

## Anex

## XPG Fusion 1600W Titanium

Lab ID#: AD16002181  
 Receipt Date: May 11, 2023  
 Test Date: May 19, 2023

Report: 23PS2181A  
 Report Date: May 19, 2023

DUT INFORMATION	
Brand	XPG
Manufacturer (OEM)	Delta Electronics
Series	Fusion
Model Number	
Serial Number	
DUT Notes	

DUT SPECIFICATIONS	
Rated Voltage (Vrms)	115-240
Rated Current (Arms)	15-8
Rated Frequency (Hz)	47-63
Rated Power (W)	1600
Type	ATX12V
Cooling	135mm Double Ball Bearing Fan (HA13525H12SB-Z)
Semi-Passive Operation	✓
Cable Design	Fully Modular

TEST EQUIPMENT	
Electronic Loads	Chroma 63601-5 x2 Chroma 63600-2 63640-80-80 x10 63610-80-20
AC Sources	Chroma 6530, APM SP300VAC4000W-P
Power Analyzers	RS HMC8015, N4L PPA1530, N4L PPA5530
Oscilloscopes	Picoscope 4444, Rigol DS7014, 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, Keithley 2015 - THD
UPS	FSP Champ Tower 3kVA, CyberPower OLS3000E 3kVA
Isolation Transformer	4kVA

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### RESULTS

Temperature Range (°C /°F)	30-32 / 86-89.6
ErP Lot 3/6 Ready	✓
(EU) No 617/2013 Compliance	✓
ALPM (Alternative Low Power Mode) compatible	✓
ATX v3.0 PSU Power Excursion	✓

### 115V

Average Efficiency	91.377%
Efficiency With 10W (≤500W) or 2% (>500W)	77.754
Average Efficiency 5VSB	83.949%
Standby Power Consumption (W)	0.0471000
Average PF	0.990
Avg Noise Output	31.82 dB(A)
Efficiency Rating (ETA)	TITANIUM
Noise Rating (LAMBDA)	Standard++

### POWER SPECIFICATIONS

Rail		3.3V	5V	12V(1)	12V(2)	12V(3)	12V(4)	12V(5)	12V(6)	5VSB	-12V
Max. Power	Amps	20	20	50	50	50	50	50	50	3.5	0.3
	Watts	120		1600						17.5	3.6
Total Max. Power (W)		1600									

### HOLD-UP TIME & POWER OK SIGNAL (230V)

Hold-Up Time (ms)	20.6
AC Loss to PWR_OK Hold Up Time (ms)	18
PWR_OK Inactive to DC Loss Delay (ms)	2.6

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### CABLES AND CONNECTORS

#### Modular Cables

Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors
ATX connector 20+4 pin (640mm)	1	1	18AWG	No
4+4 pin EPS12V (750mm)	2	2	16AWG	No
6+2 pin PCIe (650mm)	6	6	16-18AWG	No
2x 6+2 pin PCIe (650mm)	2	4	16-18AWG	No
12+4 pin PCIe (650mm) (600W)	2	2	16-28AWG	No
SATA (550mm+150mm+150mm+150mm)	3	12	18AWG	No
4-pin Molex (550mm+150mm+150mm+150mm)	1	4	18AWG	No
FDD Adapter (150mm)	2	2	20AWG	No
Overclocking Cable (550mm)	1	1	20AWG	No
USB to Motherboard Header Cable (750mm)	1	1	26AWG	No

