## Anex

SilverStone SX550

Lab ID#: 130
Receipt Date: -
Test Date: -

Report:
Report Date: Jun 22, 2018

## DUT INFORMATION

| | |
|---|---|
| Brand | SilverStone |
| Manufacturer (OEM) | FSP |
| Series | SFX |
| Model Number | SX550 |
| Serial Number | S6101000173 |
| DUT Notes | Retested on 10/16/2017 |

## DUT SPECIFICATIONS

| | |
|---|---|
| Rated Voltage (Vrms) | 100-240 |
| Rated Current (Arms) | 8-4 |
| Rated Frequency (Hz) | 50-60 |
| Rated Power (W) | 550 |
| Type | SFX |
| Cooling | 80mm Sleeve Bearing Fan (MGA8012YS-A15) |
| Semi-Passive Operation | ✗ |
| Cable Design | Fixed cables |

## POWER SPECIFICATIONS

| Rail | | 3.3V | 5V | 12V | 5VSB | -12V |
|---|---|---|---|---|---|---|
| Max. Power | Amps | 21 | 22 | 45 | 2.5 | 0.3 |
| | Watts | 120 | | 540 | 12.5 | 3.6 |
| Total Max. Power (W) | | 550 | | | | |

## CABLES AND CONNECTORS

Captive Cables

| Description | Cable Count | Connector Count (Total) | Gauge |
|---|---|---|---|
| ATX connector 20+4 pin (310mm) | 1 | 1 | 20AWG |
| 4+4 pin EPS12V (420mm) | 1 | 1 | 18AWG |
| 6+2 pin PCIe (420mm+155mm) | 1 | 2 | 18AWG |
| SATA (315mm+200mm+100mm) | 1 | 3 | 20AWG |
| 4 pin Molex (315mm+200mm) / FDD (+200mm) | 1 | 2 / 1 | 20-22AWG |







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| Primary Side | |
|---|---|
| Transient Filter | 4x Y caps, 3x X caps, 2x CM chokes, 1x MOV |
| Inrush Protection | NTC Thermistor & Relay |
| Bridge Rectifier(s) | 2x GBU10V06<br>(600V, 2.9A @ 100°C - without heatsink) |
| APFC MOSFETS | 2x Infineon IPA60R125CP<br>(650V, 16A @ 100°C, 0.125 Ohm) |
| APFC Boost Diode | 1x STMicroelectronics STTH8R06FP<br>(600V, 8A @ 85°C) |
| Hold-up Cap(s) | 2x Nippon Chemi-Con<br>(420V, 150uF each, 2000h @ 105°C, KMG) |
| Main Switcher | 1x Infineon SPA17N80C3<br>(800V, 11A @ 100°C, 0.29 ohm) |
| Reset Switch | Fairchild FQPF3N80C<br>(800V, 1.9A @ 100°C, 4.8 ohm) |
| APFC/Switching Controller | FSP 6600 IC |
| Topology | Primary side: Active Clamp Reset Forward<br>Secondary side: Synchronous Rectification & DC-DC converters |
| **Secondary Side** | |
| +12V MOSFETS | 2x Texas Instruments CSD19506KCS (80V, 193A @ 100°C, 2.2 mOhm) |
| 5V & 3.3V | DC-DC Converters: 4x Infineon BSC030N03LS G<br>(30V, 77A @ 100°C, 3 mOhm)<br>PWM Controller: ANPEC APW7159C |
| Filtering Capacitors | Electrolytics: Nippon Chemi-Con (105°C, KZE, KZH)<br>Polymers: Teapo |
| Supervisor IC | FSP6601 |
| Fan Model | Protechnic Electric MGA8012YS-A15<br>(80mm, 12V, 0.28A, Sleeve Bearing) |
| **5VSB Circuit** | |
| Rectifier | 1x A-Power AP03N70I-H FET (700V, 2.5A, 4.4 Ohm) |







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| RESULTS | |
|---|---|
| Temperature Range (°C /°F) | 30-32 / 86-89.6 |
| Average Efficiency | 87.847 |
| Efficiency With 10W (≤500W) or 2% (>500W) Load -115V | 0.000 |
| Average Efficiency 5VSB | 77.442 |
| Standby Power Consumption (W) -115V | 0.1206870 |
| Standby Power Consumption (W) -230V | 0.1774190 |
| Average PF | 0.992 |
| ErP Lot 3/6 Ready | ✓ |
| (EU) No 617/2013 Compliance | ✓ |
| Avg Noise Output | 29.14 |
| Efficiency Rating (ETA) | GOLD |
| Noise Rating (LAMBDA) | A- |

