

Lab ID#: 178
Receipt Date: Sep 14, 2018
Test Date: Sep 19, 2018

Report:

Report Date: Sep 21, 2018

DUT INFORMATION

Brand	SilverStone
Manufacturer (OEM)	High Power
Series	SFX
Model Number	SST-SX650-G
Serial Number	DE17301005SX650G00
DUT Notes	

DUT SPECIFICATIONS

Rated Voltage (Vrms)	100-240
Rated Current (Arms)	10
Rated Frequency (Hz)	50-60
Rated Power (W)	650
Type	SFX
Cooling	92mm Fluid Dynamic Bearing Fan (S0921512HB)
Semi-Passive Operation	X
Cable Design	Fully Modular

POWER SPECIFICATIONS

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	22	22	54.2	2.5	0.3
	Watts	110		650	12.5	3.6
Total Max. Power (W)		650				

CABLES AND CONNECTORS

Modular Cables

Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors
ATX connector 20+4 pin (300mm)	1	1	16-22AWG	No
4+4 pin EPS12V (410mm)	1	1	18AWG	No
6+2 pin PCIe (560mm+150mm)	2	4	18AWG	No
SATA (310mm+200mm+100mm)	2	6	18AWG	No
4 pin Molex (300mm+200mm+200mm)	1	3	18AWG	No
FDD Adapter (+105mm)	1	1	22AWG	No
AC Power Cord (1400mm) - C13 coupler	1	1	18AWG	-

All data and graphs included in this test report can be used by any individual on the following conditions:

- > It should be mentioned that the test results are provided by Cybenetics
- > The link to the original test results document should be provided in any case

PAGE 1/14

General Data	
Manufacturer (OEM)	High Power
Primary Side	
Transient Filter	4x Y caps, 2x X caps, 3x CM chokes, 1x MOV, 1x CMD02X
Inrush Protection	NTC Thermistor & Diode
Bridge Rectifier(s)	2x GBU1506L (600V, 15A @ 100°C)
APFC MOSFETS	2x Toshiba TK16A60W (600V, 15.8A @ 150°C, 0.190hm)
APFC Boost Diode	1x Power Integrations D0665C5 (600V, 8A @ 150°C)
Hold-up Cap(s)	1x Rubycon (420V, 470uF, 3000h @ 85°C, USH)
Main Switchers	2x Toshiba TK16A60W (600V, 15.8A @ 150°C, 0.190hm)
High-side/Low-Side Driver	Silicon Labs Si8233BD
APFC Controller	Infineon ICE3PCS01G
Resonant Controller	Champion CM6901X
Topology	Primary side: Half-Bridge & LLC Resonant Controller Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	
+12V MOSFETS	6x Toshiba TPHP85 04PL (SOP Advance Series, 40V, 150A @ 25C, 0.85mOhm)
5V & 3.3V	DC-DC Converters: 6x Infineon BSC0906NS (30V, 40A @ 100°C, 4.5mOhm) PWM Controller: APW7159C
Filtering Capacitors	Electrolytics: Nippon Chemi-Con (1-5,000 @ 105°C, KZE), Nippon Chemi-Con (4-10,000 @ 105°C, KY) Polymers: Nippon Chemi-Con
Supervisor IC	SM PS224 (OVP, UVP, OCP, SCP, PG)
Micro Controller	STC 15W408AS
Fan Model	Globe Fan S0921512HB (92mm, 12V, 0.45A, Fluid Dynamic Bearing)
5VSB Circuit	
Rectifier	1x P10V45 SBR (45V, 10A)
Standby PWM Controller	Sanken STR-A6069H
-12V Circuit	
Rectifier	KEC KIA7912PI (-12V, 1A)

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	88.304%
Efficiency With 10W (≤500W) or 2% (>500W)	0.000
Average Efficiency 5VSB	79.096%
Standby Power Consumption (W)	0.0834153
Average PF	0.990
Avg Noise Output	37.07 dB(A)
Efficiency Rating (ETA)	GOLD
Noise Rating (LAMBDA)	S+

230V

Average Efficiency	90.241%
Average Efficiency 5VSB	76.883%
Standby Power Consumption (W)	0.1400210
Average PF	0.957
Avg Noise Output	37.31 dB(A)
Efficiency Rating (ETA)	GOLD
Noise Rating (LAMBDA)	S+

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 4955-A, Bruel & Kjaer Type 4189	
Data Loggers	Picoscope TC-08 x2, Labjack U3-HV x2	

