



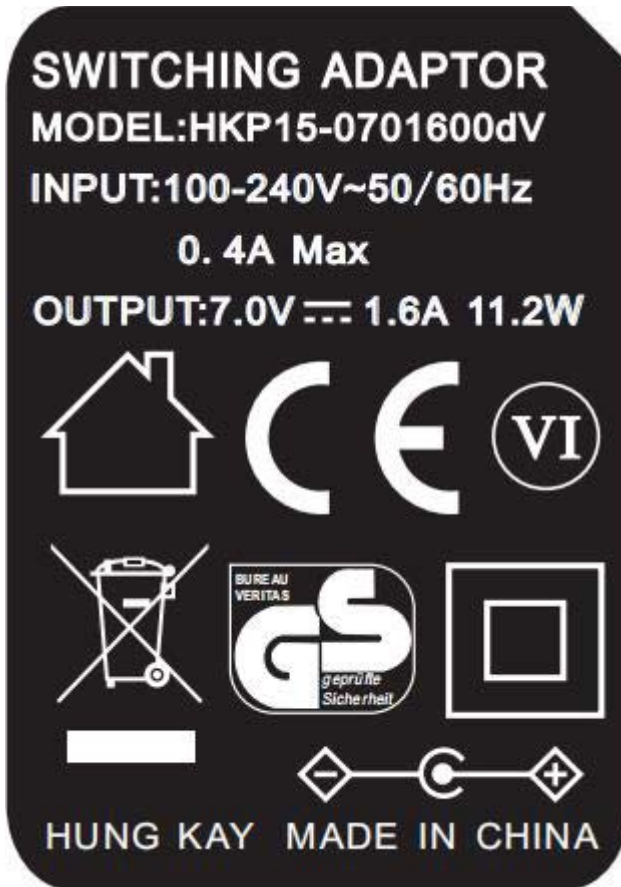
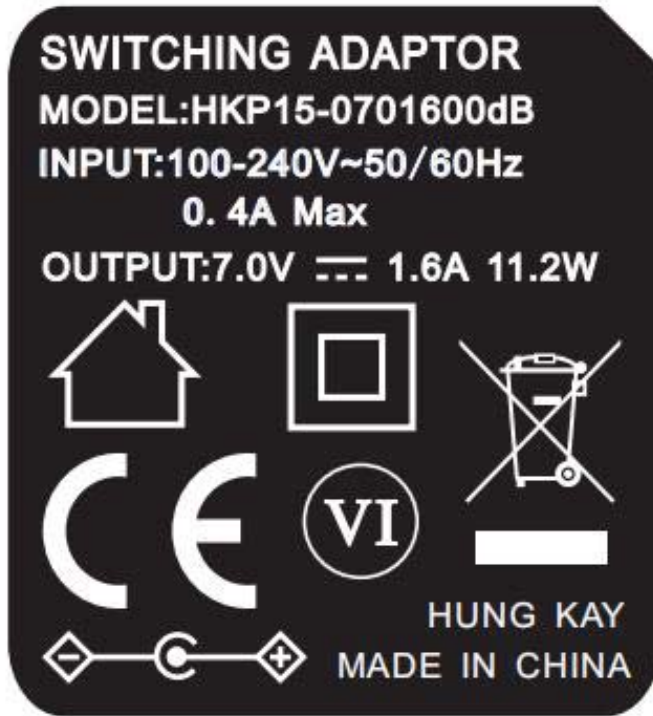
## TEST REPORT