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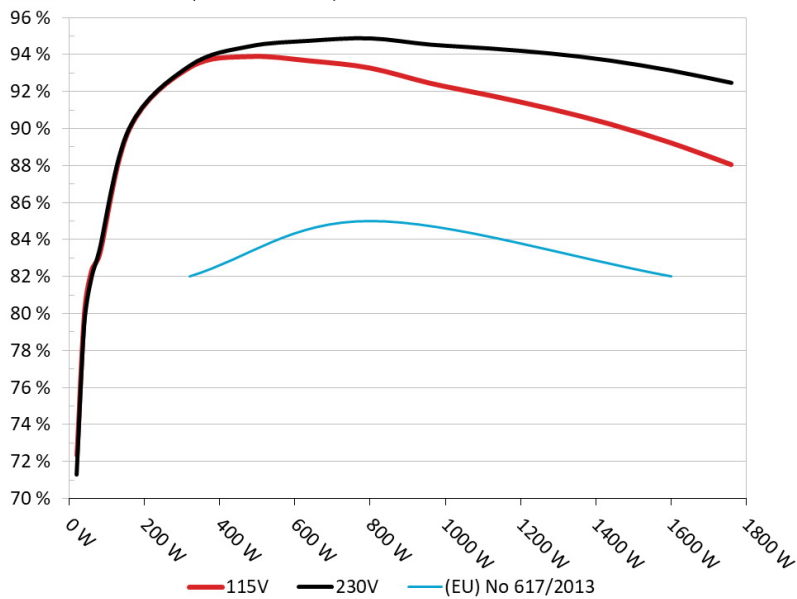
General Data	
Manufacturer (OEM)	Delta Electronics
PCB Type	Double Sided
Primary Side	
Transient Filter	6x Y caps, 4x X caps, 2x CM chokes, 4x TVS Diode, 1x MOV
Inrush Protection	1x NTC Thermistor SCK-0512 (5 Ohm) & Relay
Rectifier(s) (Standby Mode)	2x Taiwan Semiconductor S8JC (600V, 8A @ 75°C)
Totem-Pole MOSFETs (HEMTs)	4x Infineon IGT60R070D1 GaN (600V, 20A @ 100°C, Rds(on): 0.070Ohm)
Totem-Pole Driver(s)	4x Infineon 1EDB7275F
Totem-Pole PFC MOSFETs	2x Infineon IPDQ60R010S7 (600V, 50A @ 140°C, Rds(on): 0.010Ohm)
Totem-Pole PFC Driver(s)	2x Skyworks Si8273AB & 1x Champion CM03AX (Phantom Power Remover)
Bulk Cap(s)	2x Rubycon (450V, 820uF each or 1,640uF combined, 3,000h @ 105°C, MXK)
Main Switchers	4x ANCORA E6007PD020 GaN FET (650V, 24.2A @ 100°C, Rds(on): 0.0890hm)
IC Driver(s)	2x Skyworks Si8238AD
MCUs	Texas Instrument TMS320F280049CPM & Microchip dsPIC33CH256MP206
Topology	Primary side: Digital Totem-Pole Bridgeless PFC, Full-Bridge & LLC converter Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	
+12V MOSFETs	no info
5V & 3.3V	DC-DC Converters: 4x Alpha & Omega AONS36303 (30V, 52A @ 100°C, Rds(on): 3.28mOhm) PWM Controller(s): no info
Filtering Capacitors	Polymer: 6x Nippon Chemi-Con, 1x APAQ, 23x no info
Supervisor IC	no info
Fan Controller	STMicroelectronics STM32G474
Fan Model	Hong Hua HA13525H12SB-Z (135mm, 12V, 0.50A, Double Ball Bearing Fan)
5VSB Circuit	
Rectifier	1x STMicroelectronics STD10LN80K5 (800V, 5A @ 100°C, Rds(on): 0.630Ohm) & 1x STMicroelectronics STD100N10F7 (100V, 62A @ 100°C, Rds(on): 8mOhm)
Standby PWM Controller	Leadtrend LD5762E

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### EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE

**Efficiency: XPG Fusion 1600W Titanium**  
Ambient: 37°C - 47°C (98.6°F - 116.6°F)

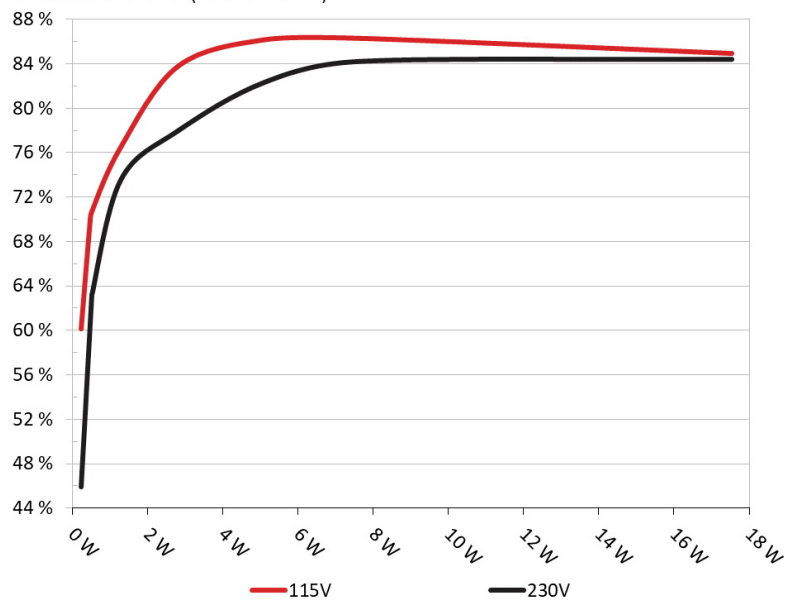


#### INFO

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: XPG Fusion 1600W Titanium**  
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

