全漢企業股份有限公司
FSP TECHNOLOGY INC.
FSP Group Inc./No. 22, Jianguo E. Road, Taoyuan city, Taiwan
TEL:+886-3-375-9888 FAX:+886-3-3756966
http://www.fsp-group.com.tw

# EPS Efficiency Test Report

| Model Name: FSP070-AHAN2 | Test Date: 2016.AUG.15 | Revision: 1 |
|---|---|---|

## PRODUCT INFORMATION:

| | |
|---|---|
| Product name | AC to DC EPS(External Power Supply) |
| DC Cable | 1400 mm 16 AWG |
| Weight | 425 g |
| Dimension | 151.3 * 75.6 * 25.4 mm |
| Trademark | FSP |
| Manufactuer | FSP Group Inc./No. 22, Jianguo E. Road, Taoyuan city, Taiwan |
| Testing laboratory | FSP Group Inc./No. 22, Jianguo E. Road, Taoyuan city, Taiwan |

## Rated:

| Specification | Input | Output 1 | Output 2 | Output 3 | Output 4 | Output 5 | Output 6 |
|---|---|---|---|---|---|---|---|
| Voltage(V) | 100-240 | 12 | --- | --- | --- | --- | --- |
| Current(mA) | 1000 | 5830 | --- | --- | --- | --- | --- |
| Frequency(Hz) | 50-60 | --- | --- | --- | --- | --- | --- |
| Power(W) | --- | 70 | | | | | |

## Test Result:

| Compliance with | |
|---|---|
| US DOE Level VI | YES |
| CEC Level IV | YES |
| Energy Star Level V | YES |
| ErP Tier 2 | YES |
| AU GEMS | YES |

**Tested By:** Kay Hsia

**Approved By:** Jason Wei



Reference No.:V160435

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# EPS Efficiency Test Report

| Model Name: FSP070-AHAN2 | Test Date: 2016.AUG.15 | Revision: 1 |
|---|---|---|

## 1. Test Equipment:

| Item | Brand | Model | Calibrates Until |
|---|---|---|---|
| AC Source | CHROMA | 6430/643000000908 | 2017/8/5 |
| Electronic Load 1 | CHROMA | 63030/6300006368 | 2017/8/5 |
| Electronic Load 2 | | | |
| Electronic Load 3 | | | |
| Electronic Load 4 | | | |
| Electronic Load 5 | | | |
| Electronic Load 6 | | | |
| Power Meter | CHROMA | 66202/662022003033 | 2017/8/5 |

## 2. Regulation:

| | |
|---|---|
| US DOE | • 10 CFR Parts 429, 430 and 431 |
| CEC | • CEC-400-2015-021 |
| Energy Star | • EPS 2.0 Apr-08-2008 |
| ErP | • Commission Regulation (EC) No 278/2009 |
| AU GEMS | • AS/NZS 4665:2005 |

The average active efficiency:

| Agency | Rated Power | Low voltage | AC-DC |
|---|---|---|---|
| US DOE Level VI | Po≦1W | ≧0.517*Po+0.087 | ≧0.5*Po+0.16 |
| | 1W<Po≦49W | ≧0.0834*ln(Po)-0.0014*Po+0.609 | ≧0.071*ln(Po)-0.0014*Po+0.67 |
| | 49W<Po≦250W | ≧0.87 | ≧0.88 |
| | 250W<Po | N/A | ≧0.875 |
| CEC Level IV | Po<1W | N/A | ≧0.5*Po |
| | 1W≦Po≦51W | | ≧0.09*ln(Po)+0.5 |
| | 51W<Po | | ≧0.85 |
| Energy Star Level V | Po≦1W | ≧0.497*Po+0.067 | ≧0.48*Po+0.14 |
| | 1W<Po≦49W | ≧0.075*ln(Po)+0.561 | ≧0.0626*ln(Po)+0.622 |
| | 49W<Po | ≧0.86 | ≧0.87 |
| ErP Tier 2 | Po≦1W | ≧0.497*Po+0.067 | ≧0.48*Po+0.14 |
| | 1W<Po≦51W | ≧0.075*ln(Po)+0.561 | ≧0.063*ln(Po)+0.622 |
| | 51W<Po | ≧0.86 | ≧0.87 |
| AU GEMS | Po≦1W | N/A | ≧0.5*Po |
| | 1W<Po≦51W | | ≧0.09*ln(Po)+0.5 |
| | 51W<Po | | ≧0.85 |

