EFFICIENCY AND NOISE REPORT IN ACCORDANCE WITH
CYBENETICS ETA AND CYBENETICS LAMBDA PROCEDURE

SilverStone Decathlon DA1650 (#2)

Lab ID#: SL16501722
Receipt Date: Sep 22, 2020
Test Date: Sep 29, 2020

Report: 20PS1722A
Report Date: Oct 5, 2020

DUT INFORMATION

Brand	SilverStone
Manufacturer (OEM)	High Power
Series	Decathlon
Model Number	DA1650-G
Serial Number	DEDAK650G02080085
DUT Notes	

DUT SPECIFICATIONS

Rated Voltage (Vrms)	100-240
Rated Current (Arms)	20
Rated Frequency (Hz)	50-60
Rated Power (W)	1650
Type	ATX12V
Cooling	135mm Fluid Dynamic Bearing Fan (RL4Z S1352512HH)
Semi-Passive Operation	✓
Cable Design	Fully Modular

POWER SPECIFICATIONS

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	25	25	137.5	3	0.3
	Watts	130		1650	15	3.6
Total Max. Power (W)		1650				

CABLES AND CONNECTORS

Modular Cables

Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors
ATX connector 20+4 pin (610mm) / 6 pin sense wires (640mm)	1	1 / 1	16-22AWG	No
4+4 pin EPS12V (750mm)	2	2	16AWG	No
6+2 pin PCIe (610mm+150mm)	4	8	16-18AWG	No
8 pin PCIe (610mm)	4	4	16AWG	No
SATA (600mm+150mm+150mm+150mm)	4	16	18AWG	No
4-pin Molex (600mm+150mm+150mm)	1	3	18AWG	No
4-pin Molex (600mm+150mm+150mm) / FDD (+150mm)	1	3 / 1	18-22AWG	No
FDD Adapter (105mm)	1	1	22AWG	No
AC Power Cord (1680mm) - C19 coupler	1	1	16AWG	-

General Data	-
Manufacturer (OEM)	High Power
PCB Type	Double Sided
Primary Side	-
Transient Filter	4x Y caps, 2x X caps, 2x CM chokes, 1x MOV
Inrush Protection	NTC Thermistor (SCK-057) (5Ohm) & Relay
Bridge Rectifier(s)	2x HY GBJ5006 (600V, 50A @ 100°C)
APFC MOSFETs	2x Infineon IPW60R060P7 (650V, 30A @ 100°C, Rds(on): 0.06Ohm)
APFC Boost Diode	2x Infineon IDH06G65C5 (650V, 6A @ 145°C)
Hold-up Cap(s)	2x Nippon Chemi-Con (400V, 820uF, 105°C, CE)
Main Switchers	2x Infineon IPW60R080P7 (650V, 23A @ 100°C, Rds(on): 0.08Ohm)
APFC Controller	Infineon ICE3PCS01G
Resonant Controller	Champion CM6901X
Topology	Primary side: Interleaved APFC, Half-Bridge & LLC converter Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	-
+12V MOSFETs	10x Toshiba TPHR8504PL (40V, 150A @ 175°C, Rds(on): 0.85mOhm)
5V & 3.3V	DC-DC Converters: 8x Infineon BSC0906NS (30V, 40A @ 100°C, Rds(on): 4.5mOhm) PWM Controllers: ANPEC APW7159C
Filtering Capacitors	Electrolytic: 3x Nippon Chemi-Con (105°C, W), 11x Nippon Chemi-Con (4-10,000h @ 105°C, KY) Polymer: 23x FPCAP, 6x United Chemi-Con
Supervisor IC	SITI PS232S (OCP, OVP, UVP, SCP, PG)
Micro Controller	STC15W408AS
Fan Model	Globe Fan RL4Z S1352512HH (135mm, 12V, 0.45A, Fluid Dynamic Bearing Fan)
5VSB Circuit	-
Rectifier	1x PFC P10V45SP SBR (45V, 10A) & 2x Infineon BSC0906NS (30V, 40A @ 100°C, Rds(on): 4.5mOhm)
Standby PWM Controller	Excelliance MOS EM8569D

