Test Report

Energy Efficiency Regulations

Energy Efficiency of Single-Voltage External AC-DC and AC-AC Power Supplies

Report Reference No. .....:	ATSC230906011
Date of Issue.....:	2023-09-15
Total Number of Page(s) .....:	13
Testing Laboratory.....:	ATS Electronic Technology Co., Ltd.
Address.....:	3/F, Building A, No.1 Hedong Three Road, Jinxia Community, Chang'an Town, Dongguan City, Guangdong, P.R. China
Testing Location .....:	As above.
Applicant's Name .....:	
Address .....:	
Standard.....:	☒ EU Energy-related Products (ErP) directive Commission Regulation (EU) 2019/1782 – 1 October 2019 laying down ecodesign requirements for external power supplies pursuant to Directive 2009/125/EC of the European Parliament and of the Council and repealing Commission Regulation (EC) No 278/2009
Test Method.....:	☒ 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 ☒ Generic: Measurement of low power modes in accordance with IEC 62301:2011 and EN 50564: 2011
Samples Received Date.....:	2023-09-11
Tested Date .....:	2023-09-15

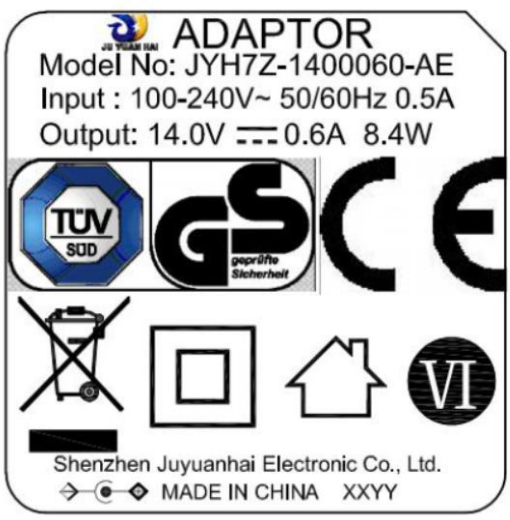
Description of Sample(s):

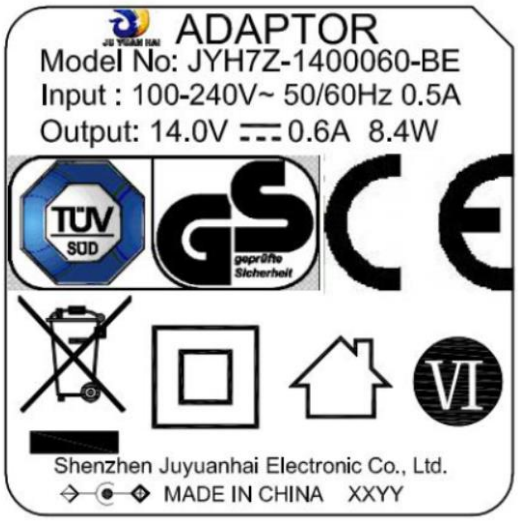
Type of Test Object .....:	ADAPTOR
Model and/or Type Reference.....:	JYH7Z-1400060-AE, JYH7Z-1400060-BE, JYH7Z-1400060-BG
Rating(s) .....:	Input: 100-240V~, 50/60Hz, 0.5A Output: 14.0V ⎓ 0.6A 8.4W
Trademark.....:	JU YUAN HAI
Class of Equipment .....:	Class II
Manufacturer(s) .....:	Same as applicant
Factory(ies) .....:	Same as applicant
Integral Input Power Switch.....:	Not present
Output Cord Length (cm) .....:	150cm (24AWG)

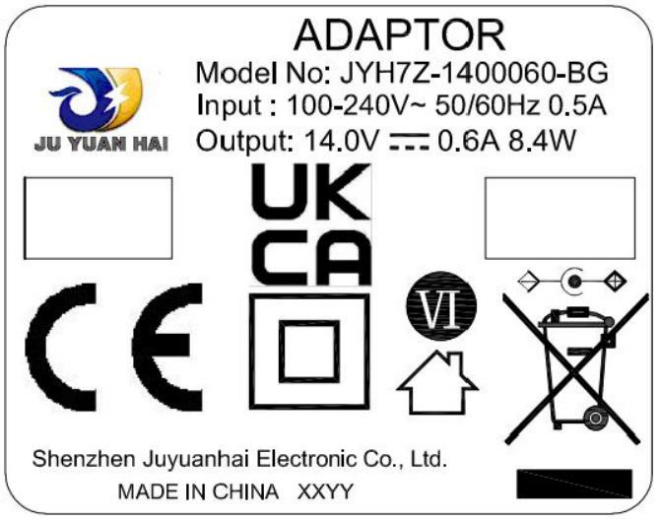
Compiled by..... : Yandy Wang (+ signature)