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# EPS Efficiency Test Report

| Model Name: FSP070-AHAN2 | Test Date: 2016.AUG.15 | Revision: 1 |
|---|---|---|

The no-load condition of power consumption:

| Agency | Rated Power | Low voltage | AC-DC |
|---|---|---|---|
| US DOE Level VI | 0W<Po≦49W | N/A | ≦0.1W |
| | 49W<Po≦250W | | ≦0.21W |
| | 250W<Po | | ≦0.5W |
| CEC Level IV | Any Output | N/A | ≦0.5W |
| Energy Star Level V | Po<50W | N/A | ≦0.3W |
| | 50W≦Po | | ≦0.5W |
| ErP Tier 2 | Po≦51W | ≦0.3W | ≦0.3W |
| | 51W<Po | N/A | ≦0.5W |
| AU GEMS | 0W<Po | N/A | ≦0.5W |

## 3. Test Method:

| | |
|---|---|
| US DOE | • Test Method for Calculating the Energy Efficiency of External AC-DC and AC-AC Power Supplies" dated August 11, 2004 |
| CEC | • Test Method for Calculating the Energy Efficiency of Single-Voltage External AC-DC and AC-AC Power Supplies" dated August 11, 2004(except that the test voltage specified in Section 4(d) of the test method shall be only 115 volts, 60 Hz.) |
| Energy Star | • Test Method for Calculating the Energy Efficiency of Single-Voltage External AC-DC and AC-AC Power Supplies" dated August 11, 2004 |
| ErP | • EN 50563:2011/A1:2013 |
| AU GEMS | • AS/NZS 4665.1 |

## 4. Test Setup:

- Connect the EUT to suitably calibrated AC source, power meter and electronic load.
- Warm up at least 30 minutes at 100% of nameplate current output.
- The EUT shall be tested at 100%, 75%, 50%, 25%, 10% of nameplate output current and no load condition.
- Measure the relative parameters required from test record.
- The input test voltage shall be used 115V / 60HZ and 230V/50HZ.
- Ambient temperature: 23 +/-5℃.
- No-Load mode: Not connection to a product or any other load.

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| Model Name: FSP070-AHAN2 | Test Date: 2016.AUG.15 | Revision: 1 |
|---|---|---|

## 5. Load Conditions:

The EUT was tested at four active mode load conditions and the no load condition according to Table 1 below by using electronics loads.

**Table 1 – Load Condition for EUT**

| *Percentage of Nameplate Output Current* | |
|---|---|
| **Load Condition 1** | **100% ± 2%** |
| **Load Condition 2** | **75%± 2%** |
| **Load Condition 3** | **50%± 2%** |
| **Load Condition 4** | **25%± 2%** |
| **Load Condition 5** | **10%± 2%** |
| **Load Condition 6** | **0% (no-load condition)** |

The 2% allowance is of nameplate output current, not of the calculated current value.

## 6. Test Result:

| Agency | No load(W) | | Average Efficiency | |
|---|---|---|---|---|
| | Standard | PASS / FAIL | Standard | PASS / FAIL |
| US DOE Level VI | ≦ 0.21 | PASS | ≧ 0.8800 | PASS |
| CEC Level IV | ≦ 0.5 | PASS | ≧ 0.8500 | PASS |
| Energy Star Level V | ≦ 0.5 | PASS | ≧ 0.8700 | PASS |
| ErP Tier 2 | ≦ 0.5 | PASS | ≧ 0.8700 | PASS |
| AU GEMS | ≦ 0.5 | PASS | ≧ 0.8500 | PASS |