### Energy Efficiency of Power Supplies

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>Report Reference No.</b> ..... : 20PNS070060 03001<br>Compiled by (name + signature)..... : Hedy Lu<br>Reviewed by (name + signature)..... : Andy Huang<br>Approved by (name + signature)..... : Free Zhao<br>Date of issue ..... : 2020-07-23<br>Total number of pages..... : 21 Pages                                                                                                                                                                                                     |  |
| <b>Testing Laboratory</b> ..... : GUANGDONG UTL CO., LTD.<br>Address..... : Lianding Testing Building, No.18 Center Road of Yayuan Industrial Zone<br>Nancheng District Dongguan Guangdong China.                                                                                                                                                                                                                                                                                              |  |
| <b>Applicant's Name</b> ..... : Hung Kay Industrial Co., LTD .<br>Address ..... : Room 2509-2510, 25/F, Mega Trade Centre, 1Mei Wan Street, Tsuen<br>Wan, N.T., Hong Kong, P.R.China                                                                                                                                                                                                                                                                                                           |  |
| <b>Manufacturer name</b> ..... : Dong Guan Sun Hung Kin Electrical Co., Ltd.<br>Address ..... : 6 Gang Wei Road, Wong Dong, Fung Kong, Dong Guan, Guang Dong<br>Province, China.                                                                                                                                                                                                                                                                                                               |  |
| <b>Factory name</b> ..... : Dong Guan Sun Hung Kin Electrical Co., Ltd.<br>Address ..... : 6 Gang Wei Road, Wong Dong, Fung Kong, Dong Guan, Guang Dong<br>Province, China.                                                                                                                                                                                                                                                                                                                    |  |
| <b>Test specification</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| Standard ..... : <input checked="" type="checkbox"/> EU Energy-related Products (ErP) directive<br>COMMISSION REGULATION (EC) No 2019/1782 –1 October 2019<br><input type="checkbox"/> U.S. DOE 10 CFR Part 430<br>Final Rule, published on Feb. 10, 2014 (Level VI)<br><input type="checkbox"/> U.S. CEC California Appliance Efficiency Regulations CEC-400-2015-<br>021, item (u) Power Supplies                                                                                            |  |
| Test procedure ..... : <input checked="" type="checkbox"/> CE ErP: External AC -DC and AC-AC power supplies. Determination<br>of no-load power and average efficiency of active modes in<br>accordance with EN 50563:2011+A1<br><input type="checkbox"/> US DOE: Appendix Z to Subpart B of 10 CFR Part 430<br><input type="checkbox"/> CEC: US EPA "Test Method for Calculating the Energy Efficiency of<br>Single-Voltage External AC-DC and AC-AC Power Supplies" dated<br>August 11, 2004. |  |
| Test item description ..... : SWITCHING ADAPTOR<br>Trade Mark ..... : Hung Kay<br>Model /Type reference..... : HKP15-0701600dV, HKP15-0701600dB<br>Serial number reference..... : N/A                                                                                                                                                                                                                                                                                                          |  |

|                                                                                                   |
|---------------------------------------------------------------------------------------------------|
| Ratings.....: I/P: 100-240V~, 50/60Hz, 0.4A Max<br>O/P :.7.0V $\overline{\text{---}}$ 1.6A, 11.2W |
|---------------------------------------------------------------------------------------------------|

Copy of marking plate:



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| Equipment list                     |              |         |                                                                                                                         |                             |
|------------------------------------|--------------|---------|-------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| Measure Equipment                  | Manufacturer | Model   | Rating                                                                                                                  | Calibrate                   |
| Digital Power Meter                | YOKOGAWA     | WT310E  | 1-600Vdc,1-500Vac<br>50/60Hz, 0.005-<br>20Adc/ac 50/60Hz ,<br>47-400Hz,1-6KW,<br>Power factor:0.1-<br>1.0,THD: 0.1-100% | 2019-08-26 to<br>2020-08-25 |
| Stop watch                         | KTJ          | TA228   | 24h                                                                                                                     | 2019-09-03 to<br>2020-09-02 |
| Electronic load                    | Beich        | CH9710C | 1-360V,0.01-30A,1-<br>300W                                                                                              | 2019-08-26 to<br>2020-08-25 |
| Flow Anemometer                    | SMART SENSOR | AR856   | 30m/s                                                                                                                   | 2019-08-29 to<br>2020-08-28 |
| Temperature &<br>Humidity recorder | Accurate     | TH10R   | 10°C-40°C, 30-<br>90%RH                                                                                                 | 2019-08-29 to<br>2020-08-28 |

**Test items particulars :**

Classification of installation and use.....:  Class I..... Class II

Supply Connection.....:  Direct plug in  
 Detachable power supply cord  
 Non-detachable power supply cord

Category.....:  Basic Voltage EPS  Low Voltage EPS

Output cord length.....: 185CM±1Cm

Output cord cross-sectional areas.....: 22AWG

Built-in switch.....: Not present

UUT supplied product.....: For general use.

UUT as service part.....:  No  Yes  
(end use equipment brand:\_\_\_\_\_, Model \_\_\_\_\_)

Photo .....: See Appendix 1 (Photographs of UUT)

Country of manufacture.....: See copy of marking plate

Name of Testing Laboratory.....: See cover page

Name of technician.....: See cover page

Ambient temperature.....: See item 3 of test report

Definition of Load.....:  Electronic Load  Resistive Load

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**Possible test case verdicts :**

Test case does not apply to the test object...: N/A

Test item does meet the requirement:.....: P(ass)

Test item does not meet the requirement:.....: F(ail)

**Testing**

Date of receipt of test item.....: 2020-07-21

Date(s) of performance of test.....: 2020-07-21

**Test sample identification**

Test specimen .....: No. 1, 2, 3

## 1. General Description of Equipment

The UUT (Unit under Test)HKP15-0701600dV, HKP15-0701600dB are Single-voltage external AC to DC power supplies with fixed plug for supplying power to equipment including electrical business equipment for general use.

All models are identical with each other, except for model name and plug shape  
HKP15-0701600dV was selected for testing representing the series model.