Approved by ..... : Sam Zhang (+ signature)

Copy of marking plate:







Instruments list:

Equipment Name	Manufacturer	Model No.	Serial No.	Calibration Date	Next Calibration Date
Electronic Load	Maynuo	M9710	ATS-S231	2023.07.06	2024.07.05
Tapeline	JiangHua	JH-1046A.X	ATS-S016	2023.07.06	2024.07.05
Humidity Meter	MINCH	MCU-800L	ATS-S317	2023.07.06	2024.07.05
Power Analyzers	Chroma	66202	ATS-S049	2023.07.06	2024.07.05
Power Parameter Meter	YOKOGAWA	WT210	ATS-S050	2023.07.06	2024.07.05

1. General Description of Equipment

The UUT (Unit Under Test) is a Single-voltage external AC to DC power supply (ADAPTOR) , switching type with non-detachable output cord for supplying power to Audio/video, information and communication technology equipment.

Summary of testing:

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

2. General Measurement Conditions

2.1 Test Room

The tests were 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:

☐ 20°C ± 5 °C for all regulations except Quebec

☐ 23°C ± 5 °C for Quebec's regulation

☒ 22°C ± 3 °C for all regulations
throughout the tests.

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 before conducting 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. As a minimum requirement select all leads used in the test set-up as specified in Table B.2, "Commonly used values for wire gauges and related voltage drops", in IEEE 1515.

A total of 3 test specimens were tested.

2.4 Load Conditions

The UUT was tested at five active mode load conditions and the no load condition according to below table by using ☒ electronic loads / ☐ resistive loads.

The relevant load conditions are as follows:

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 *1)	10 % ± 1 %
Load condition 6	0 % (no-load condition)

*1) Load condition 5 is information requirement only in ErP directive (EU) 2019/1782 when UUT's nameplate output power more than 10 W.

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): 22°C ± 3 °C

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

Test Model: Sample 1： JYH7Z-1400060-AE (Output: 14.0V ⎓ 0.6A)						
Conformity Assessment Elements	**Load condition**					**Limited value**
Percentage of Nameplate Output Current	0%	25%	50%	75%	100%	--
Output Current (A)	--	0.15	0.30	0.45	0.60	
Output Voltage (Vdc)		14.125	14.114	14.103	14.067	
Output Power (W)		2.12	4.23	6.35	8.44	
AC Input Voltage (V)	115	115	115	115	115	
AC Input Frequency	60	60	60	60	60	
AC Input Power (W)	0.05	2.63	5.09	7.59	10.14	
Total Harmonic Distortion (THDv, %)	0.322	0.44	0.581	0.722	0.845	
True Power Factor (W/VA)	0.001	0.411	0.453	0.48	0.506	
Power Consumed by UUT (W)	0.05	0.51	0.86	1.24	1.70	≤ 0.10W at no load
Active Mode Efficiency (%)	--	80.61%	83.10%	83.66%	83.23%	--
Average Active Efficiency (%)		82.65%				≥80.94% at active mode
Conformity Assessment Elements	**Load condition**					**Limited value**
Percentage of Nameplate Output Current	0%	25%	50%	75%	100%	--
Output Current (A)	--	0.15	0.30	0.45	0.60	
Output Voltage (Vdc)		14.1	14.095	14.08	14.046	
Output Power (W)		2.12	4.23	6.34	8.43	
AC Input Voltage (V)	230	230	230	230	230	
AC Input Frequency	50	50	50	50	50	
AC Input Power (W)	0.07	2.75	5.16	7.68	10.17	
Total Harmonic Distortion (THDv, %)	0.755	0.716	0.708	0.712	0.712	
True Power Factor (W/VA)	0.003	0.352	0.389	0.41	0.428	
Power Consumed by UUT (W)	0.07	0.63	0.93	1.34	1.74	≤ 0.10W at no load
Active Mode Efficiency (%)	--	77.09%	81.98%	82.55%	82.89%	--
Average Active Efficiency (%)		81.13%				≥80.94% at active mode