| TEST EQUIPMENT | | |
|---|---|---|
| Electronic Loads | Chroma 6314A x2<br>63123A x6<br>63102A<br>63101A | Chroma 63601-5 x2<br>Chroma 63600-2<br>63640-80-80 x10<br>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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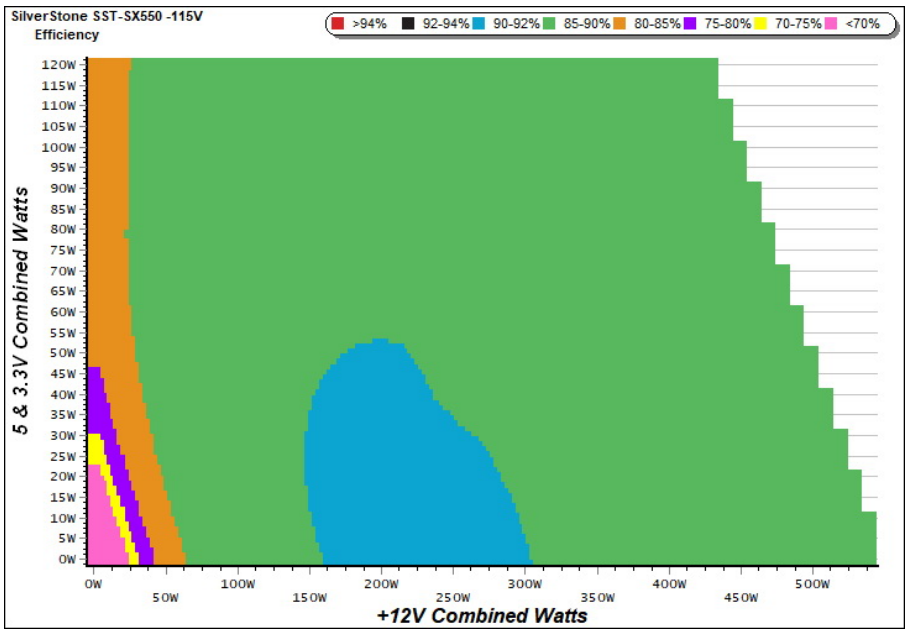
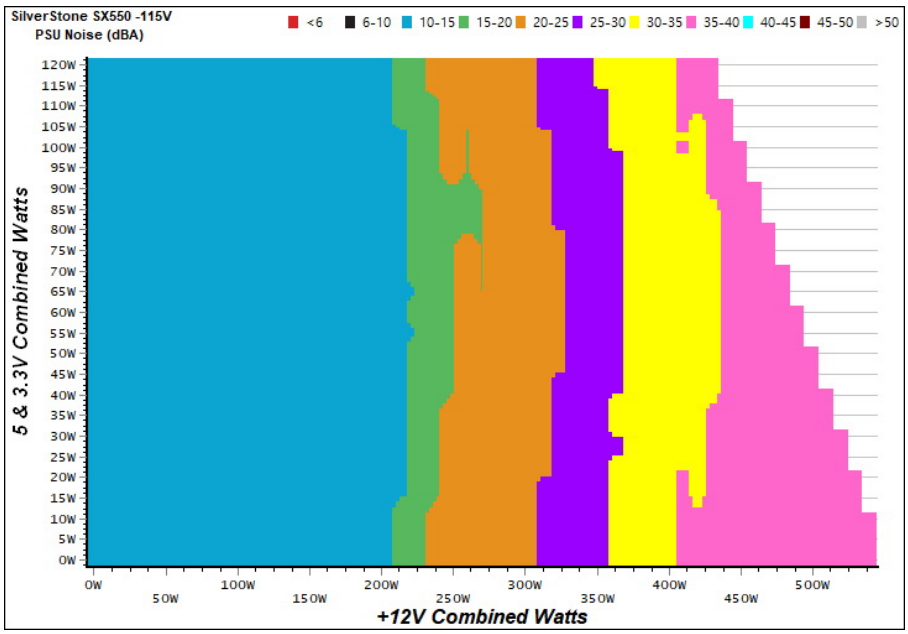
## EFFICIENCY GRAPH