### Summary of testing:

- All tests were performed at:
  - 115V/60Hz
  - 230V/50Hz

### Factory(ies):

**Dong Guan Sun Hung Kin Electrical Co., Ltd.**

6 Gang Wei Road, Wong Dong, Fung Kong, Dong Guan, Guang Dong Province, China.

## 2. General Measurement Conditions

### 2.1 Test Room

The testing was carried out in a room that has an air speed close to the UUT of  $\leq 0.5$  m/s, and the ambient temperature was maintained at  $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$  throughout the test.

### 2.2 Test Voltage

The input voltage was within the specified voltage  $\pm 1\%$  and the specified frequency  $\pm 1\%$ . The UUT was tested at rated supply as mentioned in Summary of testing. The input power source is capable of delivering at least 10 times the nameplate input power of the UUT. The THD of the supply voltage when supplying the UUT in the specified mode was not exceeding 2%, up to and including the 13<sup>th</sup> harmonic.

### 2.3 Test Setup

The samples were operated at 100% of nameplate current output for at least 30 minutes immediately prior to conducting each of efficiency measurements.

All testing leads used in the test set-up were of large gauge and shortest possible length in order to avoid the introduction of errors in the testing process.

A total of 3 test specimens were tested as required by the regulations.

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## 2.4 Load Conditions

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

### Used for CE ErP

Table 1 –Load Conditions for UUT

| 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 % ± 1 %              |
| Load condition 6                       | 0 % (no-load condition) |

### 3. Test Details

All results were taken after warm-up of 0.5 hr immediately.

The ambient temperature at the beginning of the test sequence (surrounding of the UUT):  $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$

The relative humidity at the beginning of the test sequence (surrounding of the UUT):  $\text{RH } 49 \pm 5\%$

| Table: Energy-Efficiency data and the no-load power consumption |                                                                    |       |        |        | P                      |
|-----------------------------------------------------------------|--------------------------------------------------------------------|-------|--------|--------|------------------------|
| Model No. 1                                                     | HKP15-0701600dV                                                    |       |        |        |                        |
| Test voltage/<br>Frequency                                      | 115Vac, 60Hz                                                       |       |        |        |                        |
| Test Item                                                       | Measure at load condition (Percentage of nameplate output current) |       |        |        |                        |
|                                                                 | 25%                                                                | 50%   | 75%    | 100%   | 0% (no-load condition) |
| Output Current (A)                                              | 0.40                                                               | 0.80  | 1.20   | 1.60   |                        |
| Output Voltage (V)                                              | 7.220                                                              | 7.180 | 7.151  | 7.129  |                        |
| Output Power (W)                                                | 2.888                                                              | 5.744 | 8.581  | 11.406 |                        |
| Ac Input Voltage (V)                                            | 115                                                                | 115   | 115    | 115    | 115                    |
| Ac Input Power (W)                                              | 3.420                                                              | 6.750 | 10.100 | 13.700 | 0.049                  |
| Total Harmonic Distortion A%(THD)                               | 197.3                                                              | 185.5 | 173.5  | 155.8  | 319.5                  |
| Total Harmonic Distortion V%(THD)                               | 0.79                                                               | 0.88  | 1.08   | 1.29   | 0.70                   |
| True Power Factor (W/VA)                                        | 0.447                                                              | 0.461 | 0.475  | 0.505  | 0.275                  |
| AC Input Frequency                                              | 60                                                                 | 60    | 60     | 60     | 60                     |
| Power Consumed by UUT (W)                                       | 0.53                                                               | 1.01  | 1.52   | 2.29   |                        |
| Efficiency (%)                                                  | 84.44                                                              | 85.10 | 84.96  | 83.26  |                        |
| Average Efficiency (%)                                          | 84.44                                                              |       |        |        |                        |
| Minimum Average Efficiency (%)                                  | 82.58                                                              |       |        |        |                        |
| The no-load condition power consumption (W)                     | 0.1                                                                |       |        |        |                        |

