

Anex MSI MPG A1000G

Lab ID#: MS10001965 Receipt Date: Jan 11, 2022 Test Date: Jan 21, 2022

Report: 22PS1965A

Report Date: Jan 21, 2022

DUT INFORMATION	
Brand	MSI
Manufacturer (OEM)	CWT
Series	MPG
Model Number	
Serial Number	
DUT Notes	

DUT SPECIFICATIONS				
Rated Voltage (Vrms)	100-240			
Rated Current (Arms)	13-6.5			
Rated Frequency (Hz)	50-60			
Rated Power (W)	1000			
Туре	ATX12V			
Cooling	135mm Fluid Dynamic Bearing Fan (HA13525H12SF-Z)			
Semi-Passive Operation	✓ (selectable)			
Cable Design	Fully Modular			

TEST EQUIPMENT	
Electronic Loads	Chroma 63601-5 x4 Chroma 63600-2 x2 63640-80-80 x20 63610-80-20 x2
AC Sources	Chroma 6530, Keysight AC6804B
Power Analyzers	N4L PPA1530 x2
Sound Analyzer	Bruel & Kjaer 2270 G4
Microphone	Bruel & Kjaer Type 4955-A
Data Loggers	Picoscope TC-08 x2, Labjack U3-HV x2
Tachometer	UNI-T UT372 x2
Digital Multimeter	Keysight U1273AX, Fluke 289, Keithley 2015 - THD
UPS	CyberPower OLS3000E 3kVA x2
Transformer	3kVA x2

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RESULTS	
Temperature Range (°C /°F)	30-32 / 86-89.6
ErP Lot 3/6 Ready	/
(EU) No 617/2013 Compliance	/

115V	
Average Efficiency	88.647%
Efficiency With 10W (≤500W) or 2% (>500W)	50.084
Average Efficiency 5VSB	77.992%
Standby Power Consumption (W)	0.0257543
Average PF	0.987
Avg Noise Output	32.16 dB(A)
Efficiency Rating (ETA)	GOLD
Noise Rating (LAMBDA)	Standard++

230V	
Average Efficiency	90.949%
Average Efficiency 5VSB	78.589%
Standby Power Consumption (W)	0.0457714
Average PF	0.965
Avg Noise Output	32.12 dB(A)
Efficiency Rating (ETA)	GOLD
Noise Rating (LAMBDA)	Standard++

POWER SPECIFICATIONS						
Rail		3.3V	5V	12V	5VSB	-12V
Mary Danier	Amps	22	22	83.5	3	0.3
Max. Power	Watts	120		1002	15	3.6
Total Max. Power (W)		1000				

HOLD-UP TIME & POWER OK SIGNAL (230V)	
Hold-Up Time (ms)	17.1
AC Loss to PWR_OK Hold Up Time (ms)	14.7
PWR_OK Inactive to DC Loss Delay (ms)	2.4

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CABLES AND CONNECTORS				
Modular Cables	r Cables			
Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors
ATX connector 20+4 pin (600mm)	1	1	16AWG	No
4+4 pin EPS12V (700mm)	2	2	18AWG	No
6+2 pin PCle (600mm)	3	3	16AWG	No
6+2 pin PCle (600mm+150mm)	2	4	16-18AWG	No
SATA (500mm+150mm+150mm+150mm)	3	12	18AWG	No
4 pin Molex (500mm+150mm+150mm+150mm) / FDD (+150mm)	1	4/1	18-20AWG	No