Test Model: Sample 2: JYH7Z-1400060-AE (Output: 14.0V ⎓ 0.6A)						
Conformity Assessment Elements	**Load condition**					**Limited value**
Percentage of Nameplate Output Current	0%	25%	50%	75%	100%	--
Output Current (A)	--	0.15	0.30	0.45	0.60	
Output Voltage (Vdc)		14.126	14.114	14.106	14.061	
Output Power (W)		2.12	4.23	6.35	8.44	
AC Input Voltage (V)	115	115	115	115	115	
AC Input Frequency	60	60	60	60	60	
AC Input Power (W)	0.04	2.61	5.08	7.61	10.17	
Total Harmonic Distortion (THDv, %)	0.319	0.447	0.583	0.72	0.847	
True Power Factor (W/VA)	0.001	0.413	0.455	0.484	0.504	
Power Consumed by UUT (W)	0.04	0.49	0.85	1.26	1.73	≤ 0.10W at no load
Active Mode Efficiency (%)	--	81.23%	83.27%	83.44%	82.99%	--
Average Active Efficiency (%)		82.73%				≥80.94% at active mode
Conformity Assessment Elements	**Load condition**					**Limited value**
Percentage of Nameplate Output Current	0%	25%	50%	75%	100%	--
Output Current (A)	--	0.15	0.30	0.45	0.60	
Output Voltage (Vdc)		14.105	14.091	14.082	14.045	
Output Power (W)		2.12	4.23	6.34	8.43	
AC Input Voltage (V)	230	230	230	230	230	
AC Input Frequency	50	50	50	50	50	
AC Input Power (W)	0.06	2.72	5.18	7.67	10.15	
Total Harmonic Distortion (THDv, %)	0.754	0.717	0.705	0.713	0.711	
True Power Factor (W/VA)	0.002	0.355	0.386	0.415	0.427	
Power Consumed by UUT (W)	0.06	0.60	0.95	1.33	1.72	≤ 0.10W at no load
Active Mode Efficiency (%)	--	77.94%	81.66%	82.66%	83.05%	--
Average Active Efficiency (%)		81.33%				≥80.94% at active mode

Test Model: Sample 3： JYH7Z-1400060-AE (Output: 14.0V ⎓ 0.6A)						
Conformity Assessment Elements	**Load condition**					**Limited value**
Percentage of Nameplate Output Current	0%	25%	50%	75%	100%	--
Output Current (A)	--	0.15	0.30	0.45	0.60	
Output Voltage (Vdc)		14.123	14.115	14.102	14.066	
Output Power (W)		2.12	4.23	6.35	8.44	
AC Input Voltage (V)	115	115	115	115	115	
AC Input Frequency	60	60	60	60	60	
AC Input Power (W)	0.05	2.62	5.07	7.6	10.18	
Total Harmonic Distortion (THDv, %)	0.327	0.443	0.586	0.723	0.843	
True Power Factor (W/VA)	0.002	0.414	0.451	0.482	0.505	
Power Consumed by UUT (W)	0.05	0.50	0.84	1.25	1.74	≤ 0.10W at no load
Active Mode Efficiency (%)	--	80.92%	83.43%	83.55%	82.91%	--
Average Active Efficiency (%)		82.70%				≥80.94% at active mode
Conformity Assessment Elements	**Load condition**					**Limited value**
Percentage of Nameplate Output Current	0%	25%	50%	75%	100%	--
Output Current (A)	--	0.15	0.30	0.45	0.60	
Output Voltage (Vdc)		14.106	14.093	14.085	14.044	
Output Power (W)		2.12	4.23	6.34	8.43	
AC Input Voltage (V)	230	230	230	230	230	
AC Input Frequency	50	50	50	50	50	
AC Input Power (W)	0.08	2.75	5.17	7.66	10.16	
Total Harmonic Distortion (THDv, %)	0.758	0.712	0.703	0.711	0.713	
True Power Factor (W/VA)	0.003	0.353	0.388	0.412	0.425	
Power Consumed by UUT (W)	0.08	0.63	0.94	1.32	1.73	≤ 0.10W at no load
Active Mode Efficiency (%)	--	77.09%	81.82%	82.77%	82.97%	--
Average Active Efficiency (%)		81.16%				≥80.94% at active mode

Tested model:	JYH7Z-1400060-AE			**at 115V/60Hz**
Nameplate Output:	14.0Vdc 0.6A, 8.4W			
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)	--	--	--	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	--	--	--	
True Power Factor	--	--	--	
RMS Output Voltage (Vdc)	--	--	--	
RMS Output Current (A)	--	--	--	
Active Output Power (W)	--	--	--	Output Power (Pout)
Power Consumed by UUT (W)	--	--	--	
Efficiency (%)	--	--	--	Efficiency at low load (10%)*)

