Test Report issued under the responsibility of

TEST REPORT

Energy Efficiency of Power Supplies

Report Reference No. ..... :	PNS 220902020 01001
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Date of issue ..... :	2022-09-21
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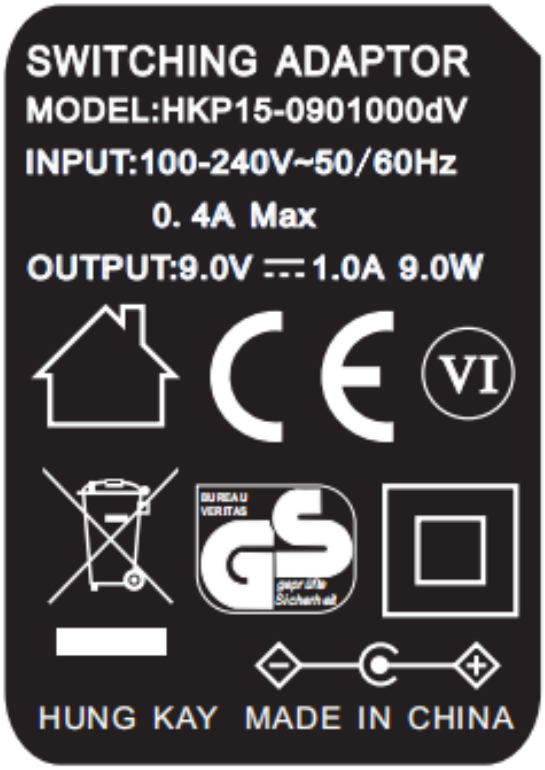
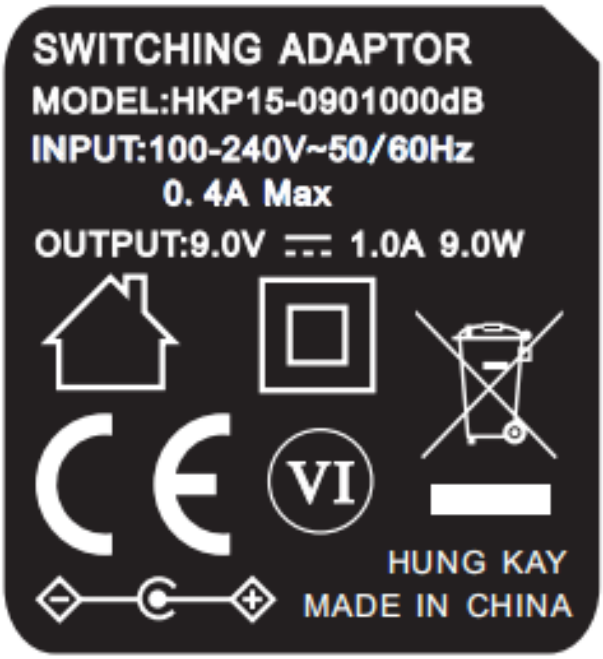
Testing Laboratory..... :	GUANGDONG UTL CO., LTD.
Address ..... :	Lianding Testing Building, No.18 Center Road of Yayuan Industrial Zone Nancheng District Dongguan Guangdong China.
Applicant's Name ..... :	Hung Kay Industrial Co., LTD .
Address ..... :	Room 2509-2510, 25/F, Mega Trade Centre, 1Mei Wan Street, Tsuen Wan, N.T., Hong Kong, P.R.China
Manufacturer name..... :	Dong Guan Sun Hung Kin Electrical Co., Ltd.
Address ..... :	6 Gang Wei Road, Wong Dong, Fung Kong, Dong Guan, Guang Dong Province, China.
Factory name..... :	Dong Guan Sun Hung Kin Electrical Co., Ltd.
Address ..... :	6 Gang Wei Road, Wong Dong, Fung Kong, Dong Guan, Guang Dong Province, China.
Test specification	
Standard ..... :	☒ EU Energy-related Products (ErP) directive COMMISSION REGULATION (EC) No 2019/1782 –1 October 2019 ☐ U.S. DOE 10 CFR Part 430 Final Rule, published on Feb. 10, 2014 (Level VI) ☐ U.S. CEC California Appliance Efficiency Regulations CEC-400-2015-021, item (u) Power Supplies
Test procedure .....:	☒ CE ErP: External AC -DC and AC-AC power supplies. Determination of no-load power and average efficiency of active modes in accordance with EN 50563:2011+A1 ☐ US DOE: Appendix Z to Subpart B of 10 CFR Part 430 ☐ CEC: US EPA "Test Method for Calculating the Energy Efficiency of Single-Voltage External AC-DC and AC-AC Power Supplies" dated August 11, 2004.
Test item description :	SWITCHING ADAPTER
Trade Mark ..... :	Hung Kay
Model /Type reference :	HKP15-0901000dV,HKP15-0901000dB
Serial number reference ..... :	N/A