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| Table: Energy-Efficiency data and the no-load power consumption |                                                                    |       |        |        | P                      |
|-----------------------------------------------------------------|--------------------------------------------------------------------|-------|--------|--------|------------------------|
| Model No. 1                                                     | HKP15-0701600dV                                                    |       |        |        |                        |
| Test voltage/<br>Frequency                                      | 230Vac, 50Hz                                                       |       |        |        |                        |
| Test Item                                                       | Measure at load condition (Percentage of nameplate output current) |       |        |        |                        |
|                                                                 | 25%                                                                | 50%   | 75%    | 100%   | 0% (no-load condition) |
| Output Current (A)                                              | 0.40                                                               | 0.80  | 1.20   | 1.60   |                        |
| Output Voltage (V)                                              | 7.235                                                              | 7.185 | 7.155  | 7.140  |                        |
| Output Power (W)                                                | 2.894                                                              | 5.748 | 8.586  | 11.424 |                        |
| Ac Input Voltage (V)                                            | 230                                                                | 230   | 230    | 230    | 230                    |
| Ac Input Power (W)                                              | 3.540                                                              | 6.890 | 10.200 | 13.600 | 0.070                  |
| Total Harmonic Distortion A%(THD)                               | 269.3                                                              | 243.1 | 233.7  | 224.5  | 470.3                  |
| Total Harmonic Distortion V%(THD)                               | 0.69                                                               | 0.70  | 0.69   | 0.73   | 0.73                   |
| True Power Factor (W/VA)                                        | 0.309                                                              | 0.362 | 0.381  | 0.395  | 0.079                  |
| AC Input Frequency                                              | 50                                                                 | 50    | 50     | 50     | 50                     |
| Power Consumed by UUT (W)                                       | 0.65                                                               | 1.14  | 1.61   | 2.18   |                        |
| Efficiency (%)                                                  | 81.75                                                              | 83.43 | 84.18  | 84.00  |                        |
| Average Efficiency (%)                                          | 83.34                                                              |       |        |        |                        |
| Minimum Average Efficiency (%)                                  | 82.58                                                              |       |        |        |                        |
| The no-load condition power consumption (W)                     | 0.1                                                                |       |        |        |                        |

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| Table: Energy-Efficiency data and the no-load power consumption |                                                                    |       |        |        | P                      |
|-----------------------------------------------------------------|--------------------------------------------------------------------|-------|--------|--------|------------------------|
| Model No. 2                                                     | HKP15-0701600dV                                                    |       |        |        |                        |
| Test voltage/<br>Frequency                                      | 115Vac, 60Hz                                                       |       |        |        |                        |
| Test Item                                                       | Measure at load condition (Percentage of nameplate output current) |       |        |        |                        |
|                                                                 | 25%                                                                | 50%   | 75%    | 100%   | 0% (no-load condition) |
| Output Current (A)                                              | 0.40                                                               | 0.80  | 1.20   | 1.60   |                        |
| Output Voltage (V)                                              | 7.134                                                              | 7.106 | 7.078  | 7.063  |                        |
| Output Power (W)                                                | 2.854                                                              | 5.685 | 8.494  | 11.301 |                        |
|                                                                 |                                                                    |       |        |        |                        |
| Ac Input Voltage (V)                                            | 115                                                                | 115   | 115    | 115    | 115                    |
| Ac Input Power (W)                                              | 3.380                                                              | 6.670 | 10.000 | 13.600 | 0.046                  |
| Total Harmonic Distortion A%(THD)                               | 189.1                                                              | 178.9 | 168.3  | 152.3  | 315.2                  |
| Total Harmonic Distortion V%(THD)                               | 0.92                                                               | 0.99  | 1.16   | 1.32   | 0.82                   |
| True Power Factor (W/VA)                                        | 0.462                                                              | 0.477 | 0.485  | 0.514  | 0.240                  |
| AC Input Frequency                                              | 60                                                                 | 60    | 60     | 60     | 60                     |
|                                                                 |                                                                    |       |        |        |                        |
| Power Consumed by UUT (W)                                       | 0.53                                                               | 0.99  | 1.51   | 2.30   |                        |
| Efficiency (%)                                                  | 84.44                                                              | 85.23 | 84.94  | 83.10  |                        |
| Average Efficiency (%)                                          | 84.43                                                              |       |        |        |                        |
| Minimum Average Efficiency (%)                                  | 82.58                                                              |       |        |        |                        |
| The no-load condition power consumption (W)                     | 0.1                                                                |       |        |        |                        |

| Table: Energy-Efficiency data and the no-load power consumption |                                                                    |       |        |        | P                      |
|-----------------------------------------------------------------|--------------------------------------------------------------------|-------|--------|--------|------------------------|
| Model No. 2                                                     | HKP15-0701600dV                                                    |       |        |        |                        |
| Test voltage/<br>Frequency                                      | 230Vac, 50Hz                                                       |       |        |        |                        |
| Test Item                                                       | Measure at load condition (Percentage of nameplate output current) |       |        |        |                        |
|                                                                 | 25%                                                                | 50%   | 75%    | 100%   | 0% (no-load condition) |
| Output Current (A)                                              | 0.40                                                               | 0.80  | 1.20   | 1.60   |                        |
| Output Voltage (V)                                              | 7.138                                                              | 7.115 | 7.075  | 7.058  |                        |
| Output Power (W)                                                | 2.855                                                              | 5.692 | 8.490  | 11.293 |                        |
| Ac Input Voltage (V)                                            | 230                                                                | 230   | 230    | 230    | 230                    |
| Ac Input Power (W)                                              | 3.500                                                              | 6.830 | 10.100 | 13.500 | 0.070                  |
| Total Harmonic Distortion A%(THD)                               | 263.1                                                              | 238.4 | 228.7  | 219.3  | 484.1                  |
| Total Harmonic Distortion V%(THD)                               | 0.72                                                               | 0.72  | 0.72   | 0.74   | 0.71                   |
| True Power Factor (W/VA)                                        | 0.320                                                              | 0.370 | 0.389  | 0.405  | 0.076                  |
| AC Input Frequency                                              | 50                                                                 | 50    | 50     | 50     | 50                     |
| Power Consumed by UUT (W)                                       | 0.65                                                               | 1.14  | 1.61   | 2.21   |                        |
| Efficiency (%)                                                  | 81.57                                                              | 83.34 | 84.06  | 83.65  |                        |
| Average Efficiency (%)                                          | 83.16                                                              |       |        |        |                        |
| Minimum Average Efficiency (%)                                  | 82.58                                                              |       |        |        |                        |
| The no-load condition power consumption (W)                     | 0.1                                                                |       |        |        |                        |