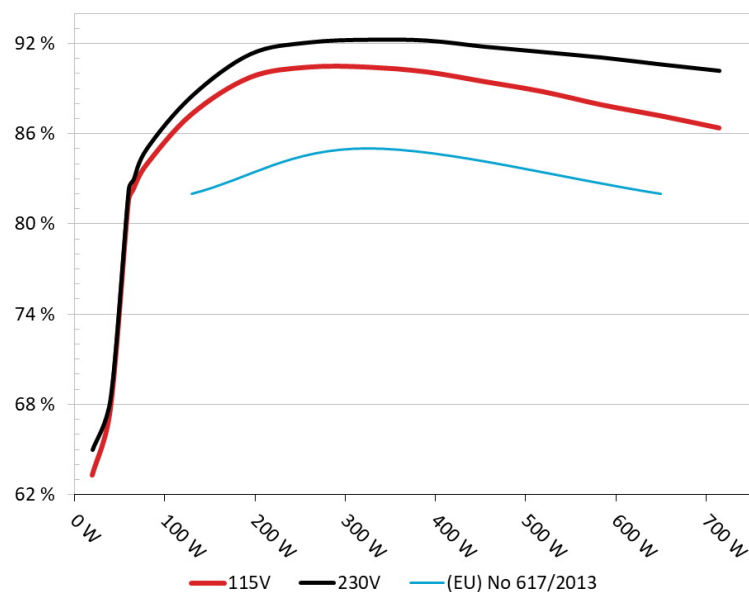
All data and graphs included in this test report can be used by any individual on the following conditions:

- › It should be mentioned that the test results are provided by Cybenetics
- › The link to the original test results document should be provided in any case

PAGE 3/14

EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE

Efficiency: SilverStone SST-SX650-G
Ambient: 37°C - 47°C (98.6°F - 116.6°F)

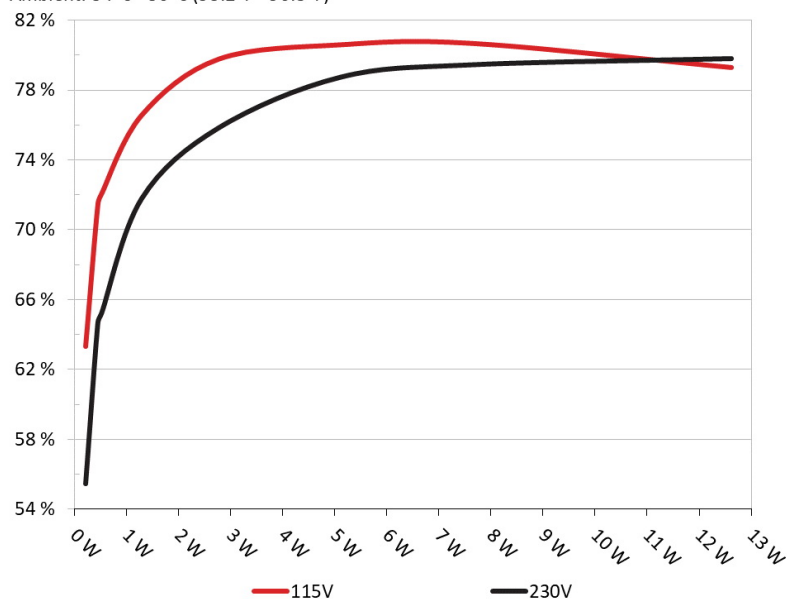


INFO

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: SilverStone SST-SX650-G
Ambient: 34°C - 36°C (93.2°F - 96.8°F)



INFO

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

All data and graphs included in this test report can be used by any individual on the following conditions:

- > It should be mentioned that the test results are provided by Cybenetics
- > The link to the original test results document should be provided in any case

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.042A	0.214	63.314%	0.056
	5.131V	0.338		115.18V
2	0.087A	0.447	71.406%	0.100
	5.130V	0.626		115.18V
3	0.542A	2.773	79.776%	0.314
	5.114V	3.476		115.16V
4	1.002A	5.112	80.593%	0.376
	5.101V	6.343		115.16V
5	1.502A	7.637	80.670%	0.408
	5.086V	9.467		115.17V
6	2.501A	12.611	79.290%	0.442
	5.042V	15.905		115.17V