Ratings ..... :	I/P: 100- 240~, 50/60Hz, 0.4A Max O/P: 9.0V⎓1.0A, 9.0W	

Copy of marking plate:





Equipment list				
Measure Equipment	Manufacturer	Model	Rating	Calibrate
Digital Power Meter	YOKOGAWA	WT310E	1-600Vdc,1-500Vac 50/60Hz, 0.005-20Adc/ac 50/60Hz , 47-400Hz,1-6KW, Power factor:0.1-1.0,THD: 0.1-100%	2020-08-26 to 2021-08-25
Stop watch	KTJ	TA228	24h	2020-09-03 to 2021-09-02
Electronic load	Beich	CH9710C	1-360V,0.01-30A,1-300W	2020-08-26 to 2021-08-25
Flow Anemometer	SMART SENSOR	AR856	30m/s	2020-08-29 to 2021-08-28
Temperature & Humidity recorder	Accurate	TH10R	10℃-40℃, 30-90%RH	2020-08-29 to 2021-08-28

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±5Cm
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
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 ..... :	2022-09-11
Date(s) of performance of test ..... :	2022-09-11
Test sample identification	
Test specimen ..... :	No. 1, 2, 3

1. General Description of Equipment

The UUT (Unit under Test) HKP15-0901000dV and HKP15-0901000dB are Single-voltage external AC to DC power supplies 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 HKP15-0901000dVwas 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 ≤ 0.5 m/s, and the ambient temperature was maintained at 23°C ± 5 °C throughout the test.

2.2 Test Voltage

The input voltage was within the specified voltage ±1% and the specified frequency ±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 13th 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.

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°C ± 2 °C

The relative humidity at the beginning of the test sequence (surrounding of the UUT): RH 49± 5%

Table: Energy-Efficiency data and the no-load power consumption					**P**
Model No. 1	HKP15-0901000dV				
Test voltage/ 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)	0.25	0.50	0.75	1.0	
Output Voltage (V)	8.989	9.001	9.024	9.048	
Output Power (W)	2.247	4.501	6.768	9.048	
Ac Input Voltage (V)	115	115	115	115	115
Ac Input Power (W)	2.683	5.274	7.888	10.582	0.037
Total Harmonic Distortion A%(THD)	193.130	191.600	180.840	166.240	347.660
Total Harmonic Distortion V%(THD)	0.855	0.803	0.844	0.936	0.037
True Power Factor (W/VA)	0.449	0.442	0.461	0.487	0.224
AC Input Frequency	60	60	60	60	60
Power Consumed by UUT (W)	0.44	0.77	1.12	1.53	
Efficiency (%)	83.75	85.34	85.80	85.50	
Average Efficiency (%)	85.10				
Minimum Average Efficiency (%)	81.34				
The no-load condition power consumption (W)	0.1				

Table: Energy-Efficiency data and the no-load power consumption					**P**
Model No. 1	HKP15-0901000dV				
Test voltage/ 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)	0.25	0.50	0.75	1.0	
Output Voltage (V)	9.007	9.024	9.028	9.045	
Output Power (W)	2.252	4.512	6.771	9.045	
Ac Input Voltage (V)	230	230	230	230	230
Ac Input Power (W)	2.771	5.433	8.080	10.700	0.065
Total Harmonic Distortion A%(THD)	249.090	244.050	228.480	193.300	550.470
Total Harmonic Distortion V%(THD)	1.081	1.137	1.093	1.108	1.147
True Power Factor (W/VA)	0.309	0.355	0.381	0.428	0.093
AC Input Frequency	50	50	50	50	50
Power Consumed by UUT (W)	0.52	0.92	1.31	1.66	
Efficiency (%)	81.27	83.05	83.80	84.53	
Average Efficiency (%)	83.16				
Minimum Average Efficiency (%)	81.34				
The no-load condition power consumption (W)	0.1				