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.23W	59.606%	0.016
	5.119V	0.386W		114.95V
2	0.09A	0.46W	69.009%	0.027
	5.118V	0.667W		114.93V
3	0.55A	2.807W	83.291%	0.13
	5.103V	3.37W		114.94V
4	1A	5.09W	85.673%	0.211
	5.089V	5.941W		114.93V
5	1.5A	7.612W	85.809%	0.283
	5.074V	8.87W		114.93V
6	3.5A	17.537W	84.45%	0.43
	5.01V	20.766W		114.92V

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.23W	45.42%	0.006
	5.119V	0.507W		229.89V
2	0.09A	0.46W	62.67%	0.009
	5.118V	0.745W		229.89V
3	0.55A	2.807W	77.465%	0.044
	5.103V	3.625W		229.89V
4	1A	5.09W	81.806%	0.074
	5.089V	6.223W		229.89V
5	1.5A	7.611W	83.702%	0.106
	5.074V	9.095W		229.89V
6	3.5A	17.538W	83.899%	0.218
	5.011V	20.905W		229.89V

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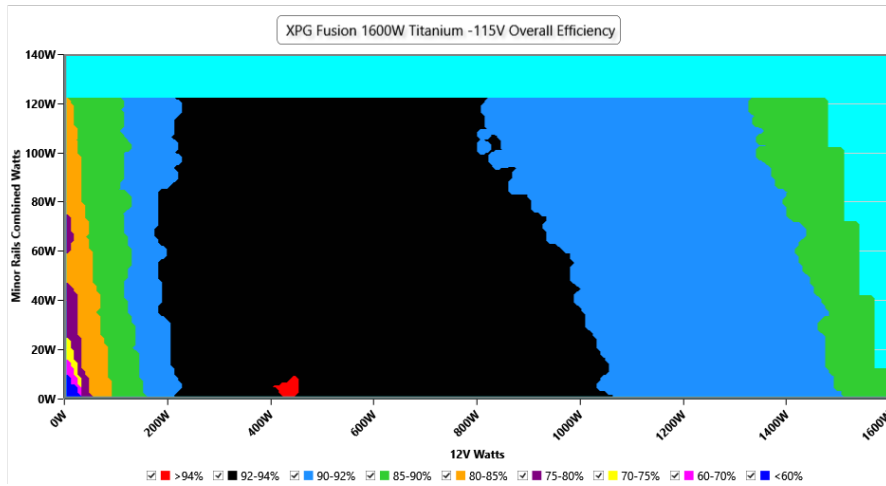
# 115V

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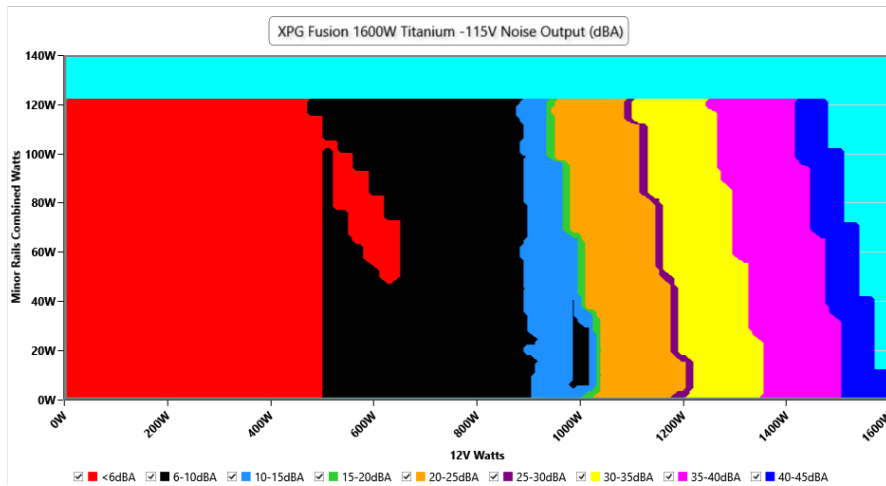
### EFFICIENCY GRAPH 115V



