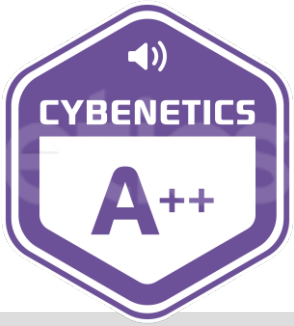
HOLD-UP TIME & POWER OK SIGNAL (230V)	
Hold-Up Time (ms)	24.3
AC Loss to PWR_OK Hold Up Time (ms)	22.8
PWR_OK Inactive to DC Loss Delay (ms)	1.5

Top side

Power specifications table

CERTIFICATIONS



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