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Canaral Data	
General Data	CMT
Manufacturer (OEM)	CWT
PCB Type	Double Sided
Primary Side	
Transient Filter	4x Y caps, 2x X caps, 2x CM chokes, 1x MOV
Inrush Protection	1x NTC Thermistor SCK203R0 (3 Ohm) & Relay
Bridge Rectifier(s)	2x GBU1506 (800V, 15A @ 100°C)
APFC MOSFETs	2x Infineon IPA60R099P6 (600V, 24A @ 100°C, Rds(on): 0.099Ohm)
APFC Boost Diode	1x On Semiconductor FFSP1065B (650V, 10A @ 139°C)
Bulk Cap(s)	1x Nichicon (400V, 820uF, 2,000h @ 105°C, GL)
Main Switchers	2x Infineon IPA60R125P6 (600V, 19A @ 100°C, Rds(on): 0.1250hm)
APFC Controller	Champion CM6500UNX & CM03X
Resonant Controller	Champion CU6901VA
Topology	Primary side: APFC, Half-Bridge & LLC converter Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	
+12V MOSFETs	8x International Rectifier IRFH7004PBF (40V, 164A @ 100°C, Rds(on): 1.4mOhm)
5V & 3.3V	DC-DC Converters: 2x UBIQ QM3054M6 (30V, 61A @ 100°C, Rds(on): 4.8mOhm) & 2x UBIQ QN3107M6N (30V, 70A @ 100°C, Rds(on): 2.6mOhm) PWM Controller(s): uPI-Semi uP3861P
Filtering Capacitors	Electrolytic: 2x Nippon Chemi-Con (105°C, W), 1x Nichicon (2-5,000h @ 105°C, HD), 2x Nippon Chemi-Con (1-5,000h @ 105°C, KZE), 2 Nichicon (4-10,000h @ 105°C, HE), 1x Nippon Chemi-Con (4-10,000h @ 105°C, KYA), 1x Rubycon (4-10,000h @ 105°C, YXJ) Polymer: 10x United Chemi-Con, 18x FPCAP
Supervisor IC	Weltrend WT7502R (OVP, UVP, SCP, PG)
Fan Controller	Microchip PIC16F1503
Fan Model	Hong Hua HA13525H12SF-Z (135mm, 12V, 0.5A, Fluid Dynamic Bearing Fan)
5VSB Circuit	
Rectifier	1x D10PS45L SBR (45V, 10A)
Standby PWM Controller	On Bright OB2365T

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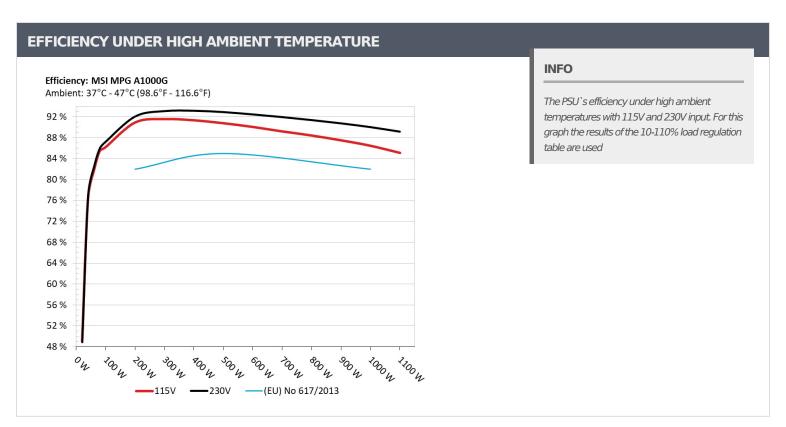
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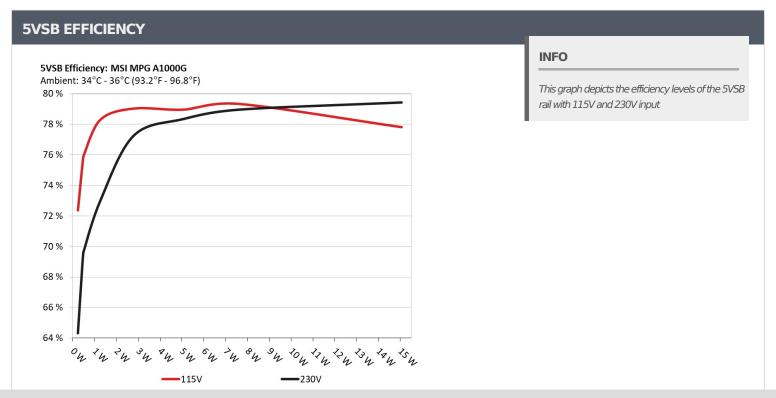
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5VSB EFFICIENCY -115V (ERP LOT 3/6 & CEC)				
Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.228W	72.0500/	0.031
1	5.07V	0.313W	72.858%	115.16V
2	0.09A	0.456W	76 1 2207	0.059
2	5.069V	0.599W	76.132%	115.16V
2	0.55A	2.785W	70.5120/	0.259
3	5.061V	3.503W	79.512%	115.17V
	1A	5.055W	70.42007	0.347
4	5.054V	6.363W	79.438%	115.17V
_	1.5A	7.57W	70.0100/	0.396
5	5.045V	9.484W	79.819%	115.17V
6	3A	15.063W		0.46
	5.021V	19.239W	78.297%	115.16V