#### 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

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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### VAMPIRE POWER -115V

#### Detailed Results

	Average	Min	Limit Min	Max	Limit Max	Result
Mains Voltage RMS:	114.93 V	114.89 V	113.85 V	114.96 V	116.15 V	PASS
Mains Frequency:	60.00 Hz	60.00 Hz	59.40 Hz	60.02 Hz	60.60 Hz	PASS
Mains Voltage CF:	1.416	1.415	1.340	1.418	1.490	PASS
Mains Voltage THD:	0.14 %	0.12 %	N/A	0.17 %	2.00 %	PASS
Real Power:	0.047 W	0.033 W	N/A	0.064 W	N/A	N/A
Apparent Power:	24.450 W	24.423 W	N/A	24.487 W	N/A	N/A
Power Factor:	0.002	N/A	N/A	N/A	N/A	N/A

#### 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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### 10-110% 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%	5.669A	1.966A	1.961A	0.983A	160.03	90.016%	0	<6.0	44.12°C	0.975
	12.210V	5.086V	3.365V	5.086V	177.773				39.85°C	114.9V
20%	23.690A	2.95A	2.943A	1.183A	320.017	93.318%	0	<6.0	45.37°C	0.994
	12.204V	5.086V	3.364V	5.073V	342.928				40.58°C	114.86V
30%	36.289A	3.442A	3.434A	1.383A	479.312	93.906%	0	<6.0	46.35°C	0.996
	12.215V	5.086V	3.363V	5.06V	510.387				41.18°C	114.82V
40%	49.036A	3.937A	3.933A	1.585A	639.685	93.673%	401	8.3	41.83°C	0.996
	12.205V	5.081V	3.357V	5.047V	682.866				47.29°C	114.78V
50%	61.419A	4.921A	4.917A	1.788A	799.449	93.288%	401	8.3	42.53°C	0.998
	12.194V	5.081V	3.356V	5.033V	856.936				48.49°C	114.75V
60%	73.731A	5.913A	5.913A	1.993A	959.926	92.462%	645	17.5	42.93°C	0.996
	12.209V	5.074V	3.349V	5.019V	1038.206				49.39°C	114.21V
70%	86.125A	6.9A	6.902A	2.198A	1119.629	91.799%	741	21.2	43.18°C	0.996
	12.197V	5.074V	3.347V	5.005V	1219.644				50.19°C	114.16V
80%	98.399A	7.886A	7.885A	2.303A	1279.677	91.079%	1039	31.6	43.98°C	0.998
	12.213V	5.073V	3.348V	4.994V	1404.991				52.01°C	114.61V
90%	111.089A	8.389A	8.383A	2.408A	1439.516	90.247%	1588	42.6	45.32°C	0.999
	12.215V	5.067V	3.34V	4.983V	1595.091				54.38°C	113.67V
100%	123.520A	8.889A	8.903A	3.546A	1599.641	89.24%	1969	48.0	45.79°C	0.999
	12.204V	5.064V	3.335V	4.936V	1792.543				55.82°C	114.52V
110%	136.119A	9.891A	10.007A	3.552A	1760.294	88.063%	2322	51.5	47.31°C	0.999
	12.191V	5.057V	3.327V	4.927V	1998.903				58.22°C	114.47V
CL1	0.115A	14.279A	14.176A	0A	121.324	83.568%	0	<6.0	47.35°C	0.962
	12.201V	5.058V	3.364V	5.113V	145.17				41.84°C	114.9V
CL2	0.115A	19.802A	0A	0A	101.43	81.74%	0	<6.0	48.16°C	0.949
	12.207V	5.052V	3.363V	5.119V	124.108				41.15°C	114.91V
CL3	0.115A	0A	19.58A	0A	67.385	74.776%	0	<6.0	50.18°C	0.909
	12.204V	5.086V	3.37V	5.114V	90.107				41.09°C	114.92V
CL4	131.071A	0A	0A	0A	1600.3	89.386%	2084	49.1	45.37°C	0.999
	12.209V	5.084V	3.337V	5.061V	1790.355				56.36°C	114.52V

