Test Report issued under the responsibility of

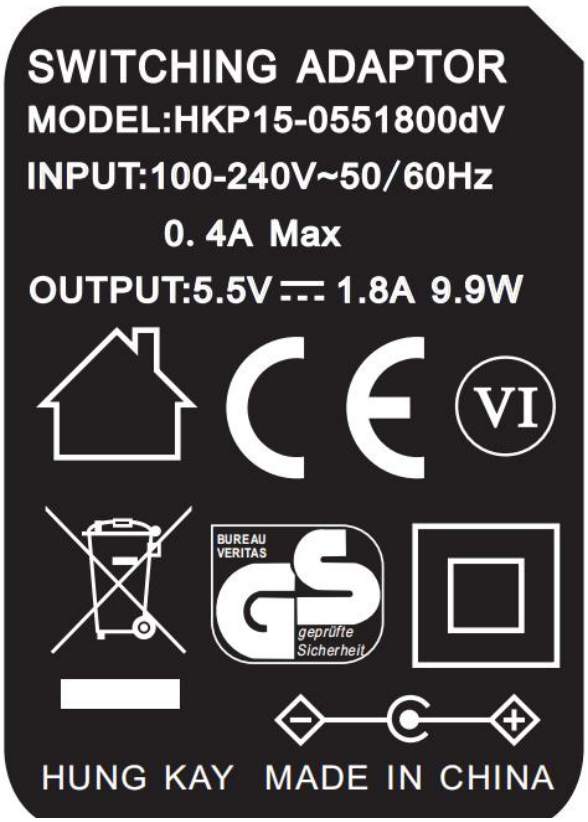
TEST REPORT

Energy Efficiency of Power Supplies

Report Reference No. ..... :	PNS21095719 01001
Compiled by (name + signature)..... :	Tracy He
Reviewed by (name + signature)..... :	Arvin Chen
Approved by (name + signature)..... :	Free Zhao
Date of issue ..... :	2021-09-19
Total number of pages..... :	20 Pages
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 ADAPTOR
Trade Mark ..... :	HUNG KAY
Model /Type reference..... :	HKP15-0551800dV
Serial number reference..... :	N/A

Ratings.....	:	I/P: 100-240V~ 50/60Hz, 0.4A Max O/P :5.5V ⎓1.8A, 9.9W

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%	2021-08-26 to 2022-08-25
Stop watch	KTJ	TA228	24h	2021-09-03 to 2022-09-02
Electronic load	Beich	CH9710C	1-360V,0.01-30A,1-300W	2021-04-24 to 2022-04-23
Flow Anemometer	SMART SENSOR	AR856	30m/s	2021-08-29 to 2022-08-28
Temperature & Humidity recorder	Accurate	TH10R	10℃-40℃, 30-90%RH	2021-08-29 to 2022-08-28

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	2021-09-15
Date(s) of performance of test	2021-09-16
Test sample identification	
Test specimen	No. 1, 2, 3

1. General Description of Equipment

The UUT (Unit under Test) HKP15-0551800dV is Single-voltage external AC to DC power supplies wi th detachable plug which for supplying power to equipment including electrical business equipment for general use.

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.

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	0%

The 2% allowance is of nameplate output current, not of the calculated current value. For example, a UUT at Load Condition 3 may be tested in a range from 48% to 52% of rated output current.

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	**HKP15-0551800dV**				
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)	0.45	0.90	1.35	1.80	
Output Voltage (V)	5.163	5.131	5.101	5.071	
Output Power (W)	1.291	2.566	3.826	5.071	
Ac Input Voltage (V)	115	115	115	115	115
Ac Input Power (W)	3.221	6.338	9.520	12.852	0.064
Total Harmonic Distortion A%(THD)	191.40	182.10	168.70	151.59	378.94
Total Harmonic Distortion V%(THD)	0.668	0.713	0.815	0.938	0.549
True Power Factor (W/VA)	0.451	0.462	0.481	0.512	0.233
AC Input Frequency	60	60	60	60	60
Power Consumed by UUT (W)	0.62	1.20	1.90	2.79	
Efficiency (%)	80.78	81.10	80.07	78.28	
Average Efficiency (%)	80.06				
Minimum Average Efficiency (%)	78.63				
The no-load condition power consumption (W)	0.1				

Table: Energy-Efficiency data and the no-load power consumption					P
Model No. 1	**HKP15-0551800dV**				
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)	0.45	0.90	1.35	1.80	
Output Voltage (V)	5.796	5.723	5.629	5.590	
Output Power (W)	2.608	5.151	7.599	10.062	
Ac Input Voltage (V)	230	230	230	230	230
Ac Input Power (W)	3.240	6.410	9.894	12.815	0.070
Total Harmonic Distortion A%(THD)	222.90	199.60	197.60	192.40	627.90
Total Harmonic Distortion V%(THD)	0.928	0.887	0.888	0.904	0.943
True Power Factor (W/VA)	0.321	0.393	0.418	0.428	0.076
AC Input Frequency	60	60	60	60	60
Power Consumed by UUT (W)	0.63	1.26	2.30	2.75	
Efficiency (%)	80.49	80.36	76.80	78.52	
Average Efficiency (%)	79.04				
Minimum Average Efficiency (%)	78.63				
The no-load condition power consumption (W)	0.1				