### 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*

## Anex

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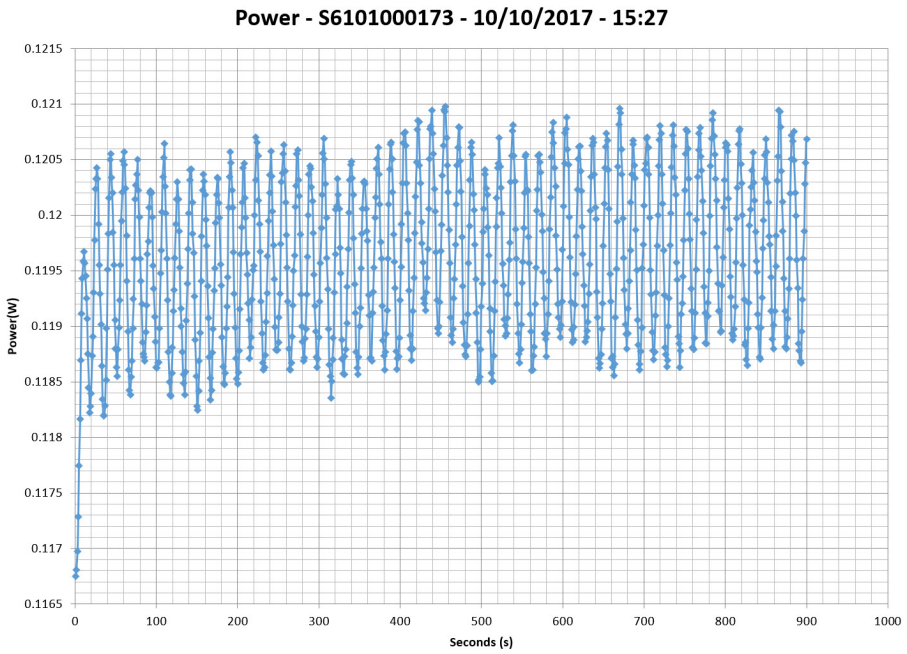
### 5VSB EFFICIENCY -115V (ERP LOT 3/6 & CEC)

| Test # | 5VSB | DC/AC (Watts) | Efficiency | PF/AC Volts |
|---|---|---|---|---|
| 1 | 0.045A | 0.228 | 59.843% | 0.035 |
| | 5.063V | 0.381 | | 115.39V |
| 2 | 0.090A | 0.456 | 69.939% | 0.059 |
| | 5.063V | 0.652 | | 115.39V |
| 3 | 0.550A | 2.775 | 78.191% | 0.256 |
| | 5.044V | 3.549 | | 115.38V |
| 4 | 1.000A | 5.024 | 79.975% | 0.351 |
| | 5.024V | 6.282 | | 115.38V |
| 5 | 1.500A | 7.501 | 79.283% | 0.409 |
| | 5.000V | 9.461 | | 115.37V |
| 6 | 2.499A | 12.380 | 76.971% | 0.463 |
| | 4.953V | 16.084 | | 115.36V |

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

| Test # | 5VSB | DC/AC (Watts) | Efficiency | PF/AC Volts |
|---|---|---|---|---|
| 1 | 0.045A | 0.228 | 50.780% | 0.015 |
| | 5.063V | 0.449 | | 230.97V |
| 2 | 0.090A | 0.456 | 63.071% | 0.024 |
| | 5.063V | 0.723 | | 230.79V |
| 3 | 0.550A | 2.775 | 77.840% | 0.111 |
| | 5.044V | 3.565 | | 230.96V |
| 4 | 1.000A | 5.024 | 77.819% | 0.184 |
| | 5.023V | 6.456 | | 230.96V |
| 5 | 1.500A | 7.499 | 79.254% | 0.242 |
| | 4.999V | 9.462 | | 230.96V |
| 6 | 2.500A | 12.379 | 78.368% | 0.320 |
| | 4.952V | 15.796 | | 230.95V |