5VSB EFFICIENCY -230V (ERP LOT 3/6 & CEC)				
Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.228W	C4 0170/	0.011
1	5.071V	0.352W	64.817%	230.36V
•	0.09A	0.456W		0.02
2	5.07V	0.653W	69.789%	230.36V
	0.55A	2.785W	77.747%	0.103
3	5.061V	3.582W		230.36V
	1A	5.055W		0.169
4	5.054V	6.412W	78.831%	230.36V
_	1.5A	7.571W		0.224
5	5.046V	9.53W	79.444%	230.36V
6	ЗА	15.064W		0.321
	5.021V	18.849W	79.918%	230.36V

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# 115V

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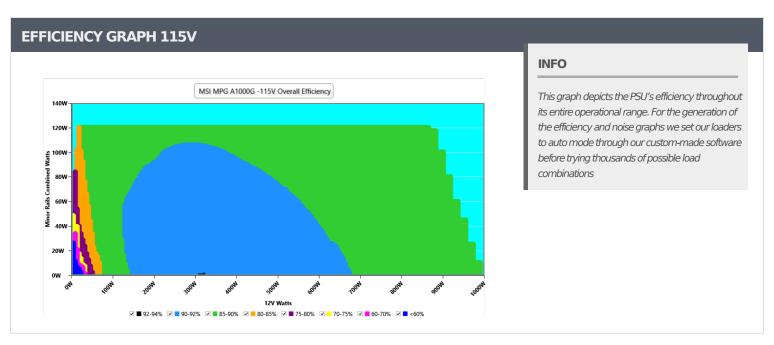
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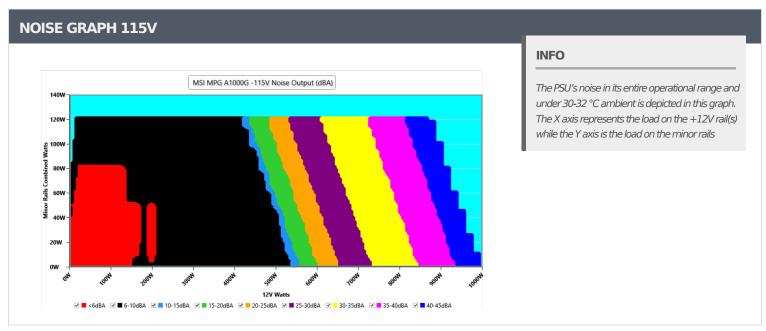
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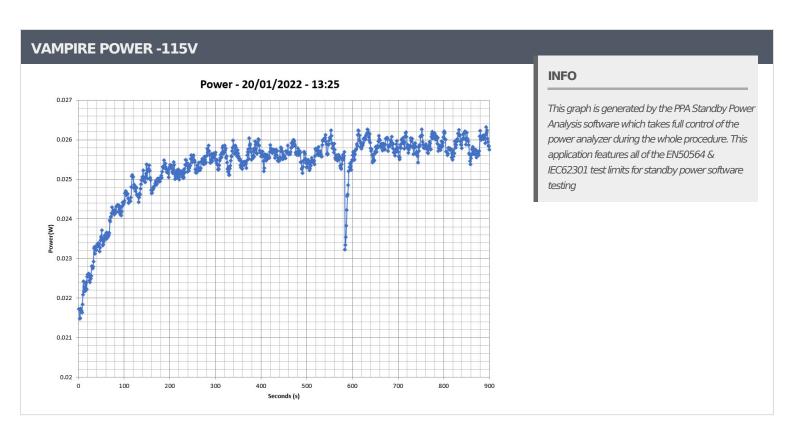
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10-1	10% LOA	J 12313								
Test	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
100/	6.483A	1.993A	2.011A	0.991A	100.005	06 1020/	0		44.97°C	0.977
10%	12.094V	5.018V	3.282V	5.045V	116.025	86.193%	0	<6.0	40.59°C	115.16
20%	14.007A	2.993A	3.021A	1.192A	199.962	90.913%	0	<6.0	45.89°C	0.986
2070	12.069V	5.013V	3.277V	5.034V	219.949	90.91570	0	<0.0	41.03°C	115.16
200/	21.881A	3.494A	3.528A	1.371A	300.013	01 5620/	0	<6.0	46.83°C	0.987
30%	12.063V	5.009V	3.274V	5.105V	327.66	91.562%		<0.0	41.45°C	115.16
400/	29.732A	3.997A	4.037A	1.569A	399.679	- 01 2220/	0	-6.0	47.43°C	0.986
40%	12.057V	5.004V	3.27V	5.099V	437.604	91.333%	0	<6.0	41.62°C	115.15
E <b>0</b> 0/	37.253A	5A	5.051A	1.769A	499.432	90.775%	416	7.5	42.34°C	0.987