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

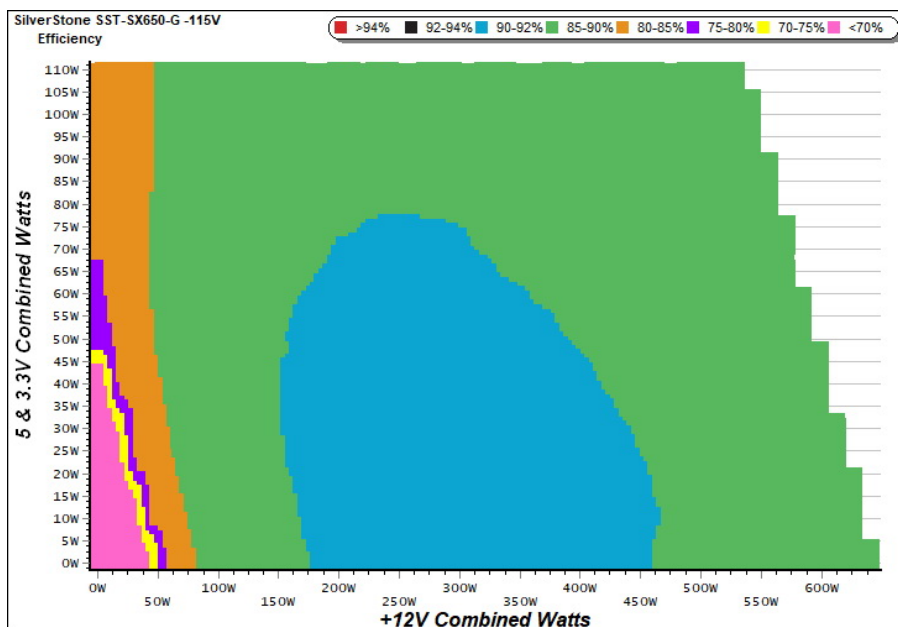
Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.042A	0.213	55.469%	0.019
	5.131V	0.384		230.42V
2	0.087A	0.446	64.638%	0.035
	5.129V	0.690		230.44V
3	0.542A	2.767	75.850%	0.158
	5.107V	3.648		230.42V
4	1.002A	5.103	78.750%	0.232
	5.093V	6.480		230.43V
5	1.501A	7.624	79.466%	0.282
	5.078V	9.594		230.43V
6	2.501A	12.622	79.820%	0.335
	5.047V	15.813		230.43V

All data and graphs included in this test report can be used by any individual on the following conditions:

- > It should be mentioned that the test results are provided by Cybenetics
- > The link to the original test results document should be provided in any case