Tested model:	JYH7Z-1400060-AE			**at 230V/50Hz**
Nameplate Output:	14.0Vdc 0.6A, 8.4W			
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)	--	--	--	Input Power (Pin)
Total Harmonic Distortion (THDv, %)	--	--	--	
True Power Factor	--	--	--	
RMS Output Voltage (Vdc)	--	--	--	
RMS Output Current (A)	--	--	--	
Active Output Power (W)	--	--	--	Output Power (Pout)
Power Consumed by UUT (W)	--	--	--	
Efficiency (%)	--	--	--	Efficiency at low load (10%)*)
Note: ***)** External power supplies with a nameplate output power of 10 W or less shall be exempted from this requirement.				

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:

Regulations		Remark
☒	EU Energy-related Products (ErP) directive COMMISSION REGULATION (EU) No 2019/1782 – 1 October 2019	Complied. (equivalent to level VI)

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.

EU Energy-related Products (ErP) directive

Ecodesign requirements

set out in Annex II, 1 a) 1 b) of COMMISSION REGULATION (EU) No 2019/1782

for no-load electric power consumption and average active efficiency of external power supplies from 1 April 2020

AC-DC or AC-AC external power supplies, except low voltage external power supplies			
Nameplate Output Power (Po)	**Minimum Average Efficiency in Active Mode**		**Verdict**
≤ 1.0W	≥ 0.5 × PO/1W+ 0.160		N/A
1 W < Po ≤ 49.0 W	≥ 0.071 × ln(PO/1W) – 0.0014 × PO/1W+ 0.67		P
> 49.0 W	≥ 0.880		N/A
Nameplate Output Power (Po)	**Maximum Power in No-Load Mode**		**Verdict**
	☐ **AC-AC EPS**	☒ **AC-DC EPS**	
≤ 49.0 W	≤ 0.21W	≤ 0.10W	P
> 49.0 W	≤ 0.21W	≤ 0.21W	N/A
Low voltage external power supplies			
Nameplate Output Power (Po)	**Minimum Average Efficiency in Active Mode**		**Verdict**
≤ 1.0W	≥ 0.517 × PO/1W+ 0.087		N/A
1 W < Po ≤ 49.0 W	≥ 0.0834 × ln(PO/1W) – 0.0014 × Po/1W+ 0.609		N/A
> 49.0 W	≥ 0.870		N/A
Nameplate Output Power (Po)	**Maximum Power in No-Load Mode**		**Verdict**
≤ 49.0 W	≤ 0.10W		N/A
> 49.0 W	≤ 0.21W		N/A

Note(s):

1. Required Minimum Efficiency in Active Mode is 0.880
2. Where Ln (Nameplate Output) = Natural Logarithm of the nameplate output expressed in Watts.
3. An efficiency of 0.88 in decimal form corresponds to the more familiar value of 88%.
4. 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.

Result:
The output rating 14.0Vd.c/0.6A, limit of level of VI: 80.94%; the minimum average active efficiency from the tested sample is 81.13% Limit of level of VI for no load power: 0.10W; the maximum no load power tested sample is 0.08W.

Test uncertainty considered.