| Table: Energy-Efficiency data and the no-load power consumption |                                                                    |       |        |        | P                      |
|-----------------------------------------------------------------|--------------------------------------------------------------------|-------|--------|--------|------------------------|
| Model No. 3                                                     | HKP15-0701600dV                                                    |       |        |        |                        |
| Test voltage/<br>Frequency                                      | 115Vac, 60Hz                                                       |       |        |        |                        |
| Test Item                                                       | Measure at load condition (Percentage of nameplate output current) |       |        |        |                        |
|                                                                 | 25%                                                                | 50%   | 75%    | 100%   | 0% (no-load condition) |
| Output Current (A)                                              | 0.40                                                               | 0.80  | 1.20   | 1.60   |                        |
| Output Voltage (V)                                              | 7.129                                                              | 7.100 | 7.064  | 7.036  |                        |
| Output Power (W)                                                | 2.852                                                              | 5.680 | 8.477  | 11.258 |                        |
| Ac Input Voltage (V)                                            | 115                                                                | 115   | 115    | 115    | 115                    |
| Ac Input Power (W)                                              | 3.360                                                              | 6.660 | 10.000 | 13.500 | 0.046                  |
| Total Harmonic Distortion A%(THD)                               | 191.4                                                              | 186.4 | 177.9  | 159.3  | 297.1                  |
| Total Harmonic Distortion V%(THD)                               | 0.78                                                               | 0.83  | 0.99   | 1.19   | 0.71                   |
| True Power Factor (W/VA)                                        | 0.457                                                              | 0.460 | 0.467  | 0.499  | 0.261                  |
| AC Input Frequency                                              | 60                                                                 | 60    | 60     | 60     | 60                     |
| Power Consumed by UUT (W)                                       | 0.51                                                               | 0.98  | 1.52   | 2.24   |                        |
| Efficiency (%)                                                  | 84.88                                                              | 85.29 | 84.77  | 83.39  |                        |
| Average Efficiency (%)                                          | 84.58                                                              |       |        |        |                        |
| Minimum Average Efficiency (%)                                  | 82.58                                                              |       |        |        |                        |
| The no-load condition power consumption (W)                     | 0.1                                                                |       |        |        |                        |

| Table: Energy-Efficiency data and the no-load power consumption |                                                                    |       |        |        | P                      |
|-----------------------------------------------------------------|--------------------------------------------------------------------|-------|--------|--------|------------------------|
| Model No. 3                                                     | HKP15-0701600dV                                                    |       |        |        |                        |
| Test voltage/<br>Frequency                                      | 230Vac, 50Hz                                                       |       |        |        |                        |
| Test Item                                                       | Measure at load condition (Percentage of nameplate output current) |       |        |        |                        |
|                                                                 | 25%                                                                | 50%   | 75%    | 100%   | 0% (no-load condition) |
| Output Current (A)                                              | 0.40                                                               | 0.80  | 1.20   | 1.60   |                        |
| Output Voltage (V)                                              | 7.128                                                              | 7.103 | 7.070  | 7.031  |                        |
| Output Power (W)                                                | 2.851                                                              | 5.682 | 8.484  | 11.250 |                        |
|                                                                 |                                                                    |       |        |        |                        |
| Ac Input Voltage (V)                                            | 230                                                                | 230   | 230    | 230    | 230                    |
| Ac Input Power (W)                                              | 3.460                                                              | 6.780 | 10.100 | 13.400 | 0.070                  |
| Total Harmonic Distortion A%(THD)                               | 271.9                                                              | 241.2 | 231.2  | 223.6  | 461.3                  |
| Total Harmonic Distortion V%(THD)                               | 0.72                                                               | 0.68  | 0.70   | 0.73   | 0.72                   |
| True Power Factor (WVA)                                         | 0.310                                                              | 0.364 | 0.385  | 0.398  | 0.071                  |
| AC Input Frequency                                              | 50                                                                 | 50    | 50     | 50     | 50                     |
|                                                                 |                                                                    |       |        |        |                        |
| Power Consumed by UUT (W)                                       | 0.61                                                               | 1.10  | 1.62   | 2.15   |                        |
| Efficiency (%)                                                  | 82.40                                                              | 83.81 | 84.00  | 83.96  |                        |
| Average Efficiency (%)                                          | 83.54                                                              |       |        |        |                        |
| Minimum Average Efficiency (%)                                  | 82.58                                                              |       |        |        |                        |
| The no-load condition power consumption (W)                     | 0.1                                                                |       |        |        |                        |