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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
20W	1.216A	0.491A	0.489A	0.195A	20.009	72.335%	0	<6.0	40.5°C	0.86
	12.212V	5.094V	3.372V	5.116V	27.67				37.44°C	114.93V
40W	2.678A	0.687A	0.685A	0.293A	40.007	80.08%	0	<6.0	41.01°C	0.959
	12.210V	5.093V	3.371V	5.112V	49.962				37.71°C	114.93V
60W	4.132A	0.884A	0.881A	0.392A	60.007	82.401%	0	<6.0	41.99°C	0.963
	12.228V	5.091V	3.37V	5.108V	72.803				38.3°C	114.92V
80W	5.594A	1.081A	1.077A	0.49A	79.969	83.205%	0	<6.0	43.28°C	0.92
	12.215V	5.09V	3.369V	5.104V	96.106				39.3°C	114.92V

### RIPPLE MEASUREMENTS 115V

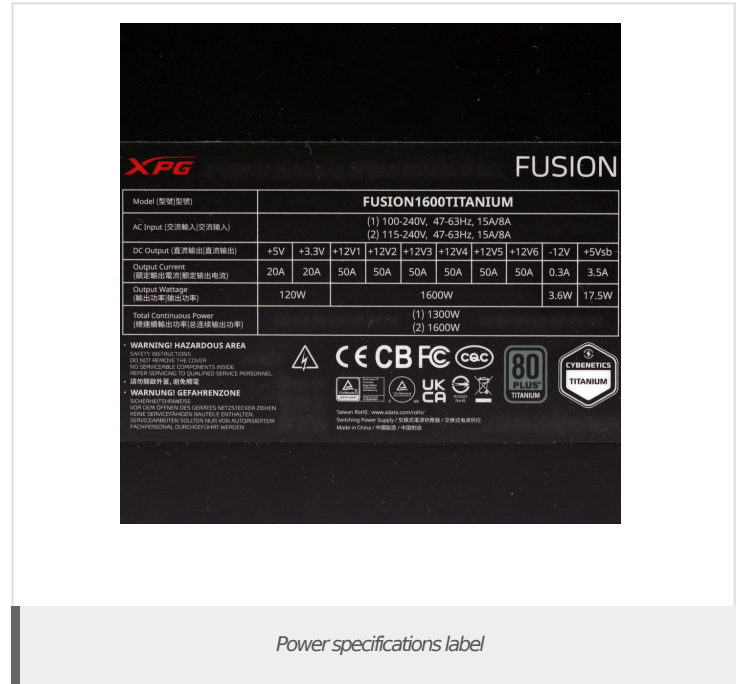
Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	10.08mV	8.84mV	9.10mV	9.98mV	Pass
20% Load	10.51mV	15.68mV	8.03mV	11.11mV	Pass
30% Load	11.98mV	14.55mV	14.83mV	9.78mV	Pass
40% Load	12.33mV	9.50mV	9.16mV	10.64mV	Pass
50% Load	13.51mV	10.88mV	9.82mV	10.28mV	Pass
60% Load	19.35mV	15.22mV	10.59mV	14.23mV	Pass
70% Load	14.74mV	16.08mV	11.25mV	13.15mV	Pass
80% Load	17.30mV	15.37mV	13.14mV	13.31mV	Pass
90% Load	14.22mV	16.03mV	13.65mV	12.85mV	Pass
100% Load	22.52mV	17.22mV	20.33mV	25.36mV	Pass
110% Load	27.18mV	17.90mV	20.00mV	23.45mV	Pass
Crossload1	12.20mV	10.65mV	19.38mV	26.07mV	Pass
Crossload2	9.11mV	9.50mV	9.97mV	18.37mV	Pass
Crossload3	10.44mV	8.22mV	16.52mV	22.77mV	Pass
Crossload4	23.63mV	17.74mV	15.69mV	30.13mV	Pass

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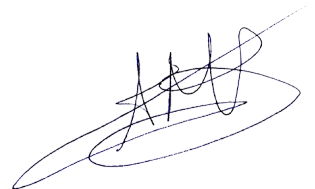
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## CERTIFICATIONS 115V

**Aristeidis Bitziopoulos**  
Lab Director

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