50%	12.051V	5.001V	3.267V	5.088V	550.188	90.775%	416	7.5	48.41°C	115.15
C00/	44.842A	6.004A	6.067A	1.97A	599.952	00.069/	642	18.1	42.49°C	0.989
60%	12.045V	4.998V	3.264V	5.078V	666.168	90.06%	643		49.2°C	115.14
700/	52.377A	7.009A	7.085A	2.171A	699.692	- 00 2000/	OE 4	27.2	43.77°C	0.991
70%	12.039V	4.995V	3.261V	5.067V	784.353	89.206%	854	27.2	50.97°C	115.14
000/	60.001A	8.002A	8.103A	2.274A	799.652	00.4220/	1041	22.1	43.96°C	0.992
80%	12.030V	4.992V	3.258V	5.057V	904.361	88.422%	1041	33.1	52.32°C	115.14
000/	67.959A	8.522A	8.602A	2.377A	899.506	07.5010/	1.407	40.4	44.5°C	0.993
90%	12.023V	4.988V	3.255V	5.048V	1027.993	87.501%	1427	42.4	53.55°C	115.14
1000/	75.722A	9.031A	9.133A	2.982A	999.504	06.4570/	1767	40.7	45.63°C	0.994
100%	12.016V	4.983V	3.251V	5.031V	1156.079	86.457%	1767	48.1	55.62°C	115.14
1100/	83.431A	10.043A	10.254A	2.987A	1100.15	05.0030/	21.40	F2.0	46.69°C	0.995
110%	12.008V	4.978V	3.247V	5.022V	1292.906	85.091%	2149	52.8	57.56°C	115.14
Cl 1	0.116A	14.407A	14.621A	0A	121.298	04.0700/	F60	12.2	43.23°C	0.986
CL1	12.097V	5.011V	3.262V	5.042V	144.271	84.076%	560	13.2	48.43°C	115.18
CLO	0.115A	21.846A	0A	0A	111.39	02.2110/	060	27.0	41.61°C	0.981
CL2	12.101V	5.035V	3.276V	5.055V	135.494	82.211%	868	27.8	48.69°C	115.17
CI 3	0.115A	0A	22.242A	0A	73.988	75.040/	040	20.2	40.18°C	0.977
CL3	12.095V	5.008V	3.264V	5.042V	97.43	75.94%	940	30.3	49.29°C	115.17
Cl 4	83.215A	0A	0A	0A	1000.08	07.2440/	1504	42.0	42.62°C	0.994
CL4	12.018V	5.005V	3.272V	5.094V	1146.31	87.244%	1504	43.9	54.03°C	115.13