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RESULTS

Temperature Range (°C /°F)	30-32 / 86-89.6 (+-2°C / +- 3.6°F)
ErP Lot 3/6 Ready	✓
(EU) No 617/2013 Compliance	✓

115V

Average Efficiency	89.267%
Efficiency With 10W (≤500W) or 2% (>500W)	70.264
Average Efficiency 5VSB	76.969%
Standby Power Consumption (W)	0.0869718
Average PF	0.995
Avg Noise Output	36.62 dB(A)
Efficiency Rating (ETA)	PLATINUM
Noise Rating (LAMBDA)	S+

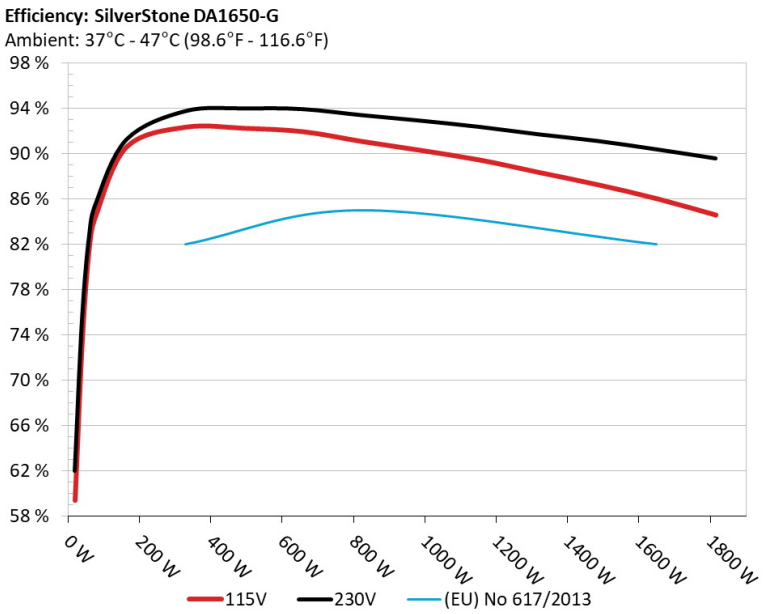
230V

Average Efficiency	91.613%
Average Efficiency 5VSB	76.547%
Standby Power Consumption (W)	0.1198790
Average PF	0.977
Avg Noise Output	36.61 dB(A)
Efficiency Rating (ETA)	PLATINUM
Noise Rating (LAMBDA)	S+

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

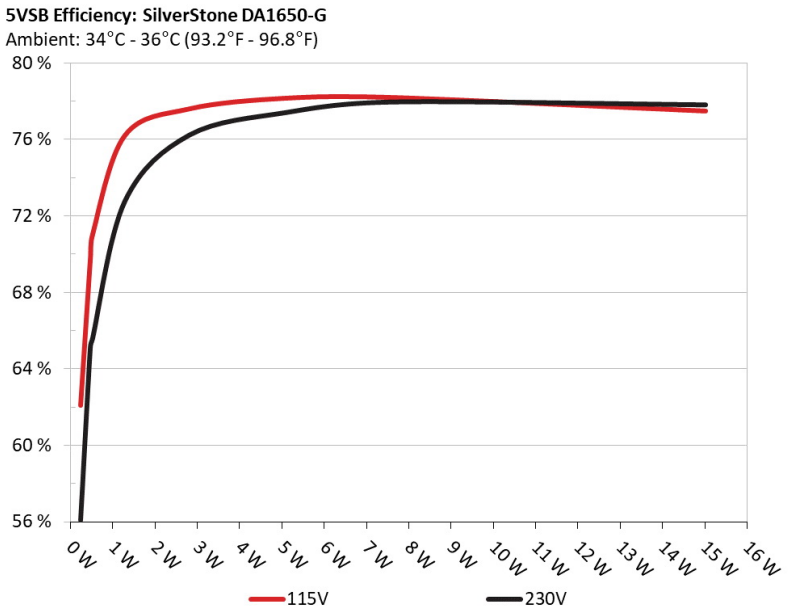
EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE



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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.231	62.097%	0.052
	5.119V	0.372		115.12V
2	0.090A	0.461	69.743%	0.089
	5.119V	0.661		115.13V
3	0.550A	2.806	77.600%	0.305
	5.101V	3.616		115.13V
4	1.000A	5.085	78.159%	0.377
	5.084V	6.506		115.13V
5	1.500A	7.598	78.193%	0.418
	5.065V	9.717		115.13V
6	3.000A	15.010	77.487%	0.470
	5.003V	19.371		115.13V

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.046A	0.231	56.068%	0.178
	5.063V	0.412		230.25V
2	0.090A	0.461	65.113%	0.030
	5.120V	0.708		230.24V
3	0.550A	2.807	76.215%	0.139
	5.103V	3.683		230.25V
4	1.000A	5.086	77.389%	0.216
	5.086V	6.572		230.25V
5	1.500A	7.600	77.941%	0.273
	5.067V	9.751		230.26V
6	3.000A	15.017	77.792%	0.359
	5.005V	19.304		230.24V

115V

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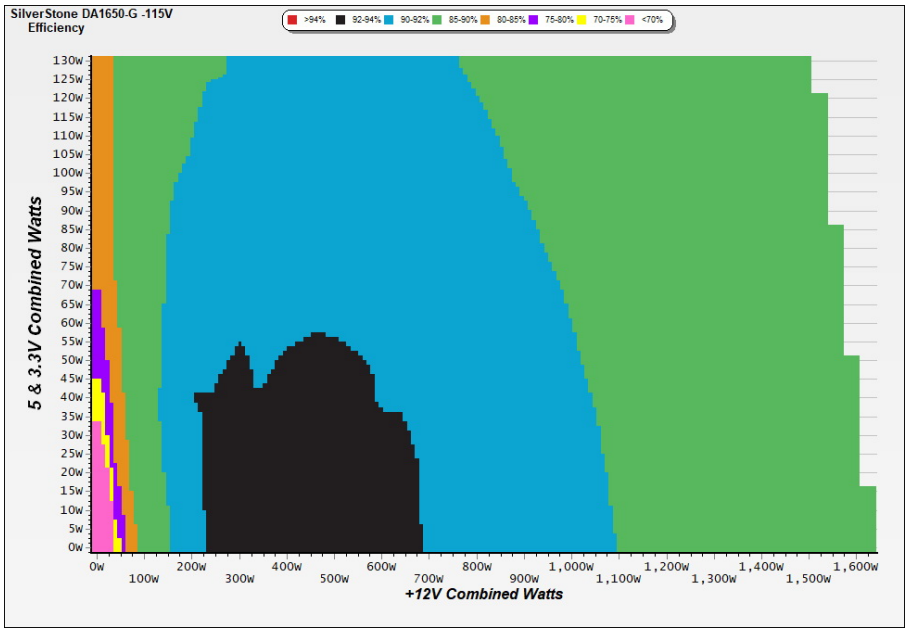
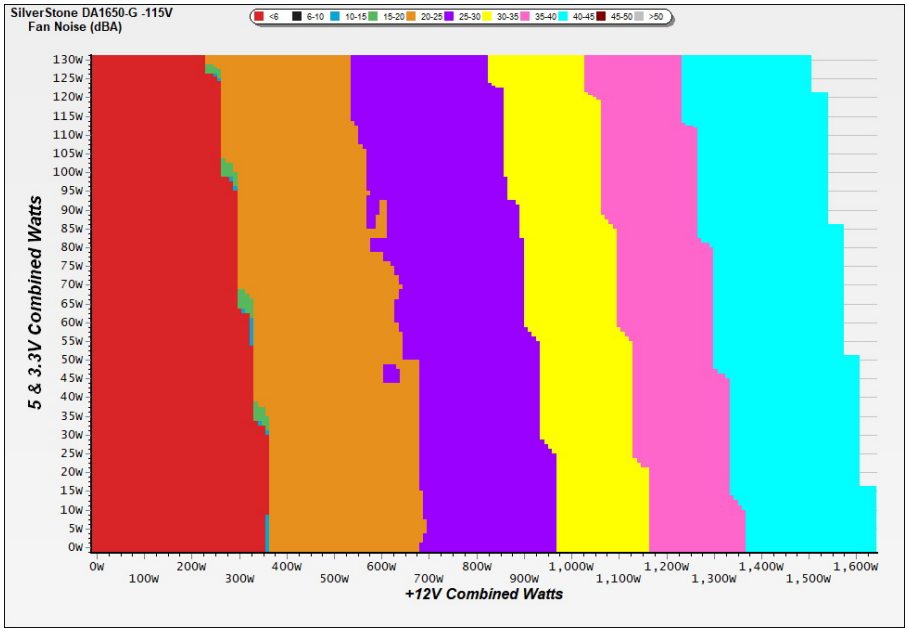
EFFICIENCY GRAPH 115V