### 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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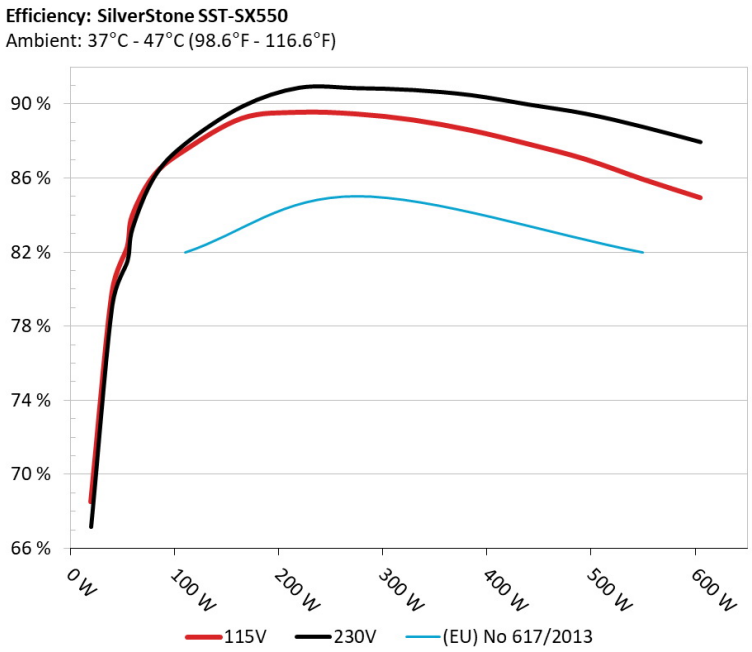
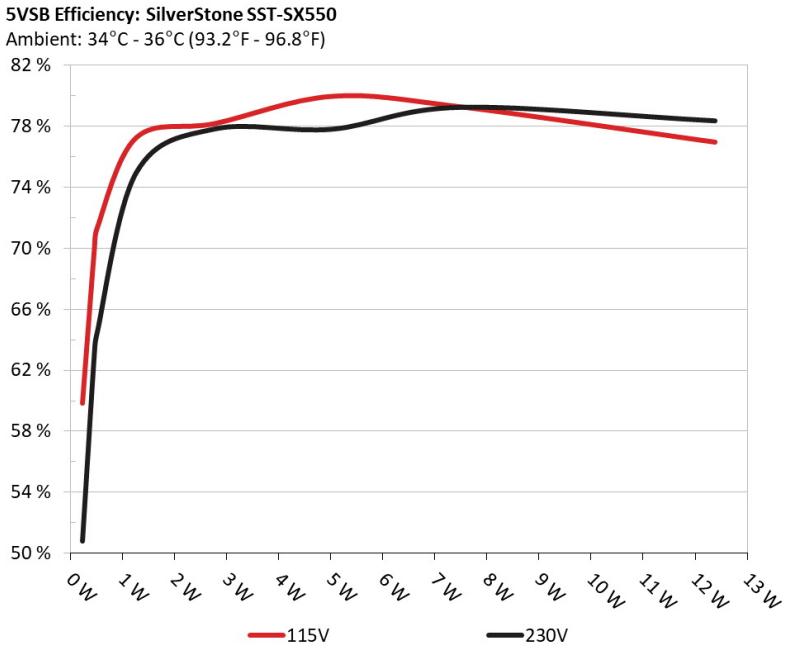
## EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE




**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 | 2.737A | 1.966A | 1.958A | 0.998A | 54.473 | 82.258% | 1412 | 15.8 | 38.29°C | 0.962 |
| | 12.011V | 5.087V | 3.369V | 5.011V | 66.222 | | | | 46.83°C | 115.31V |
| 2 | 6.547A | 2.957A | 2.947A | 1.202A | 109.366 | 87.493% | 1412 | 15.8 | 38.60°C | 0.980 |
| | 11.984V | 5.074V | 3.359V | 4.995V | 125.000 | | | | 48.55°C | 115.23V |
| 3 | 10.761A | 3.456A | 3.430A | 1.406A | 164.872 | 89.239% | 1412 | 15.8 | 39.15°C | 0.989 |
| | 11.976V | 5.064V | 3.352V | 4.979V | 184.753 | | | | 49.84°C | 115.14V |
| 4 | 14.908A | 3.960A | 3.946A | 1.612A | 219.690 | 89.562% | 1594 | 20.0 | 39.39°C | 0.995 |
| | 11.972V | 5.053V | 3.345V | 4.964V | 245.293 | | | | 51.52°C | 115.16V |
| 5 | 18.738A | 4.962A | 4.946A | 1.820A | 274.582 | 89.470% | 1919 | 25.2 | 40.07°C | 0.997 |
| | 11.958V | 5.040V | 3.336V | 4.948V | 306.899 | | | | 53.20°C | 115.07V |
| 6 | 22.577A | 5.970A | 5.952A | 2.029A | 329.510 | 89.145% | 2265 | 30.2 | 40.84°C | 0.998 |
| | 11.946V | 5.026V | 3.326V | 4.931V | 369.632 | | | | 55.27°C | 114.99V |
| 7 | 26.472A | 6.983A | 6.964A | 2.240A | 384.809 | 88.587% | 2602 | 34.2 | 42.13°C | 0.998 |
| | 11.926V | 5.012V | 3.317V | 4.913V | 434.385 | | | | 58.24°C | 115.01V |
| 8 | 30.402A | 8.005A | 7.983A | 2.453A | 440.109 | 87.845% | 2957 | 38.4 | 42.55°C | 0.999 |
| | 11.897V | 4.998V | 3.307V | 4.895V | 501.004 | | | | 61.20°C | 114.92V |
| 9 | 34.754A | 8.522A | 8.489A | 2.457A | 494.630 | 87.030% | 3250 | 40.7 | 44.29°C | 0.999 |
| | 11.858V | 4.988V | 3.299V | 4.886V | 568.343 | | | | 63.97°C | 114.83V |
| 10 | 39.131A | 9.043A | 9.027A | 2.567A | 549.744 | 85.951% | 3460 | 42.2 | 45.73°C | 0.999 |
| | 11.820V | 4.977V | 3.291V | 4.870V | 639.602 | | | | 66.99°C | 114.84V |
| 11 | 44.160A | 9.055A | 9.046A | 2.572A | 604.956 | 84.953% | 3460 | 42.2 | 46.73°C | 0.999 |
| | 11.724V | 4.971V | 3.284V | 4.862V | 712.108 | | | | 69.73°C | 114.75V |
| CL1 | 0.737A | 14.003A | 13.999A | 0.000A | 125.036 | 82.678% | 2745 | 35.6 | 44.38°C | 0.985 |
| | 11.993V | 4.981V | 3.318V | 5.026V | 151.233 | | | | 58.28°C | 115.19V |
| CL2 | 45.005A | 1.002A | 1.000A | 1.000A | 545.702 | 86.687% | 3450 | 42.0 | 45.35°C | 0.999 |
| | 11.829V | 5.046V | 3.322V | 4.960V | 629.508 | | | | 63.22°C | 114.77V |