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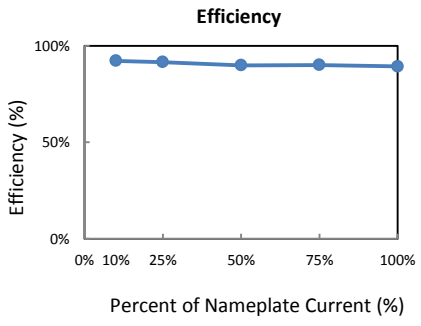
# EPS Efficiency Test Report

| Model Name: FSP070-AHAN2 | Test Date: 2016.AUG.15 | Revision: 1 |
|---|---|---|

## 7. Test Record:

| V160435 -1 | 115V/60Hz | | | | | | 230V/50Hz | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No load | Active power values | | | | | No load | Active power values | | | | |
| **Load** | **0%** | **10%** | **25%** | **50%** | **75%** | **100%** | **0%** | **10%** | **25%** | **50%** | **75%** | **100%** |
| Iout-1 (A) | | 0.58 | 1.45 | 2.91 | 4.36 | 5.81 | | 0.58 | 1.45 | 2.91 | 4.36 | 5.81 |
| Vout-1 (V) | | 12.24 | 12.20 | 12.13 | 12.05 | 11.96 | | 12.25 | 12.20 | 12.14 | 12.06 | 11.97 |
| Iout-2 (A) | | | | | | | | | | | | |
| Vout-2 (V) | | | | | | | | | | | | |
| Iout-3 (A) | | | | | | | | | | | | |
| Vout-3 (V) | | | | | | | | | | | | |
| Iout-4 (A) | -- | | | | | | -- | | | | | |
| Vout-4 (V) | | | | | | | | | | | | |
| Iout-5 (A) | | | | | | | | | | | | |
| Vout-5 (V) | | | | | | | | | | | | |
| Iout-6 (A) | | | | | | | | | | | | |
| Vout-6 (V) | | | | | | | | | | | | |
| Pout (W) | | 7.07 | 17.70 | 35.26 | 52.51 | 69.52 | | 7.07 | 17.70 | 35.27 | 52.55 | 69.57 |
| Fin (Hz) | 60 | 60 | 60 | 60 | 60 | 60 | 50 | 50 | 50 | 50 | 50 | 50 |
| Iin (A) | 0.01 | 0.17 | 0.38 | 0.36 | 0.53 | 0.69 | 0.02 | 0.10 | 0.22 | 0.21 | 0.29 | 0.37 |
| Vin (V) | 115.26 | 115.24 | 115.21 | 115.16 | 115.11 | 115.06 | 230.08 | 230.06 | 230.05 | 230.03 | 230.01 | 229.97 |
| Pin (W) | 0.08 | 7.66 | 19.32 | 39.19 | 58.29 | 77.82 | 0.11 | 7.74 | 19.35 | 39.83 | 58.84 | 77.76 |
| THDv (%) | 0.07 | 0.13 | 0.19 | 0.23 | 0.13 | 0.07 | 0.04 | 0.10 | 0.12 | 0.08 | 0.15 | 0.10 |
| PF (W/VA) | 0.05 | 0.40 | 0.44 | 0.94 | 0.96 | 0.98 | 0.02 | 0.34 | 0.38 | 0.84 | 0.88 | 0.90 |
| Power consumed (W) | **0.08** | 0.59 | 1.63 | 3.93 | 5.78 | 8.29 | **0.11** | 0.67 | 1.66 | 4.57 | 6.29 | 8.19 |
| Efficiency | -- | 0.9224 | 0.9158 | 0.8997 | 0.9009 | 0.8934 | -- | 0.9136 | 0.9144 | 0.8854 | 0.8932 | 0.8947 |
| Average Efficiency | -- | -- | **0.9025** | | | | -- | -- | **0.8969** | | | |