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

NOISE GRAPH 115V



INFO

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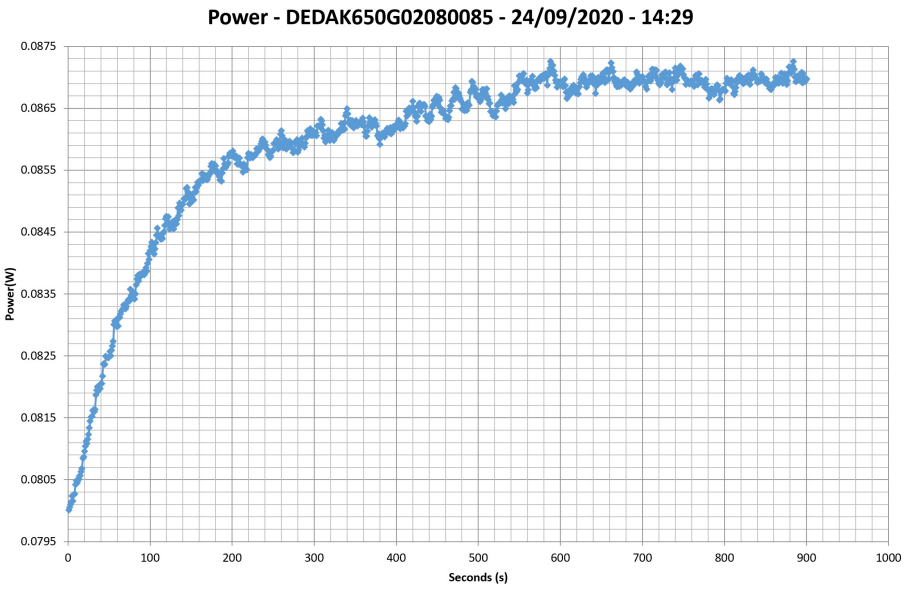
VAMPIRE POWER -115V



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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COMMISSION REGULATION (EU) NO 617/2013 TESTING 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	11.953A	1.995A	1.996A	1.005A	165.049	90.637%	0	<6.0	40.31°C	0.989
	12.001V	5.011V	3.309V	4.975V	182.098				44.27°C	115.12V
2	24.940A	2.997A	2.997A	1.209A	330.064	92.359%	0	<6.0	40.99°C	0.997
	11.995V	5.006V	3.304V	4.965V	357.372				45.66°C	115.11V
5	64.685A	5.008A	5.004A	1.826A	825.113	91.088%	914	27.3	42.21°C	0.999
	11.975V	4.993V	3.298V	4.930V	905.840				49.13°C	115.09V
10	130.596A	9.051A	9.056A	3.084A	1650.098	86.028%	1608	43.7	45.09°C	0.999
	11.948V	4.974V	3.281V	4.865V	1918.099				57.31°C	115.05V

230V

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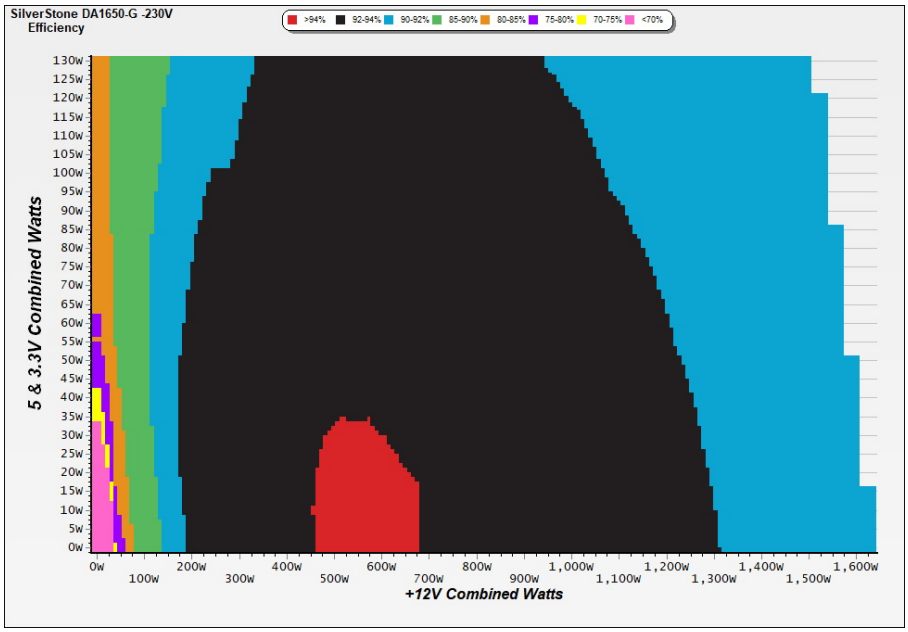
EFFICIENCY GRAPH 230V



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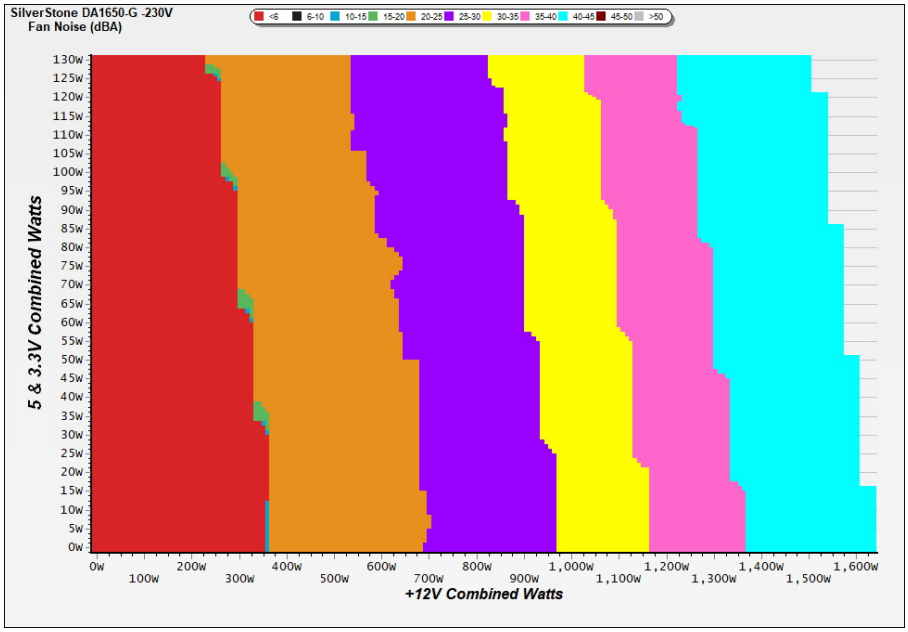
NOISE GRAPH 230V