Photo document

Details of: External view for model JYH7Z-1400060-AE

Details of: External view for model JYH7Z-1400060-AE

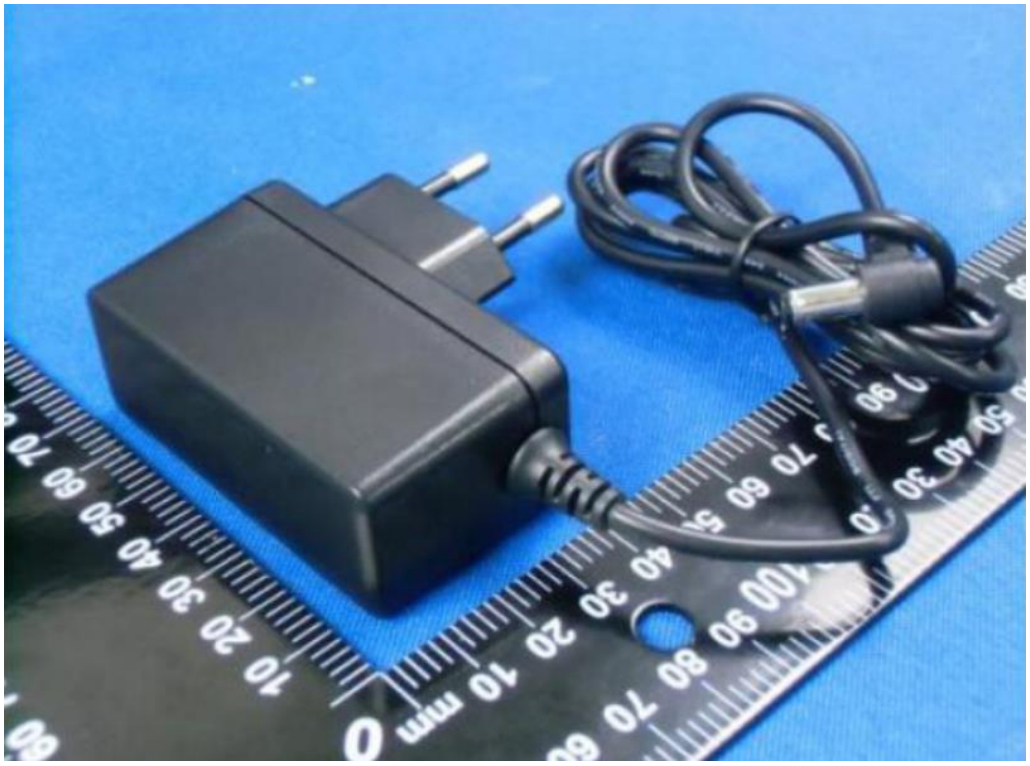
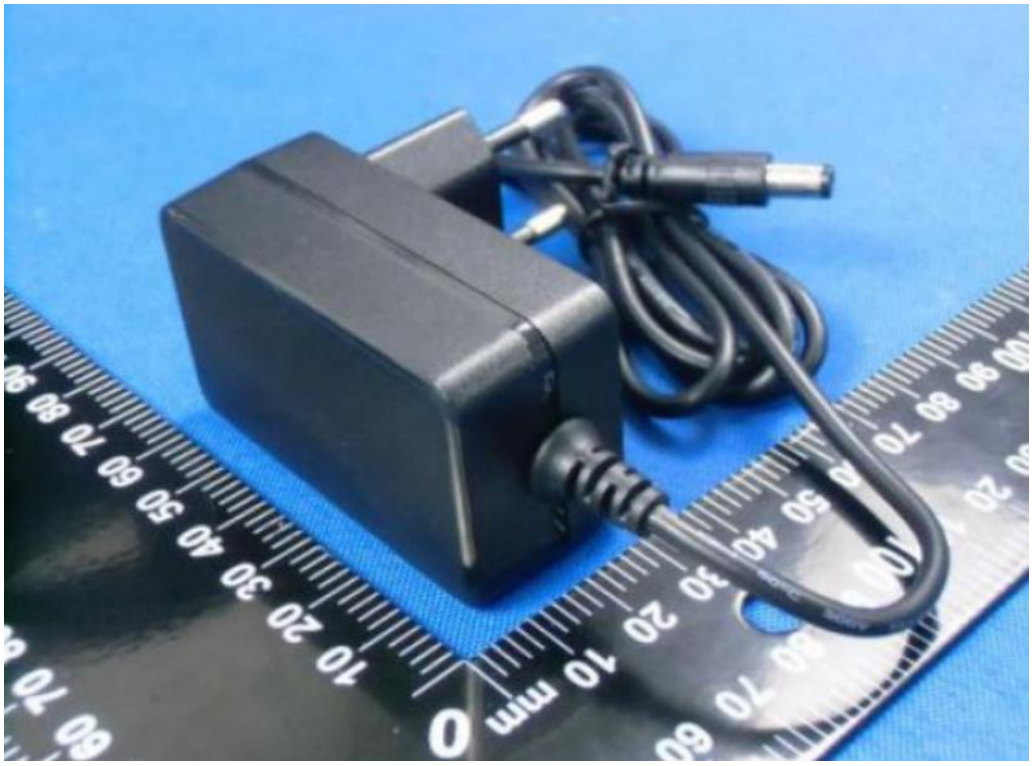


Photo document

Details of: External view for model JYH7Z-1400060-BE

Details of: External view for model JYH7Z-1400060-BE



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Details of: External view for model JYH7Z-1400060-BG

Details of: External view for model JYH7Z-1400060-BG

********** End of test report**********