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|                                     |                        |            |            |                     |
|-------------------------------------|------------------------|------------|------------|---------------------|
| <b>Tested model:</b>                | <b>HKP15-0701600dV</b> |            |            | <b>115Vac, 60Hz</b> |
| <b>Nameplate Output:</b>            | <b>7.0V/1.6A</b>       |            |            |                     |
| <b>Test specimen</b>                | <b>1</b>               | <b>2</b>   | <b>3</b>   |                     |
| <b>Percent of Nameplate Current</b> | <b>10%</b>             | <b>10%</b> | <b>10%</b> | <b>Remark</b>       |
| RMS Input Voltage (V)               | 115                    | 115        | 115        |                     |
| Input Frequency (Hz)                | 60                     | 60         | 60         |                     |
| RMS Input Power (W)                 | 1.42                   | 1.4        | 1.39       | Input Power (Pin)   |
| Total Harmonic Distortion (THDv, %) | 0.74                   | 0.85       | 0.78       |                     |
| True Power Factor                   | 0.432                  | 0.416      | 0.423      |                     |
| Output Voltage (Vdc)                | 7.233                  | 7.147      | 7.161      |                     |
| Output Current (A)                  | 0.18                   | 0.18       | 0.18       |                     |
| Active Output Power (W)             | 0.16                   | 0.16       | 0.16       | Output Power (Pout) |
| Power Consumed by UUT (W)           | 0.26                   | 0.26       | 0.24       |                     |
| Efficiency (%)                      | 81.48                  | 81.71      | 82.45      |                     |

|                                     |                        |            |            |                     |
|-------------------------------------|------------------------|------------|------------|---------------------|
| <b>Tested model:</b>                | <b>HKP15-0701600dV</b> |            |            | <b>230Vac, 50Hz</b> |
| <b>Nameplate Output:</b>            | <b>7.0V/1.6A</b>       |            |            |                     |
| <b>Test specimen</b>                | <b>1</b>               | <b>2</b>   | <b>3</b>   |                     |
| <b>Percent of Nameplate Current</b> | <b>10%</b>             | <b>10%</b> | <b>10%</b> | <b>Remark</b>       |
| RMS Input Voltage (V)               | 230                    | 230        | 230        |                     |
| Input Frequency (Hz)                | 50                     | 50         | 50         |                     |
| RMS Input Power (W)                 | 1.48                   | 1.47       | 1.43       | Input Power (Pin)   |
| Total Harmonic Distortion (THDv, %) | 0.7                    | 0.72       | 0.7        |                     |
| True Power Factor                   | 0.236                  | 0.245      | 0.236      |                     |
| Output Voltage (Vdc)                | 7.233                  | 7.143      | 7.143      |                     |
| Output Current (A)                  | 0.16                   | 0.16       | 0.16       |                     |
| Active Output Power (W)             | 1.157                  | 1.157      | 1.157      | Output Power (Pout) |
| Power Consumed by UUT (W)           | 0.32                   | 0.33       | 0.29       |                     |
| Efficiency (%)                      | 78.18                  | 77.76      | 79.93      |                     |

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Refer to Energy Efficiency Regulations for External Power Supplies of US DoE for external power supplies (Level VI), Single-Voltage External AC-DC or AC-AC Power Supply, Low-Voltage, The power supply complies with level VI standard.

| Test sample | Test Item                                   | Test voltage/ Frequency |              |
|-------------|---------------------------------------------|-------------------------|--------------|
|             |                                             | 115Vac, 60Hz            | 230Vac, 50Hz |
| No. 1       | Average Efficiency (%)                      | 84.44                   | 83.34        |
|             | The no-load condition Ac Input Power (W)    | 0.049                   | 0.070        |
| No. 2       | Average Efficiency (%)                      | 84.43                   | 83.16        |
|             | The no-load condition Ac Input Power (W)    | 0.046                   | 0.070        |
| No. 3       | Average Efficiency (%)                      | 84.58                   | 83.54        |
|             | The no-load condition Ac Input Power (W)    | 0.046                   | 0.070        |
| /           | Minimum Average Efficiency (%)              | 82.58                   |              |
|             | The no-load condition power consumption (W) | 0.1                     |              |

## 4. Test Result

The samples submitted were tested and comply with the efficiency in the active mode and the energy consumption in the no-load mode at the corresponding national AC mains supply voltage according to following regulations:

|                                     |                                                                                                                                                                            |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | EU Energy-related Products (ErP) directive<br>COMMISSION REGULATION (EC) No 2019/1782 – 1 October 2019                                                                     |
| <input type="checkbox"/>            | U.S. DOE 10 CFR Part 430<br>Final Rule, published on Feb. 10, 2014 (Level VI)                                                                                              |
| <input type="checkbox"/>            | U.S. CEC California Appliance Efficiency Regulations<br>(Section 1601 through 1609 of Title 20 of the California Code of Regulations), item (u) Power Supplies (Table U-4) |

And the use of an efficiency mark, according to the international efficiency marking protocol, qualified with efficiency marking:

IV       V       VI

Details of Minimum Efficiency Performance Standard (MEPS) refer to following tables.