Table: Energy-Efficiency data and the no-load power consumption					**P**
Model No. 2	HKP15-0901000dV				
Test voltage/ 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)	0.25	0.50	0.75	1.0	
Output Voltage (V)	9.038	9.05	9.072	9.094	
Output Power (W)	2.260	4.525	6.804	9.094	
Ac Input Voltage (V)	115	115	115	115	115
Ac Input Power (W)	2.692	5.304	7.934	10.646	0.037
Total Harmonic Distortion A%(THD)	195.450	191.410	179.420	164.360	325.410
Total Harmonic Distortion V%(THD)	0.820	0.792	0.832	0.915	0.374
True Power Factor (W/VA)	0.446	0.444	0.464	0.490	0.233
AC Input Frequency	60	60	60	60	60
Power Consumed by UUT (W)	0.43	0.78	1.13	1.55	
Efficiency (%)	83.95	85.31	85.76	85.42	
Average Efficiency (%)	85.11				
Minimum Average Efficiency (%)	81.34				
The no-load condition power consumption (W)	0.1				

Table: Energy-Efficiency data and the no-load power consumption					**P**
Model No. 2	HKP15-0901000dV				
Test voltage/ 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)	0.25	0.50	0.75	1.0	
Output Voltage (V)	9.069	9.06	9.07	9.095	
Output Power (W)	2.267	4.530	6.803	9.095	
Ac Input Voltage (V)	230	230	230	230	230
Ac Input Power (W)	2.790	5.483	8.119	10.765	0.069
Total Harmonic Distortion A%(THD)	249.650	237.240	225.650	204.890	483.030
Total Harmonic Distortion V%(THD)	1.058	1.081	1.058	1.086	1.109
True Power Factor (W/VA)	0.311	0.359	0.382	0.414	0.089
AC Input Frequency	50	50	50	50	50
Power Consumed by UUT (W)	0.52	0.95	1.32	1.67	
Efficiency (%)	81.25	82.62	83.79	84.49	
Average Efficiency (%)	83.04				
Minimum Average Efficiency (%)	81.34				
The no-load condition power consumption (W)	0.1				

Table: Energy-Efficiency data and the no-load power consumption					**P**
Model No. 3	HKP15-0901000dV				
Test voltage/ 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)	0.25	0.50	0.75	1.0	
Output Voltage (V)	9.087	9.099	9.119	9.14	
Output Power (W)	2.726	4.550	7.295	9.140	
Ac Input Voltage (V)	115	115	115	115	115
Ac Input Power (W)	3.207	5.333	7.980	10.710	0.037
Total Harmonic Distortion A%(THD)	197.780	191.230	178.000	162.490	303.170
Total Harmonic Distortion V%(THD)	0.785	0.781	0.820	0.894	0.710
True Power Factor (W/VA)	0.442	0.446	0.466	0.493	0.242
AC Input Frequency	60	60	60	60	60
Power Consumed by UUT (W)	0.48	0.78	0.69	1.57	
Efficiency (%)	85.00	85.32	91.42	85.34	
Average Efficiency (%)	86.77				
Minimum Average Efficiency (%)	81.34				
The no-load condition power consumption (W)	0.1				

Table: Energy-Efficiency data and the no-load power consumption					**P**
Model No. 3	HKP15-0901000dV				
Test voltage/ 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)	0.25	0.50	0.75	1.0	
Output Voltage (V)	9.131	9.095	9.112	9.145	
Output Power (W)	2.739	4.548	7.290	9.145	
Ac Input Voltage (V)	230	230	230	230	230
Ac Input Power (W)	2.809	5.533	8.157	10.830	0.073
Total Harmonic Distortion A%(THD)	250.220	230.430	222.830	216.480	415.590
Total Harmonic Distortion V%(THD)	1.034	1.025	1.022	1.064	1.071
True Power Factor (W/VA)	0.312	0.362	0.383	0.399	0.085
AC Input Frequency	50	50	50	50	50
Power Consumed by UUT (W)	0.07	0.99	0.87	1.69	
Efficiency (%)	97.51	82.20	89.37	84.44	
Average Efficiency (%)	88.38				
Minimum Average Efficiency (%)	81.34				
The no-load condition power consumption (W)	0.1				

Tested model:	HKP15-0901000dV			**115Vac, 60Hz**
Nameplate Output:	**9.0V/1.0A**			
Test specimen	**1**	**2**	**3**	
Percent of Nameplate Current	**10%**	**10%**	**10%**	**Remark**
RMS Input Voltage (V)	115	115	115	
Input Frequency (Hz)	60	60	60	
RMS Input Power (W)	1.155	1.153	1.151	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.857	0.816	0.775	
True Power Factor	0.413	0.441	0.469	
Output Voltage (Vdc)	9.038	9.045	9.052	
Output Current (A)	0.10	0.1	0.1	
Active Output Power (W)	0.904	0.905	0.905	Output Power (Pout)
Power Consumed by UUT (W)	0.25	0.25	0.25	
Efficiency (%)	78.27	78.49	78.63	