Table: Energy-Efficiency data and the no-load power consumption					P
Model No. 2	**HKP15-0551800dV**				
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)	0.45	0.90	1.35	1.80	
Output Voltage (V)	5.846	5.773	5.708	5.650	
Output Power (W)	2.631	5.196	7.706	10.170	
Ac Input Voltage (V)	115	115	115	115	115
Ac Input Power (W)	3.248	6.393	9.604	12.965	0.046
Total Harmonic Distortion A%(THD)	193.20	183.80	170.23	152.96	382.36
Total Harmonic Distortion V%(THD)	0.672	0.719	0.821	0.946	0.553
True Power Factor (W/VA)	0.454	0.465	0.484	0.516	0.234
AC Input Frequency	60	60	60	60	60
Power Consumed by UUT (W)	0.62	1.20	1.90	2.80	
Efficiency (%)	81.00	81.28	80.24	78.44	
Average Efficiency (%)	80.24				
Minimum Average Efficiency (%)	78.63				
The no-load condition power consumption (W)	0..1				

Table: Energy-Efficiency data and the no-load power consumption					P
Model No. 2	**HKP15-0551800dV**				
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)	0.45	0.90	1.35	1.80	
Output Voltage (V)	5.859	5.786	5.690	5.651	
Output Power (W)	2.637	5.207	7.682	10.172	
Ac Input Voltage (V)	230	230	230	230	230
Ac Input Power (W)	3.267	6.465	10.044	12.928	0.066
Total Harmonic Distortion A%(THD)	224.90	201.40	199.40	194.10	633.50
Total Harmonic Distortion V%(THD)	0.935	0.893	0.894	0.911	0.951
True Power Factor (W/VA)	0.323	0.395	0.420	0.430	0.072
AC Input Frequency	50	50	50	50	50
Power Consumed by UUT (W)	0.63	1.26	2.36	2.76	
Efficiency (%)	80.72	80.54	76.48	78.68	
Average Efficiency (%)	79.11				
Minimum Average Efficiency (%)	78.63				
The no-load condition power consumption (W)	0.1				

Table: Energy-Efficiency data and the no-load power consumption					P
Model No. 3	**HKP15-0551800dV**				
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)	0.45	0.90	1.35	1.80	
Output Voltage (V)	5.818	5.745	5.681	5.623	
Output Power (W)	2.618	5.171	7.669	10.121	
Ac Input Voltage (V)	115	115	115	115	115
Ac Input Power (W)	3.233	6.362	9.557	12.902	0.042
Total Harmonic Distortion A%(THD)	192.20	182.87	169.38	152.20	380.46
Total Harmonic Distortion V%(THD)	0.670	0.716	0.818	0.942	0.551
True Power Factor (W/VA)	0.453	0.464	0.483	0.514	0.234
AC Input Frequency	60	60	60	60	60
Power Consumed by UUT (W)	0.62	1.19	1.89	2.78	
Efficiency (%)	80.98	81.28	80.24	78.45	
Average Efficiency (%)	80.24				
Minimum Average Efficiency (%)	77.96				
The no-load condition power consumption (W)	0.1				

Table: Energy-Efficiency data and the no-load power consumption					P
Model No. 3	**HKP15-0551800dV**				
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)	0.45	0.90	1.35	1.80	
Output Voltage (V)	5.831	5.758	5.663	5.624	
Output Power (W)	2.624	5.182	7.645	10.123	
Ac Input Voltage (V)	230	230	230	230	230
Ac Input Power (W)	3.252	6.434	9.904	12.865	0.062
Total Harmonic Distortion A%(THD)	223.82	200.38	198.36	193.17	630.39
Total Harmonic Distortion V%(THD)	0.931	0.890	0.891	0.907	0.947
True Power Factor (W/VA)	0.322	0.394	0.419	0.429	0.073
AC Input Frequency	50	50	50	50	50
Power Consumed by UUT (W)	0.63	1.25	2.26	2.74	
Efficiency (%)	80.69	80.54	77.19	78.69	
Average Efficiency (%)	79.28				
Minimum Average Efficiency (%)	78.63				
The no-load condition power consumption (W)	0.1				

Tested model:	**HKP15-0551800dV**			**115Vac, 60Hz**
Nameplate Output:	**5.0V/1.8A**			
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)	1.350	1.360	1.354	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.616	0.620	0.618	
True Power Factor	0.419	0.421	0.420	
Output Current (A)	0.18	0.18	0.18	
Output Voltage (Vdc)	5.151	5.892	5.864	
Active Output Power (W)	0.515	1.061	1.056	Output Power (Pout)
Power Consumed by UUT (W)	0.30	0.30	0.30	
Efficiency (%)	77.70	78.01	77.99	