**Energy Efficiency Regulations for External Power Supplies of  
US CEC (Table U-4)**

| Nameplate Output             | Minimum Efficiency in Active Mode           | Verdict |
|------------------------------|---------------------------------------------|---------|
| <1 watt                      | $0.5 * \text{Nameplate Output}$             | N/A     |
| $\geq 1$ and $\leq 51$ watts | $0.09 * \ln(\text{Nameplate Output}) + 0.5$ | N/A     |
| > 51 watts                   | 0.85                                        | N/A     |
|                              |                                             |         |
| Nameplate Output             | Maximum Energy Consumption in No-Load Mode  | Verdict |
| Any output                   | 0.5 watts                                   | N/A     |
|                              |                                             |         |
| Note(s):                     |                                             |         |

U.S. DOE 10 CFR Part 430 Final Rule, published on Feb. 10, 2014 (Level VI) for no-load electric power consumption and average active efficiency of external power supplies

**Table I-1: Energy Conservation Standards for Direct Operation EPSs  
(Compliance Starting Feb. 10, 2016)**

| Single-Voltage External AC-DC or AC-AC Power Supply, Basic-Voltage |                                                               |                                               |         |
|--------------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------|---------|
| Nameplate Output Power (Pno)                                       | Minimum Average Efficiency in Active Mode                     |                                               | Verdict |
| $\leq 1W$                                                          | $\geq 0.5 \times P_{no} + 0.16$                               |                                               | N/A     |
| $1 W < P_{no} \leq 49 W$                                           | $\geq 0.071 \times \ln(P_{no}) - 0.0014 \times P_{no} + 0.67$ |                                               | N/A     |
| $49W < P_{no} \leq 250W$                                           | $\geq 0.880$                                                  |                                               | N/A     |
| $> 250W$                                                           | $\geq 0.875$                                                  |                                               | N/A     |
| Nameplate Output Power (Pno)                                       | Maximum Power in No-Load Mode                                 |                                               | Verdict |
|                                                                    | <input type="checkbox"/> Ac-Ac EPS                            | <input checked="" type="checkbox"/> Ac-Dc EPS |         |
| $\leq 1W$                                                          | $\leq 0.21W$                                                  | $\leq 0.10W$                                  | N/A     |
| $1 W < P_{no} \leq 49 W$                                           | $\leq 0.21W$                                                  | $\leq 0.10W$                                  | N/A     |
| $49W < P_{no} \leq 250W$                                           | $\leq 0.21W$                                                  |                                               | N/A     |
| $> 250W$                                                           | $\leq 0.50W$                                                  |                                               | N/A     |

| Single-Voltage External AC-DC or AC-AC Power Supply, Low-Voltage |                                           |         |
|------------------------------------------------------------------|-------------------------------------------|---------|
| Nameplate Output Power (Pno)                                     | Minimum Average Efficiency in Active Mode | Verdict |
| $\leq 1W$                                                        | $\geq 0.517 \times P_{out} + 0.087$       | N/A     |

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| 1 W < to ≤ 49 W              | $\geq 0.0834 \times \ln(P_{no}) - 0.00115 \times P_{no} + 0.609$ |                                    | N/A     |
|------------------------------|------------------------------------------------------------------|------------------------------------|---------|
| 49W < to ≤ 250W              | $\geq 0.870$                                                     |                                    | N/A     |
| > 250W                       | $\geq 0.875$                                                     |                                    | N/A     |
| Nameplate Output Power (Pno) | Maximum Power in No-Load Mode                                    |                                    | Verdict |
|                              | <input type="checkbox"/> Ac-Ac EPS                               | <input type="checkbox"/> Ac-Dc EPS |         |
| ≤ 1W                         | ≤ 0.21W                                                          | ≤ 0.10W                            | N/A     |
| 1 W < to ≤ 49 W              | ≤ 0.21W                                                          | ≤ 0.10W                            | N/A     |
| 49W < to ≤ 250W              | ≤ 0.21W                                                          |                                    | N/A     |
| > 250W                       | ≤ 0.50W                                                          |                                    | N/A     |