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20-80W 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
2014	1.228A	0.496A	0.5A	0.197A	19.999	49.037%	0	<6.0	40.07°C	0.932
20W	12.099V	5.044V	3.297V	5.065V	40.783				36.85°C	115.17V
40144	2.702A	0.694A	0.701A	0.296A	39.997	76.284%	0	<6.0	41.29°C	0.959
40W	12.097V	5.043V	3.297V	5.062V	52.432				37.81°C	115.16V
60144	4.176A	0.895A	0.903A	0.395A	59.996	81.677%	0	<6.0	41.78°C	0.968
60W	12.097V	5.029V	3.288V	5.059V	73.455				38.02°C	115.16V
00147	5.648A	1.095A	1.105A	0.495A	79.952	85.456%			43.55°C	0.977
80W	12.095V	5.022V	3.285V	5.055V	93.559		0	<6.0	39.49°C	115.16V

RIPPLE MEA	SUREMENTS 115V				
Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	4.90mV	6.24mV	4.71mV	6.17mV	Pass
20% Load	11.43mV	5.88mV	4.76mV	5.96mV	Pass
30% Load	9.13mV	6.19mV	6.70mV	6.78mV	Pass
40% Load	9.23mV	6.49mV	5.37mV	7.39mV	Pass
50% Load	9.53mV	6.80mV	5.68mV	7.29mV	Pass
60% Load	10.25mV	7.57mV	5.78mV	7.34mV	Pass
70% Load	10.52mV	8.13mV	6.19mV	8.36mV	Pass
80% Load	11.80mV	8.59mV	10.29mV	8.67mV	Pass
90% Load	12.21mV	9.26mV	10.75mV	8.87mV	Pass
100% Load	21.00mV	10.07mV	11.54mV	10.52mV	Pass
110% Load	21.22mV	10.58mV	11.97mV	11.13mV	Pass
Crossload1	10.06mV	8.65mV	11.80mV	10.55mV	Pass
Crossload2	7.71mV	11.15mV	5.68mV	10.14mV	Pass
Crossload3	6.59mV	5.83mV	14.99mV	9.58mV	Pass
Crossload4	19.43mV	8.81mV	6.67mV	13.38mV	Pass