Fig.1



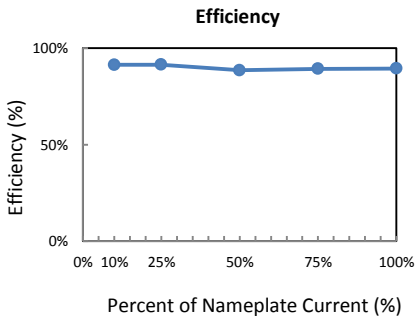
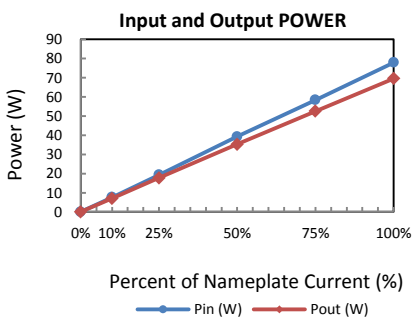
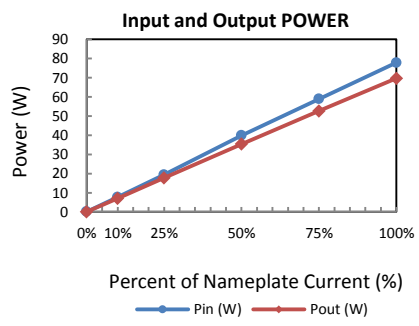




Fig.2



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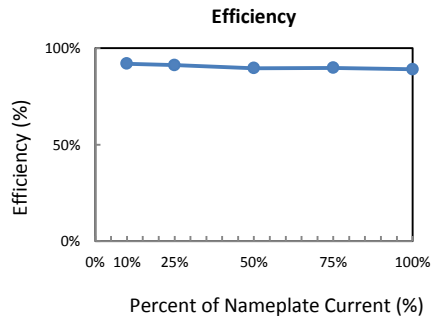
# EPS Efficiency Test Report

**Model Name: FSP070-AHAN2** | **Test Date: 2016.AUG.15** | **Revision: 1**

| V160435 -2 | 115V/60Hz | | | | | | 230V/50Hz | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No load | Active power values | | | | | No load | Active power values | | | | |
| **Load** | **0%** | **10%** | **25%** | **50%** | **75%** | **100%** | **0%** | **10%** | **25%** | **50%** | **75%** | **100%** |
| Iout-1 (A) | | 0.58 | 1.45 | 2.91 | 4.36 | 5.81 | | 0.58 | 1.45 | 2.91 | 4.36 | 5.81 |
| Vout-1 (V) | | 12.16 | 12.11 | 12.03 | 11.94 | 11.84 | | 12.16 | 12.11 | 12.04 | 11.96 | 11.87 |
| Iout-2 (A) | | | | | | | | | | | | |
| Vout-2 (V) | | | | | | | | | | | | |
| Iout-3 (A) | | | | | | | | | | | | |
| Vout-3 (V) | | | | | | | | | | | | |
| Iout-4 (A) | -- | | | | | | -- | | | | | |
| Vout-4 (V) | | | | | | | | | | | | |
| Iout-5 (A) | | | | | | | | | | | | |
| Vout-5 (V) | | | | | | | | | | | | |
| Iout-6 (A) | | | | | | | | | | | | |
| Vout-6 (V) | | | | | | | | | | | | |
| Pout (W) | | 7.02 | 17.56 | 34.97 | 52.04 | 68.85 | | 7.03 | 17.57 | 35.00 | 52.14 | 69.01 |
| Fin (Hz) | 60 | 60 | 60 | 60 | 60 | 60 | 50 | 50 | 50 | 50 | 50 | 50 |
| Iin (A) | 0.01 | 0.17 | 0.38 | 0.36 | 0.52 | 0.69 | 0.02 | 0.10 | 0.22 | 0.21 | 0.29 | 0.37 |
| Vin (V) | 115.17 | 115.14 | 115.21 | 115.16 | 115.11 | 115.06 | 230.18 | 230.18 | 230.16 | 230.14 | 230.12 | 230.10 |
| Pin (W) | 0.07 | 7.63 | 19.24 | 38.99 | 57.96 | 77.30 | 0.11 | 7.68 | 19.34 | 39.62 | 58.55 | 77.25 |
| THDv (%) | 0.06 | 0.21 | 0.17 | 0.09 | 0.17 | 0.07 | 0.03 | 0.06 | 0.11 | 0.05 | 0.06 | 0.06 |
| PF (W/VA) | 0.05 | 0.40 | 0.44 | 0.94 | 0.96 | 0.98 | 0.02 | 0.34 | 0.38 | 0.84 | 0.88 | 0.90 |
| Power consumed (W) | **0.07** | 0.61 | 1.69 | 4.02 | 5.92 | 8.46 | **0.11** | 0.66 | 1.77 | 4.62 | 6.40 | 8.24 |
| Efficiency | -- | 0.9195 | 0.9124 | 0.8969 | 0.8978 | 0.8906 | -- | 0.9145 | 0.9084 | 0.8833 | 0.8906 | 0.8934 |
| Average Efficiency | -- | -- | **0.8994** | | | | -- | -- | **0.8939** | | | |