115V

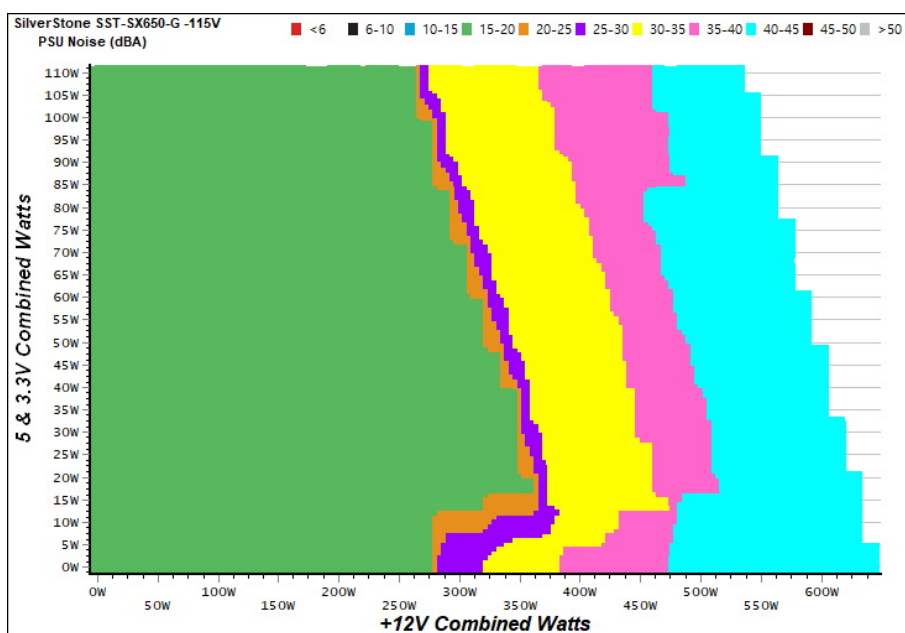
EFFICIENCY GRAPH 115V



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

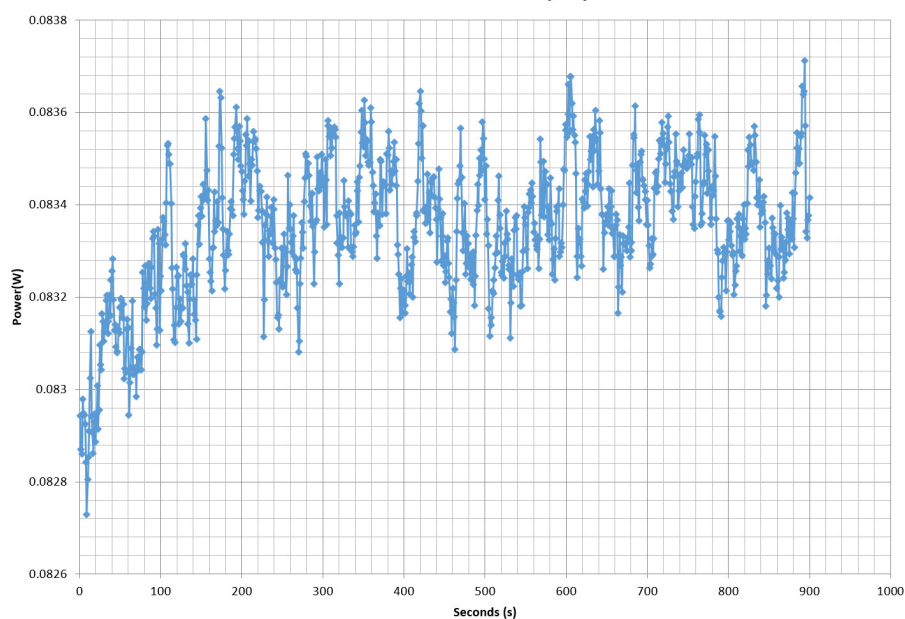
The PSU's noise in its entire operational range and under 30-32 °C (+2 °C) ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails

All data and graphs included in this test report can be used by any individual on the following conditions:

- > It should be mentioned that the test results are provided by Cybenetics
- > The link to the original test results document should be provided in any case

VAMPIRE POWER -115V

Power - DE17301005SX650G00 - 20/09/2017 - 11:10



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

All data and graphs included in this test report can be used by any individual on the following conditions:

- > It should be mentioned that the test results are provided by Cybenetics
- > The link to the original test results document should be provided in any case

PAGE 8/14

COMMISSION REGULATION (EU) NO 617/2013 TESTING 115V

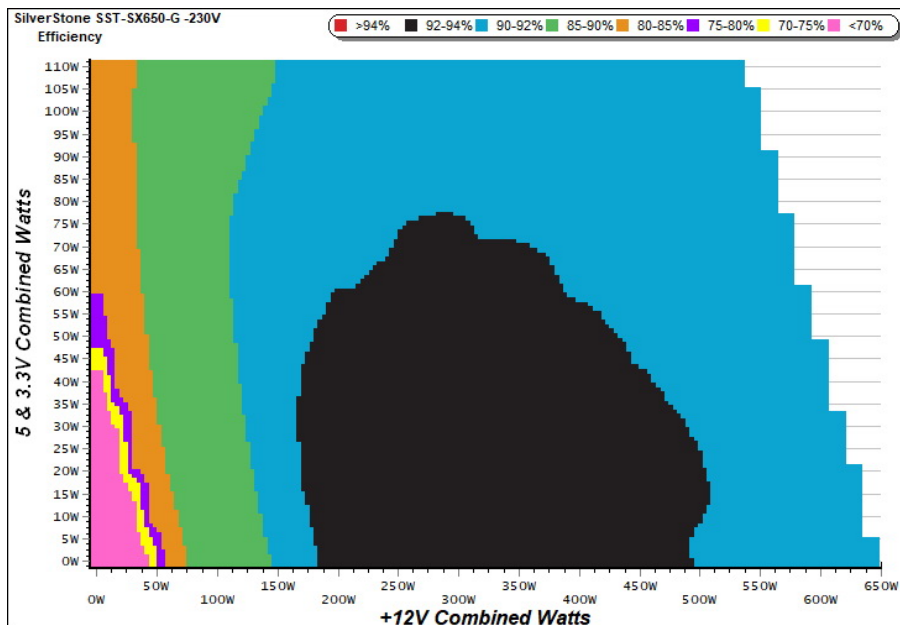
All data and graphs included in this test report can be used by any individual on the following conditions:

- › It should be mentioned that the test results are provided by Cybenetics
- › The link to the original test results document should be provided in any case