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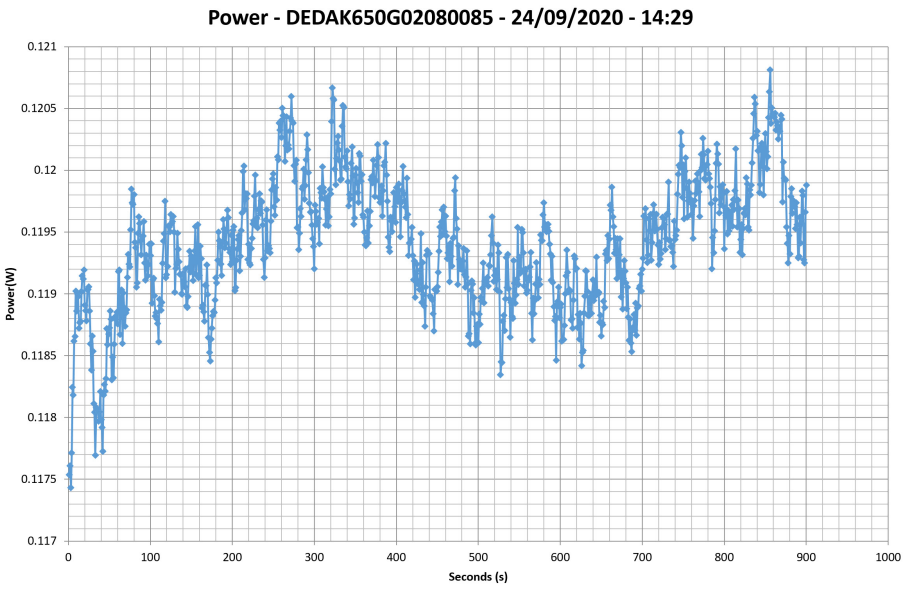
VAMPIRE POWER -230V



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Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
1	11.951A	1.995A	1.997A	1.005A	165.065	91.249%	0	<6.0	40.08°C	0.920
	12.004V	5.012V	3.308V	4.976V	180.896				44.20°C	230.27V
2	24.952A	3.002A	2.997A	1.211A	330.082	93.751%	0	<6.0	40.89°C	0.963
	11.990V	4.998V	3.304V	4.956V	352.085				46.04°C	230.27V
5	64.710A	5.008A	5.005A	1.826A	825.088	93.387%	916	27.3	42.01°C	0.994
	11.970V	4.993V	3.297V	4.930V	883.517				49.59°C	230.25V
10	130.626A	9.050A	9.055A	3.085A	1650.039	90.368%	1608	43.7	45.15°C	0.993
	11.945V	4.973V	3.280V	4.864V	1825.902				56.89°C	230.25V

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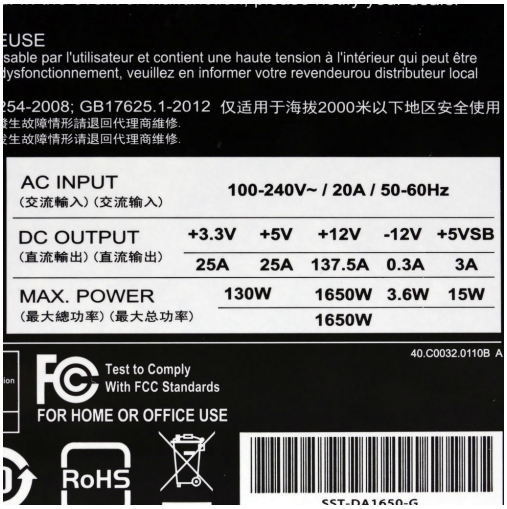
SilverStone Decathlon DA1650 (#2)

Top side



Power specifications label

CERTIFICATIONS 115V

CYBENETICS PLATINUM

CYBENETICS STANDARD+

CERTIFICATIONS 230V

CYBENETICS PLATINUM 230v

CYBENETICS STANDARD+ 230v

Aris Mpitsiopoulos
Lab Director