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# 230V

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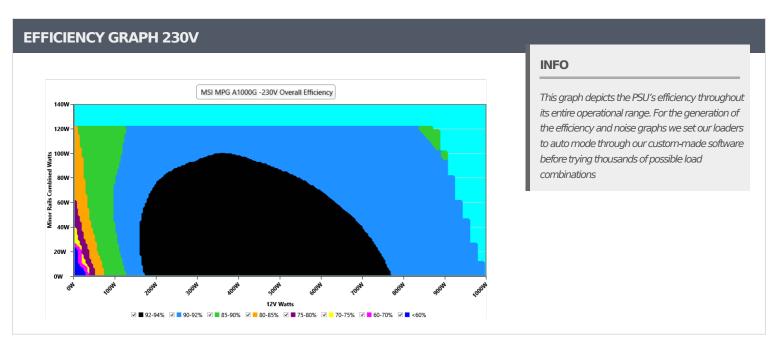
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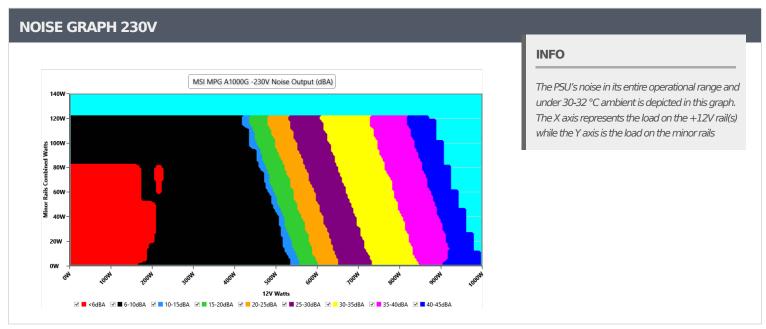
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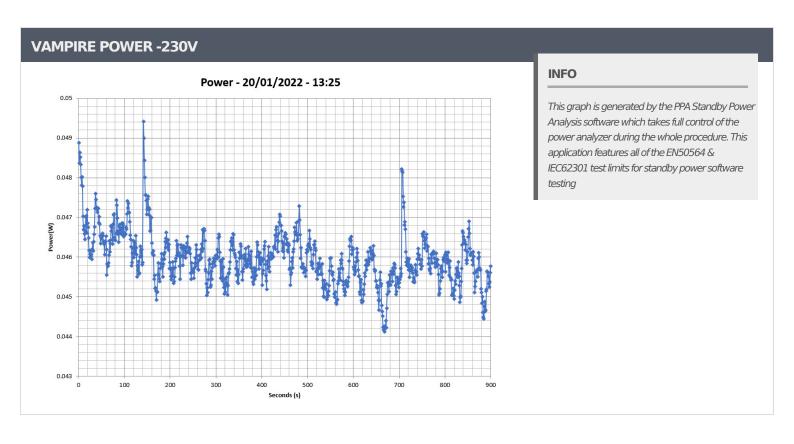
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10-1	10% LOA	D TESTS	230V							
Test	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
100/	6.482A	1.993A	2.011A	0.991A	100.001	07.2570/		.6.0	44.62°C	0.898
10%	12.094V	5.018V	3.281V	5.044V	114.604	87.257%	0	<6.0	40.55°C	230.34V
2007	14.008A	2.993A	3.022A	1.192A	199.947	02.000/	0	-00	45.06°C	0.951
20%	12.068V	5.013V	3.276V	5.032V	217.173	92.068%	0	<6.0	40.72°C	230.34V
2007	21.885A	3.495A	3.529A	1.372A	299.995	02.0010/	0	-6.0	46.07°C	0.966
30%	12.061V	5.008V	3.272V	5.103V	322.26	93.091%	0	<6.0	41.39°C	230.34V
100/	29.749A	3.998A	4.038A	1.57A	399.688	02.1560/	0	<6.0	47.27°C	0.974
10%	12.051V	5.003V	3.269V	5.096V	429.053	93.156%	0	<b>\0.0</b>	42.07°C	230.34V
-00/	37.266A	5.002A	5.054A	1.77A	499.411	02.0000/	415	7.5	42.24°C	0.977
50%	12.046V	4.999V	3.265V	5.085V	537.534	92.908%	415	7.5	47.81°C	230.34V
2007	44.864A	6.007A	6.072A	1.971A	599.944	- 02.4610/	640	17.5	42.84°C	0.98
60%	12.039V	4.996V	3.261V	5.074V	648.861	92.461%			48.99°C	230.34V
700/	52.407A	7.013A	7.092A	2.173A	699.674	01.05.40/	042	27.1	43.39°C	0.982
′0%	12.032V	4.992V	3.258V	5.062V	760.897	91.954%	843	27.1	50.5°C	230.34V
2007	60.028A	8.003A	8.113A	2.277A	799.63	01.2020/	1004	22.0	43.75°C	0.983
30%	12.024V	4.988V	3.254V	5.051V	875.046	91.382%	1034	32.9	52.3°C	230.34V
	67.987A	8.529A	8.615A	2.38A	899.519	00 ===0/			44.02°C	0.984
90%	12.018V	4.983V	3.25V	5.042V	991.192	90.751%	1422	42.3	53.46°C	230.34V
000/	75.775A	9.04A	9.148A	2.987A	999.519	00.00=0/		40.1	44.93°C	0.986
L00%	12.008V	4.979V	3.246V	5.023V	1110.117	90.037%	1763	48.1	55.24°C	230.34V
17.00/	83.497A	10.055A	10.274A	2.993A	1100.208	00.1660/	21.47	F2.0	46.53°C	0.987
10%	11.999V	4.973V	3.241V	5.013V	1233.887	89.166%	2147	52.8	57.33°C	230.34V
	0.116A	14.415A	14.639A	0A	121.298	0.4-7-0/			44.42°C	0.923
CL1	12.095V	5.009V	3.258V	5.039V	143.193	84.71%	558	12.9	50.09°C	230.35V
21.0	0.115A	21.86A	0A	0A	111.392		066	27.0	42.13°C	0.917
L2	12.100V	5.032V	3.274V	5.054V	134.51	82.814%	866	27.8	49.29°C	230.34V
	0.115A	0A	22.265A	0A	73.989	70.55007	020	20.2	40.96°C	0.873
CL3	12.094V	5.008V	3.26V	5.04V	96.695	76.518%	939	30.3	50.21°C	230.34V
	83.252A	0A	0A	0A	1000.047	00.05-21			45.54°C	0.985
CL4	12.012V	5.001V	3.268V	5.088V	1101.237	90.811%	1502	43.6	56.22°C	230.33V