PAGE 9/14

230V

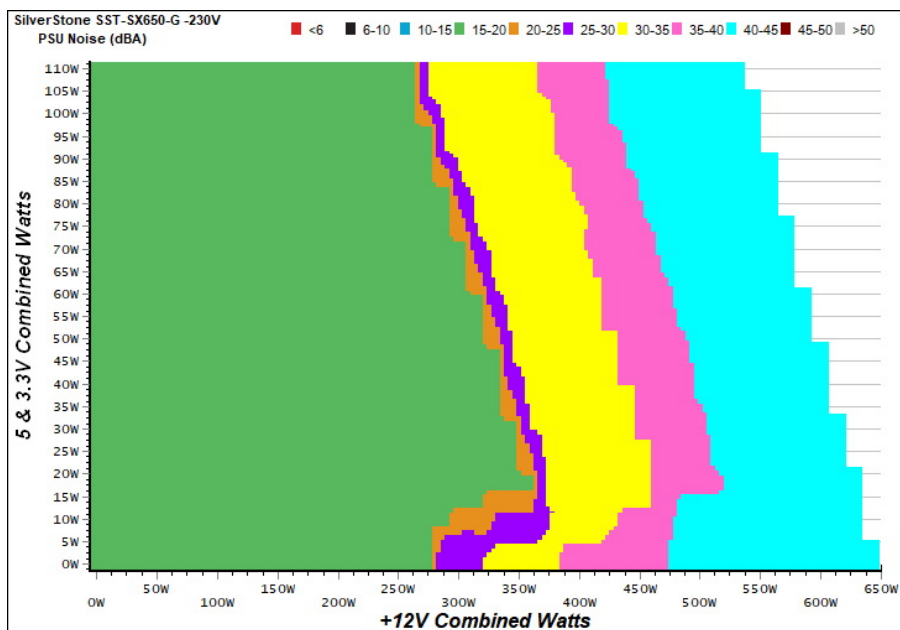
EFFICIENCY GRAPH 230V



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

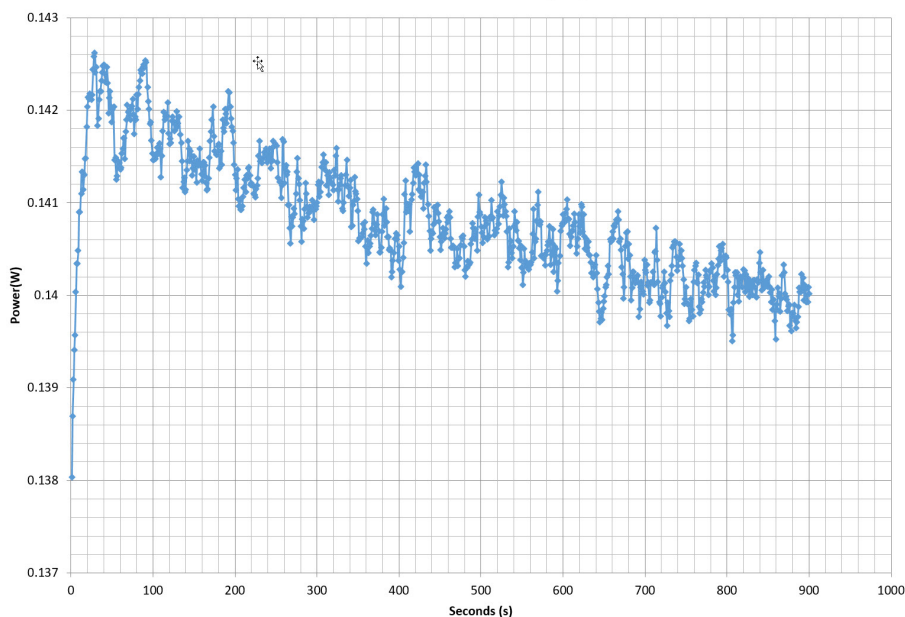
The PSU's noise in its entire operational range and under 30-32 °C (+2 °C) ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails

All data and graphs included in this test report can be used by any individual on the following conditions:

- > It should be mentioned that the test results are provided by Cybenetics
- > The link to the original test results document should be provided in any case

VAMPIRE POWER -230V

Power - DE17301005SX650G00 - 20/09/2017 - 11:10



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

All data and graphs included in this test report can be used by any individual on the following conditions:

- > It should be mentioned that the test results are provided by Cybenetics
- > The link to the original test results document should be provided in any case

COMMISSION REGULATION (EU) NO 617/2013 TESTING 230V

All data and graphs included in this test report can be used by any individual on the following conditions:

- › It should be mentioned that the test results are provided by Cybenetics
- › The link to the original test results document should be provided in any case

PAGE 13/14



Top side



Power specifications label

CERTIFICATIONS 115V




Aris Mpitsiopoulos
Lab Director

CERTIFICATIONS 230V



All data and graphs included in this test report can be used by any individual on the following conditions:

- > It should be mentioned that the test results are provided by Cybenetics
- > The link to the original test results document should be provided in any case