### EU Energy-related Products (ErP) directive Ecodesign requirements

set out in Annex II of COMMISSION REGULATION (EC) No 2019/1782

for no-load electric power consumption and average active efficiency of external power supplies

(Compliance Starting April. 1, 2020)

| Single-Voltage External AC-DC or AC-AC Power Supply, Basic-Voltage |                                                                 |                                               |         |
|--------------------------------------------------------------------|-----------------------------------------------------------------|-----------------------------------------------|---------|
| Nameplate Output Power (Pno)                                       | Minimum Average Efficiency in Active Mode                       |                                               | Verdict |
| ≤ 1W                                                               | $\geq 0.5 \times P_{no} + 0.16$                                 |                                               | N/A     |
| 1 W < to ≤ 49 W                                                    | $\geq 0.071 \times \ln(P_{no}) - 0.0014 \times P_{no} + 0.67$   |                                               | P       |
| > 49W                                                              | $\geq 0.880$                                                    |                                               | N/A     |
| Nameplate Output Power (Pno)                                       | Maximum Power in No-Load Mode                                   |                                               | Verdict |
|                                                                    | <input type="checkbox"/> Ac-Ac EPS                              | <input checked="" type="checkbox"/> Ac-Dc EPS |         |
| ≤ 49W                                                              | ≤ 0.21W                                                         | ≤ 0.10W                                       | P       |
| > 49 W                                                             | ≤ 0.21W                                                         | ≤ 0.21W                                       | N/A     |
| Single-Voltage External AC-DC or AC-AC Power Supply, Low-Voltage   |                                                                 |                                               |         |
| Nameplate Output Power (Pno)                                       | Minimum Average Efficiency in Active Mode                       |                                               | Verdict |
| ≤ 1W                                                               | $\geq 0.517 \times P_{out} + 0.087$                             |                                               | N/A     |
| 1 W < to ≤ 49 W                                                    | $\geq 0.0834 \times \ln(P_{no}) - 0.0014 \times P_{no} + 0.609$ |                                               | N/A     |
| > 49W                                                              | $\geq 0.870$                                                    |                                               | N/A     |
| Nameplate Output Power (Pno)                                       | Maximum Power in No-Load Mode                                   |                                               | Verdict |
|                                                                    | <input type="checkbox"/> Ac-Ac EPS                              | <input checked="" type="checkbox"/> Ac-Dc EPS |         |
| ≤ 49W                                                              | ≤ 0.10W                                                         | ≤ 0.10W                                       | N/A     |
| > 49 W                                                             | ≤ 0.21W                                                         | ≤ 0.21W                                       | N/A     |

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| <b>Multiple-Voltage External AC-DC or AC-AC Power Supply</b>                                                                                                                                                                                                                                                                                                                 |                                                  |                                           |                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-------------------------------------------|----------------|
| <b>Nameplate Output Power (Pno)</b>                                                                                                                                                                                                                                                                                                                                          | <b>Minimum Average Efficiency in Active Mode</b> |                                           | <b>Verdict</b> |
| ≤ 1W                                                                                                                                                                                                                                                                                                                                                                         | $\geq 0.497 \times P_{out} + 0.067$              |                                           | N/A            |
| 1 W < to ≤ 49 W                                                                                                                                                                                                                                                                                                                                                              | $\geq 0.075 \times \ln(P_{no}) + 0.561$          |                                           | N/A            |
| >49W                                                                                                                                                                                                                                                                                                                                                                         | $\geq 0.860$                                     |                                           | N/A            |
| <b>Nameplate Output Power (Pno)</b>                                                                                                                                                                                                                                                                                                                                          | <b>Maximum Power in No-Load Mode</b>             |                                           | <b>Verdict</b> |
|                                                                                                                                                                                                                                                                                                                                                                              | <input type="checkbox"/> <b>Ac-Ac EPS</b>        | <input type="checkbox"/> <b>Ac-Dc EPS</b> |                |
| ≤ 49W                                                                                                                                                                                                                                                                                                                                                                        | ≤ 0.30W                                          | ≤ 0.30W                                   | N/A            |
| >49 W                                                                                                                                                                                                                                                                                                                                                                        | ≤ 0.30W                                          | ≤ 0.30W                                   | N/A            |
| <b>Note(s):</b><br>1. Where Ln (Nameplate Output) = Natural Logarithm of the nameplate output expressed in Watts.<br>2. An efficiency of 0.85 in decimal form corresponds to the more familiar value of 85%.<br>3. A low voltage model is an EPS with a nameplate output voltage of less than 6 volts and a nameplate output current greater than or equal to 550 milliamps. |                                                  |                                           |                |

**Appendix 1-Photos**



Picture 1.Overall view I for model HKP15-0701600dB



Picture 2.Overall view II for model HKP15-0701600dB



Picture 3.Overall view III for model HKP15-0701600dV



Picture 4.Overall view VI for model HKP15-0701600dV

-----End of Test Report-----