Tested model:	HKP15-0901000dV			**230Vac, 50Hz**
Nameplate Output:	**9.0V/1.0A**			
Test specimen	**1**	**2**	**3**	
Percent of Nameplate Current	**10%**	**10%**	**10%**	**Remark**
RMS Input Voltage (V)	230	230	230	
Input Frequency (Hz)	50	50	50	
RMS Input Power (W)	1.238	1.237	1.235	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	1.13	1.105	1.079	
True Power Factor	0.243	0.241	0.238	
Output Voltage (Vdc)	8.996	9.01	9.023	
Output Current (A)	0.1	0.1	0.1	
Active Output Power (W)	0.9	0.901	0.902	Output Power (Pout)
Power Consumed by UUT (W)	0.34	0.34	0.33	
Efficiency (%)	72.70	72.84	73.04	

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	Test voltage/ Frequency
		115Vac, 60Hz	230Vac, 50Hz
No. 1	Average Efficiency (%)	85.10	83.16
	The no-load condition Ac Input Power (W)	0.037	0.065
No. 2	Average Efficiency (%)	85.11	83.04
	The no-load condition Ac Input Power (W)	0.037	0.069
No. 3	Average Efficiency (%)	83.04	86.77
	The no-load condition Ac Input Power (W)	0.069	0.037
/	Minimum Average Efficiency (%)	81.34	
	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:

☒	EU Energy-related Products (ErP) directive COMMISSION REGULATION (EC) No 2019/1782 – 1 October 2019
☐	U.S. DOE 10 CFR Part 430 Final Rule, published on Feb. 10, 2014 (Level VI)
☐	U.S. CEC California Appliance Efficiency Regulations (Section 1601 through 1609 of Tile 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 * Nameplate Output	N/A
≥1 and ≤51 watts	0.09 * Ln (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**
≤ 1W	≥ 0.5 ×Pno+ 0.16		N/A
1 W < to≤49 W	≥ 0.071 × ln(Pno) − 0.0014 ×Pno+0.67		N/A
49W <to ≤250W	≥ 0.880		N/A
> 250W	≥ 0.875		N/A
Nameplate Output Power (Pno)	**Maximum Power in No-Load Mode**		**Verdict**
	☐ **Ac-Ac EPS**	☒ **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

Single-Voltage External AC-DC or AC-AC Power Supply, Low-Voltage		
Nameplate Output Power (Pno)	**Minimum Average Efficiency in Active Mode**	**Verdict**
≤ 1W	≥ 0.517 × Pout + 0.087	N/A

1 W < to≤49 W	≥ 0.0834 × ln(Pno) − 0.00115 ×Pno + 0.609		N/A
49W <to ≤250W	≥ 0.870		N/A
> 250W	≥ 0.875		N/A
Nameplate Output Power (Pno)	**Maximum Power in No-Load Mode**		**Verdict**
	☐ **Ac-Ac EPS**	☐ **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

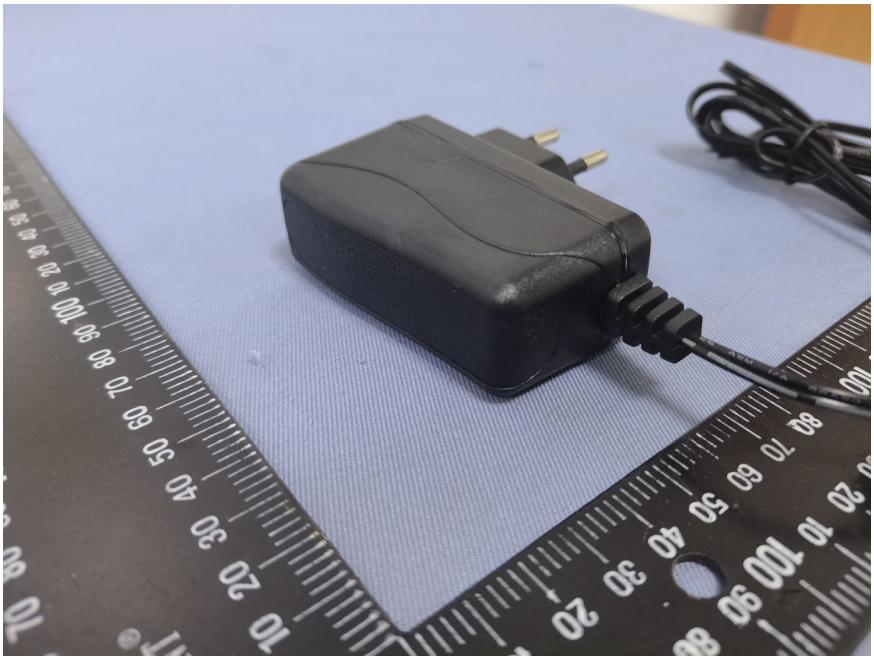
(Compliance Starting April. 1, 2020)