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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 | 1.204A | 0.490A | 0.473A | 0.198A | 19.564 | 68.547% | 1412 | 15.8 | 0.826 |
| | 12.015V | 5.101V | 3.379V | 5.054V | 28.541 | | | | 115.36V |
| 2 | 2.465A | 0.984A | 0.978A | 0.397A | 39.934 | 79.834% | 1412 | 15.8 | 0.939 |
| | 12.015V | 5.096V | 3.375V | 5.043V | 50.021 | | | | 115.33V |
| 3 | 3.669A | 1.473A | 1.451A | 0.597A | 59.458 | 83.994% | 1412 | 15.8 | 0.965 |
| | 12.010V | 5.090V | 3.371V | 5.031V | 70.788 | | | | 115.30V |
| 4 | 4.937A | 1.967A | 1.961A | 0.797A | 79.862 | 86.137% | 1412 | 15.8 | 0.972 |
| | 12.003V | 5.085V | 3.366V | 5.019V | 92.715 | | | | 115.27V |

### RIPPLE MEASUREMENTS

| Test | 12V | 5V | 3.3V | 5VSB | Pass/Fail |
|---|---|---|---|---|---|
| 10% Load | 10.9 mV | 15.9 mV | 13.7 mV | 11.5 mV | Pass |
| 20% Load | 28.6 mV | 23.1 mV | 15.5 mV | 14.5 mV | Pass |
| 30% Load | 28.0 mV | 22.7 mV | 14.9 mV | 7.8 mV | Pass |
| 40% Load | 29.2 mV | 22.9 mV | 15.6 mV | 8.7 mV | Pass |
| 50% Load | 33.2 mV | 25.5 mV | 16.5 mV | 9.3 mV | Pass |
| 60% Load | 33.9 mV | 28.8 mV | 18.9 mV | 10.2 mV | Pass |
| 70% Load | 36.6 mV | 32.1 mV | 20.7 mV | 10.6 mV | Pass |
| 80% Load | 38.0 mV | 33.2 mV | 20.9 mV | 11.0 mV | Pass |
| 90% Load | 46.3 mV | 36.5 mV | 22.9 mV | 12.3 mV | Pass |
| 100% Load | 61.6 mV | 39.4 mV | 26.1 mV | 14.1 mV | Pass |
| 110% Load | 97.3 mV | 41.8 mV | 27.3 mV | 15.2 mV | Pass |
| Crossload 1 | 33.4 mV | 26.5 mV | 18.7 mV | 17.0 mV | Pass |
| Crossload 2 | 60.2 mV | 38.3 mV | 25.4 mV | 18.2 mV | Pass |

## Anex



| HOLD-UP TIME & POWER OK SIGNAL (230V) | |
|---|---|
| Hold-Up Time (ms) | 21.7 |
| AC Loss to PWR_OK Hold Up Time (ms) | 17.5 |
| PWR_OK Inactive to DC Loss Delay (ms) | 4.2 |

*Top side*


*Power specifications label*

## CERTIFICATIONS

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