Tested model:	**HKP15-0551800dV**			**230Vac, 50Hz**
Nameplate Output:	**5.0V/1.8A**			
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)	1.416	1.426	1.420	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	0.892	0.898	0.895	
True Power Factor	0.238	0.239	0.239	
Output Current (A)	0.18	0.18	0.18	
Output Voltage (Vdc)	5.815	5.878	5.850	
Active Output Power (W)	1.047	1.058	1.053	Output Power (Pout)
Power Consumed by UUT (W)	0.37	0.37	0.37	
Efficiency (%)	73.94	74.19	74.15	

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 (%)	80.06	79.04
	The no-load condition Ac Input Power (W)	0.064	0.070
No. 2	Average Efficiency (%)	80.24	79.11
	The no-load condition Ac Input Power (W)	0.046	0.066
No. 3	Average Efficiency (%)	80.24	79.28
	The no-load condition Ac Input Power (W)	0.042	0.062
/	Minimum Average Efficiency (%)	78.63	
	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

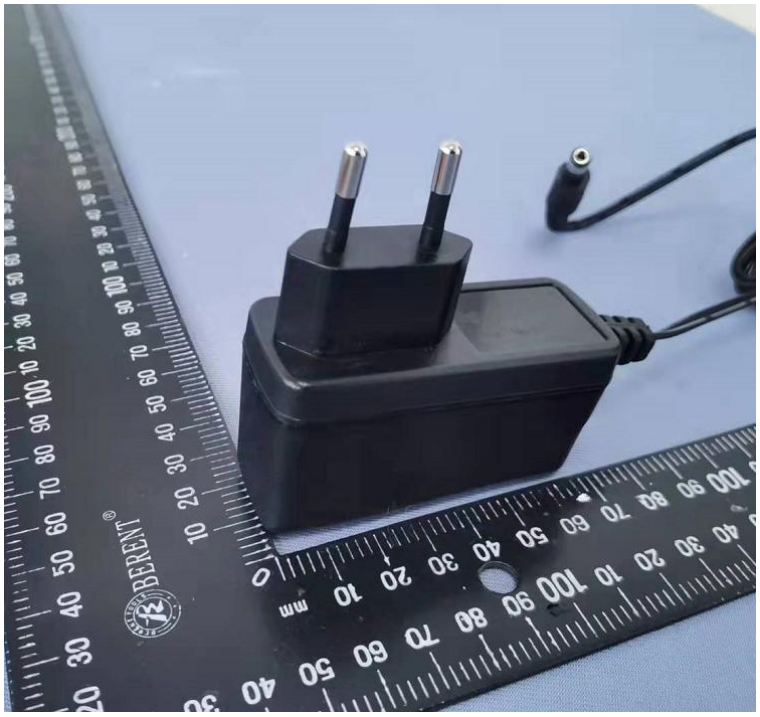
(Compliance Starting April. 1, 2020)

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

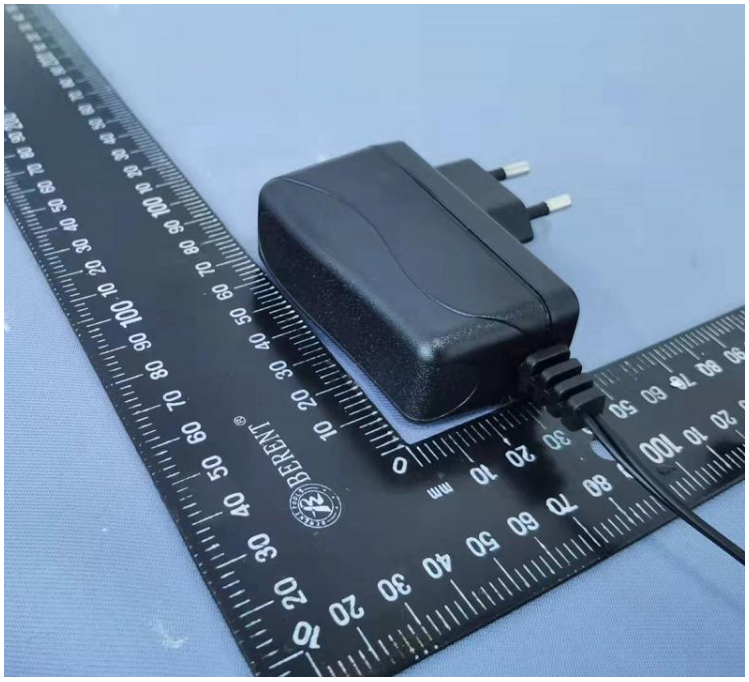
Multiple-Voltage External AC-DC or AC-AC Power Supply			
Nameplate Output Power (Pno)	**Minimum Average Efficiency in Active Mode**		**Verdict**
≤ 1W	≥ 0.497 × Pout + 0.067		N/A
1 W < to≤49 W	≥ 0.075 × ln(Pno) + 0.561		N/A
>49W	≥ 0.860		N/A
Nameplate Output Power (Pno)	**Maximum Power in No-Load Mode**		**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 HKP15-0551800dV



Picture 2.Overall view II for model HKP15-0551800dV

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