Single-Voltage External AC-DC or AC-AC Power Supply, Basic-Voltage			
Nameplate Output Power (Po)	**Minimum Average Efficiency in Active Mode**		**Verdict**
≤ 1W	≥ 0.5 ×Po/1W+ 0.16		N/A
1 W < to≤49 W	≥ 0.071 × ln(Po/1W) − 0.0014 ×Po/1W +0.67		P
>49W	≥ 0.880		N/A
Nameplate Output Power (Po)	**Maximum Power in No-Load Mode**		**Verdict**
	☐ **Ac-Ac EPS**	☒ **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 (Po)	**Minimum Average Efficiency in Active Mode**		**Verdict**
≤ 1W	≥ 0.517 ×Po/1W + 0.087		N/A
1 W < to≤49 W	≥ 0.0834 × ln(Po/1W) − 0.0014 ×Po/1W + 0.609		N/A
>49W	≥ 0.870		N/A
Nameplate Output Power (Po)	**Maximum Power in No-Load Mode**		**Verdict**
	☐ **Ac-Ac EPS**	☒ **Ac-Dc EPS**	
≤ 49W	≤ 0.10W	≤ 0.10W	N/A
>49 W	≤ 0.21W	≤ 0.21W	N/A

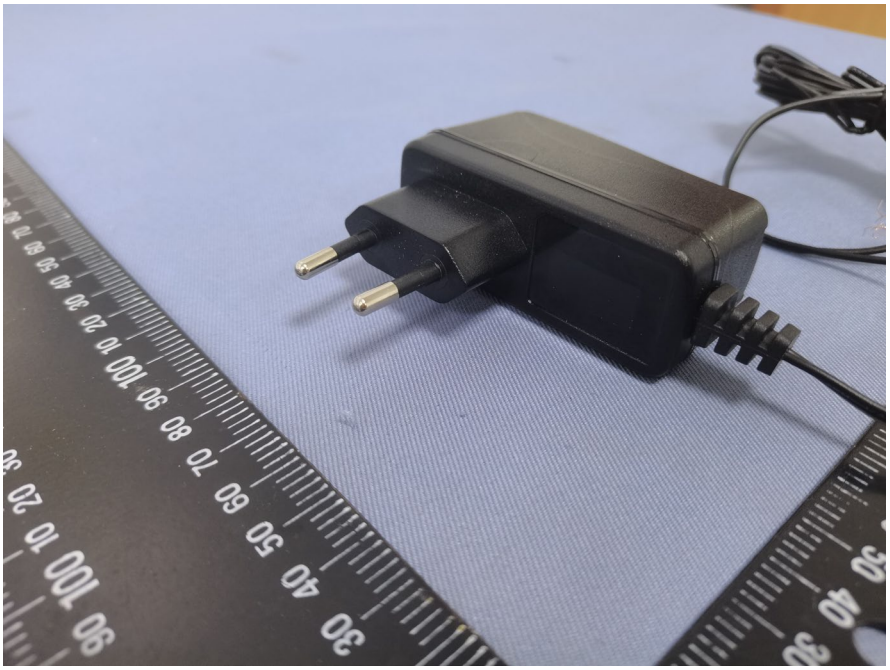
Multiple-Voltage External AC-DC or AC-AC Power Supply			
Nameplate Output Power (Po)	**Minimum Average Efficiency in Active Mode**		**Verdict**
≤ 1W	≥ 0.497 ×Po/1W + 0.067		N/A
1 W < to≤49 W	≥ 0.075 × ln(Po/1W) + 0.561		N/A
>49W	≥ 0.860		N/A
Nameplate Output Power (Po)	**Maximum Power in No-Load Mode**		**Verdict**
	☐ **Ac-Ac EPS**	☐ **Ac-Dc EPS**	
≤ 49W	≤ 0.30W	≤ 0.30W	N/A
>49 W	≤ 0.30W	≤ 0.30W	N/A

Note(s):
1. Where Ln (Nameplate Output) = Natural Logarithm of the nameplate output expressed in Watts.
2. An efficiency of 0.85 in decimal form corresponds to the more familiar value of 85%.
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 HKP15-0901000dV



Picture 2. Overall view II for model HKP15-0901000dV

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