Fig.1



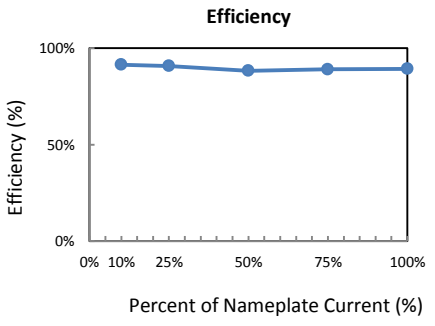
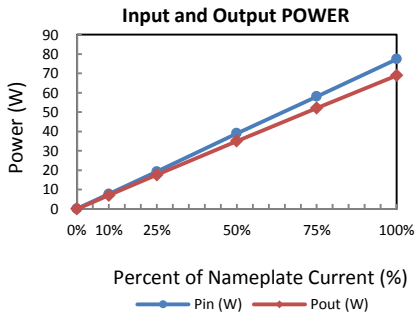
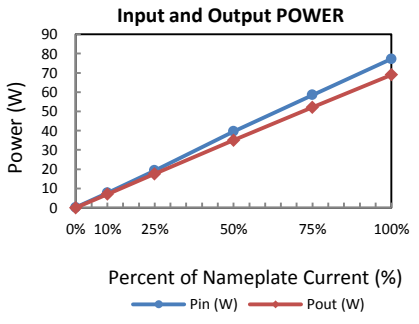




Fig.2



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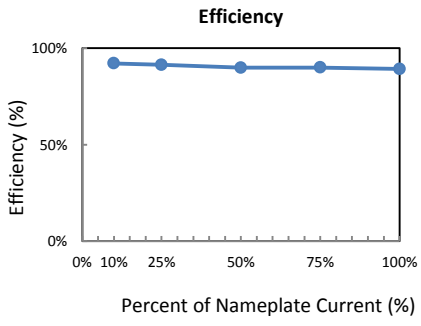
# EPS Efficiency Test Report