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20-80W 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
2014	1.228A	0.496A	0.5A	0.197A	20.001	48.899%	0	<6.0	40.67°C	0.681
20W	12.096V	5.044V	3.297V	5.064V	40.902				37.49°C	230.36V
40)44	2.702A	0.694A	0.701A	0.296A	39.998	76.955%	0	<6.0	40.96°C	0.751
40W	12.094V	5.043V	3.297V	5.061V	51.976				37.63°C	230.36V
60)44	4.178A	0.895A	0.903A	0.395A	59.996	82.436%		<6.0	42.24°C	0.824
60W	12.095V	5.028V	3.288V	5.058V	72.779		0		38.72°C	230.35V
00144	5.650A	1.095A	1.105A	0.495A	79.949		0	<6.0	43.26°C	0.866
80W	12.093V	5.022V	3.284V	5.055V	92.968	85.997%	0		39.45°C	230.35V

RIPPLE MEASU	REMENTS 230V				
Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	4.85mV	5.68mV	5.02mV	5.91mV	Pass
20% Load	13.21mV	5.52mV	4.86mV	6.47mV	Pass
30% Load	10.86mV	6.96mV	6.96mV	7.24mV	Pass
40% Load	9.74mV	6.19mV	5.58mV	7.60mV	Pass
50% Load	10.61mV	6.60mV	5.68mV	6.99mV	Pass
60% Load	10.40mV	7.36mV	6.14mV	7.44mV	Pass
70% Load	11.07mV	9.05mV	6.45mV	8.26mV	Pass
80% Load	12.04mV	8.18mV	10.23mV	8.46mV	Pass
90% Load	13.26mV	8.95mV	11.00mV	8.72mV	Pass
100% Load	21.08mV	10.24mV	11.57mV	20.41mV	Pass
110% Load	22.65mV	10.10mV	12.25mV	10.17mV	Pass
Crossload1	17.24mV	8.42mV	12.61mV	9.56mV	Pass
Crossload2	7.66mV	11.20mV	6.30mV	9.94mV	Pass
Crossload3	6.54mV	5.52mV	15.00mV	9.89mV	Pass
Crossload4	20.45mV	8.36mV	6.92mV	12.53mV	Pass

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