**Model Name: FSP070-AHAN2** | **Test Date: 2016.AUG.15** | **Revision: 1**

| V160435 -3 | 115V/60Hz | | | | | | 230V/50Hz | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No load | Active power values | | | | | No load | Active power values | | | | |
| **Load** | **0%** | **10%** | **25%** | **50%** | **75%** | **100%** | **0%** | **10%** | **25%** | **50%** | **75%** | **100%** |
| Iout-1 (A) | | 0.58 | 1.45 | 2.91 | 4.36 | 5.81 | | 0.58 | 1.45 | 2.91 | 4.36 | 5.81 |
| Vout-1 (V) | | 12.26 | 12.21 | 12.14 | 12.06 | 11.96 | | 12.26 | 12.21 | 12.14 | 12.06 | 11.97 |
| Iout-2 (A) | | | | | | | | | | | | |
| Vout-2 (V) | | | | | | | | | | | | |
| Iout-3 (A) | | | | | | | | | | | | |
| Vout-3 (V) | | | | | | | | | | | | |
| Iout-4 (A) | -- | | | | | | -- | | | | | |
| Vout-4 (V) | | | | | | | | | | | | |
| Iout-5 (A) | | | | | | | | | | | | |
| Vout-5 (V) | | | | | | | | | | | | |
| Iout-6 (A) | | | | | | | | | | | | |
| Vout-6 (V) | | | | | | | | | | | | |
| Pout (W) | | 7.08 | 17.71 | 35.28 | 52.54 | 69.53 | | 7.08 | 17.71 | 35.28 | 52.58 | 69.58 |
| Fin (Hz) | 60 | 60 | 60 | 60 | 60 | 60 | 50 | 50 | 50 | 50 | 50 | 50 |
| Iin (A) | 0.01 | 0.17 | 0.38 | 0.36 | 0.53 | 0.69 | 0.02 | 0.10 | 0.22 | 0.21 | 0.29 | 0.38 |
| Vin (V) | 115.26 | 115.24 | 115.21 | 115.16 | 115.11 | 115.06 | 230.09 | 230.07 | 230.05 | 230.03 | 230.02 | 229.98 |
| Pin (W) | 0.07 | 7.68 | 19.37 | 39.25 | 58.40 | 77.95 | 0.11 | 7.73 | 19.43 | 39.87 | 58.95 | 77.85 |
| THDv (%) | 0.06 | 0.09 | 0.24 | 0.21 | 0.04 | 0.05 | 0.15 | 0.08 | 0.13 | 0.18 | 0.15 | 0.09 |
| PF (W/VA) | 0.04 | 0.40 | 0.44 | 0.94 | 0.97 | 0.98 | 0.02 | 0.34 | 0.38 | 0.84 | 0.88 | 0.90 |
| Power consumed (W) | **0.07** | 0.60 | 1.66 | 3.97 | 5.86 | 8.42 | **0.11** | 0.66 | 1.72 | 4.58 | 6.37 | 8.27 |
| Efficiency | -- | 0.9217 | 0.9142 | 0.8989 | 0.8997 | 0.8920 | -- | 0.9151 | 0.9115 | 0.8850 | 0.8919 | 0.8938 |
| Average Efficiency | -- | -- | **0.9012** | | | | -- | -- | **0.8955** | | | |

Fig.1



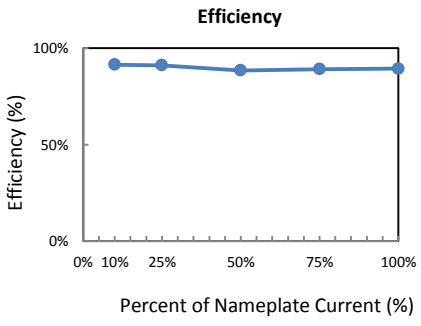
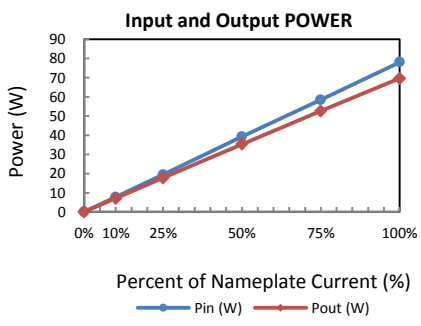
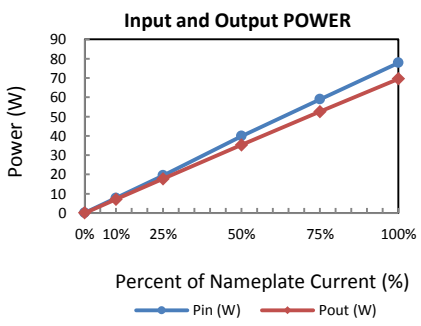




Fig.2



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# EPS Efficiency Test Report

| Model Name: FSP070-AHAN2 | Test Date: 2016.AUG.15 | Revision: 1 |
|---|---|---|

## 8. Product Photo: