全漢企業股份有限公司
FSP TECHNOLOGY INC.

FSP TECHNOLOGY INC./No. 22, Jianguo E. Road, Taoyuan city, Taiwan
TEL:+886-3-375-9888 FAX:+886-3-3756966
http://www.fsp-group.com.tw
Company registration number:84239055

EPS Efficiency Test Report

Model Name: FSP040-RHAN2	Test Date: 2019.NOV.29	Revision: 3

PRODUCT INFORMATION:

Product name	AC to DC EPS(External Power Supply)
DC Cable	1500 mm 18 AWG
Weight	222 g
Dimension	110 * 50 * 32 mm
Trademark	FSP
Manufactuer	FSP Group Inc./No. 22, Jianguo E. Road, Taoyuan city, Taiwan
Testing laboratory	FSP Group Inc./No. 22, Jianguo E. Road, Taoyuan city, Taiwan

Rated:

Specification	Input	Output
Voltage(V)	100-240	12.0
Current(A)	1.5	3.33
Frequency(Hz)	50-60	---
Power(W)	---	40.0

Test Result:

Compliance with	
US DOE Level VI	YES
CEC Level IV	YES
ErP Lot7	YES
AU GEMS	YES

Tested By: Kay Hsia

Approved By: Jason Wei

Reference No.:V190672

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1. Test Equipment:

Item	Brand	Model	Calibrates Until
AC Source	CHROMA	6430/643000000908	2020/8/5
Electronic Load	CHROMA	63030/6300006368	2020/8/5
Power Meter	CHROMA	66202/662022003033	2020/8/5

2. Regulation:

US DOE	• 10 CFR Parts 429, 430 and 431
CEC	• CEC-400-2015-021
ErP (Lot 7)	• Commission Regulation (EU) 2019/1782
AU GEMS	• AS/NZS 4665:2005

The average active efficiency:

Agency	Rated Power	Low voltage	AC-DC
US DOE Level VI	Po≦1W	≧0.517*Po+0.087	≧0.5*Po+0.16
	1W<Po≦49W	≧0.0834*ln(Po)-0.0014*Po+0.609	≧0.071*ln(Po)-0.0014*Po+0.67
	49W<Po≦250W	≧0.87	≧0.88
	250W<Po	≧0.875	≧0.875
CEC Level IV	Po<1W	N/A	≧0.5*Po
	1W≦Po≦51W		≧0.09*ln(Po)+0.5
	51W<Po		≧0.85
ErP Lot 7	Po≦1W	≧0.517*Po+0.087	≧0.5*Po+0.16
	1W<Po≦49W	≧0.0834*ln(Po)-0.0014*Po+0.609	≧0.071*ln(Po)-0.0014*Po+0.67
	49W<Po	≧0.87	≧0.88
AU GEMS	Po≦1W	N/A	≧0.5*Po
	1W<Po≦51W		≧0.09*ln(Po)+0.5
	51W<Po		≧0.85

The no-load condition of power consumption:

Agency	Rated Power	Low voltage	AC-DC
US DOE Level VI	0W<Po≦49W	≦0.1W	≦0.1W
	49W<Po≦250W	≦0.21W	≦0.21W
	250W<Po	≦0.5W	≦0.5W
CEC Level IV	Any Output	N/A	≦0.5W
ErP Lot7	Po≦49W	≦0.1W	≦0.1W
	49W<Po	≦0.21W	≦0.21W
AU GEMS	0W<Po	N/A	≦0.5W

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3. Test Method:

US DOE	• Test Method for Calculating the Energy Efficiency of External AC-DC and AC-AC Power Supplies" dated August 11, 2004
CEC	• Test Method for Calculating the Energy Efficiency of Single-Voltage External AC-DC and AC-AC Power Supplies" dated August 11, 2004(except that the test voltage specified in Section 4(d) of the test method shall be only 115 volts, 60 Hz.)
ErP Lot7	• EN 50563:2011/A1:2013
AU GEMS	• AS/NZS 4665.1

4. Test Setup:

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

5. Load Conditions:

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

Table 1 – Load Condition for EUT

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

The 1% & 2% allowance is of nameplate output current, not of the calculated current value.

6. Test Result:

Agency	No load(W)		Average Efficiency	
	Standard	PASS / FAIL	Standard	PASS / FAIL
US DOE Level VI	≦ 0.1	PASS	≧ 0.8759	PASS
CEC Level IV	≦ 0.5	PASS	≧ 0.8320	PASS
ErP Lot7	≦ 0.1	PASS	≧ 0.8759	PASS
AU GEMS	≦ 0.5	PASS	≧ 0.8320	PASS

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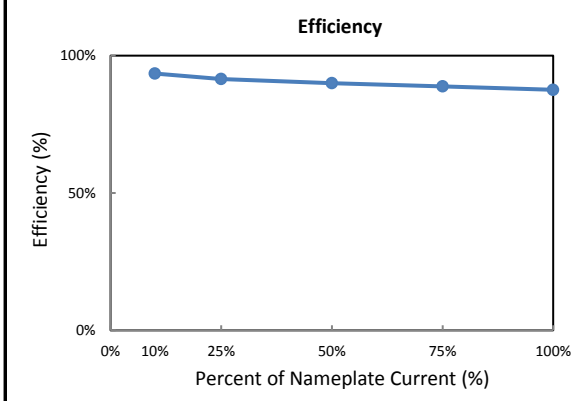
7. Test Record:

V190672 -1	115V/60Hz						230V/50Hz					
	No load	Active power values					No load	Active power values				
Load	**0%**	**10%**	**25%**	**50%**	**75%**	**100%**	**0%**	**10%**	**25%**	**50%**	**75%**	**100%**
Iout (A)	--	0.34	0.83	1.67	2.50	3.34	--	0.34	0.83	1.67	2.50	3.34
Vout (V)		12.08	12.03	11.96	11.88	11.80		12.08	12.03	11.95	11.86	11.78
Pout (W)		4.08	10.02	20.02	29.67	39.41		4.08	10.01	20.00	29.63	39.34
Fin (Hz)	60	60	60	60	60	60	50	50	50	50	50	50
Iin (A)	0.01	0.11	0.25	0.46	0.64	0.81	0.02	0.06	0.14	0.26	0.39	0.52
Vin (V)	115.06	115.05	115.03	115.01	114.99	114.97	230.18	230.17	230.16	230.16	230.14	230.13
Pin (W)	0.04	4.36	10.95	22.26	33.39	45.01	0.06	4.43	11.01	22.18	33.23	44.40
THDv (%)	0.09	0.08	0.13	0.29	0.30	0.27	0.19	0.11	0.09	0.12	0.17	0.17
PF (W/VA)	0.04	0.35	0.39	0.42	0.45	0.49	0.02	0.30	0.34	0.37	0.37	0.37
Power consumed (W)	**0.04**	0.28	0.94	2.24	3.72	5.59	**0.06**	0.35	1.00	2.18	3.60	5.06
Efficiency	--	93.5%	91.5%	89.9%	88.9%	87.6%	--	92.1%	90.9%	90.2%	89.2%	88.6%
Average Efficiency	--	--	**89.46%**				--	--	**89.72%**			

Fig.1



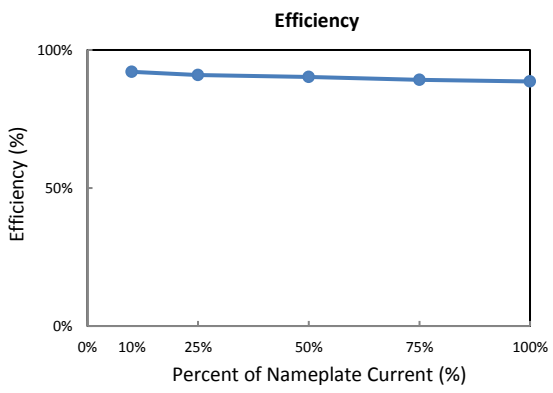
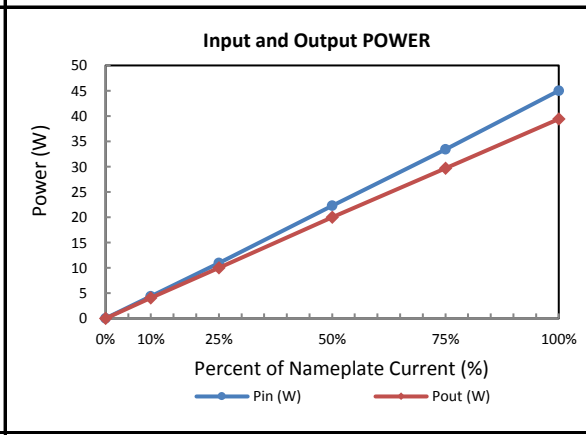
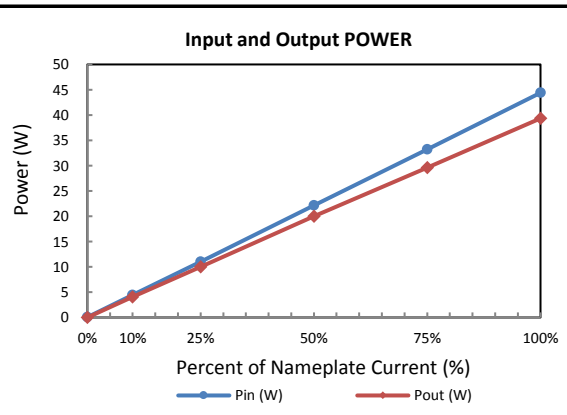


Fig.2





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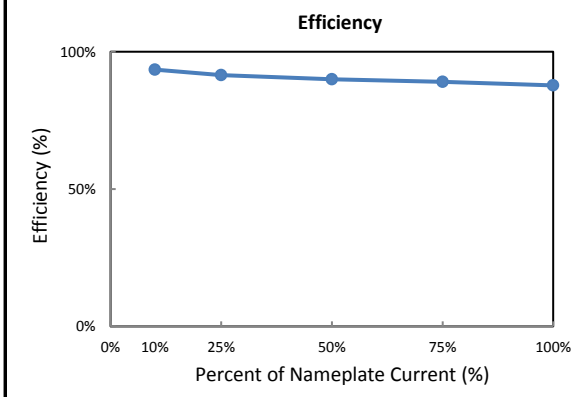
V190672 -2	115V/60Hz						230V/50Hz					
	No load	Active power values					No load	Active power values				
Load	**0%**	**10%**	**25%**	**50%**	**75%**	**100%**	**0%**	**10%**	**25%**	**50%**	**75%**	**100%**
Iout (A)	--	0.34	0.83	1.67	2.50	3.34	--	0.34	0.83	1.67	2.50	3.34
Vout (V)		12.13	12.09	12.02	11.95	11.87		12.13	12.09	12.02	11.95	11.88
Pout (W)		4.09	10.06	20.12	29.84	39.65		4.09	10.06	20.12	29.85	39.66
Fin (Hz)	60	60	60	60	60	60	50	50	50	50	50	50
Iin (A)	0.01	0.11	0.25	0.46	0.65	0.82	0.02	0.06	0.14	0.26	0.39	0.52
Vin (V)	115.05	115.05	115.03	115.01	114.99	114.96	230.17	230.16	230.16	230.16	230.15	230.14
Pin (W)	0.04	4.38	11.00	22.35	33.53	45.18	0.06	4.45	11.05	22.22	33.31	44.56
THDv (%)	0.08	0.10	0.25	0.31	0.28	0.27	0.07	0.11	0.08	0.20	0.16	0.17
PF (W/VA)	0.03	0.35	0.39	0.42	0.45	0.48	0.02	0.30	0.34	0.37	0.37	0.38
Power consumed (W)	**0.04**	0.29	0.94	2.23	3.69	5.54	**0.06**	0.35	0.98	2.10	3.46	4.90
Efficiency	--	93.5%	91.4%	90.0%	89.0%	87.7%	--	92.1%	91.1%	90.6%	89.6%	89.0%
Average Efficiency	--	--	**89.55%**				--	--	**90.07%**			

Fig.1



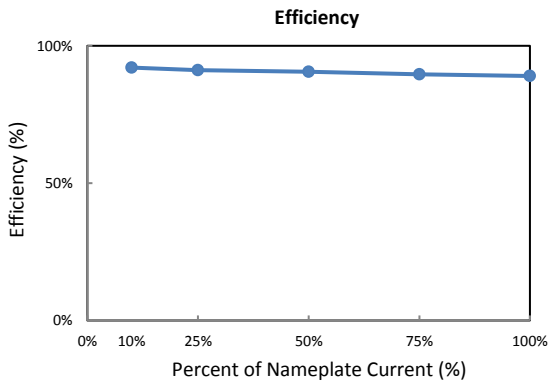
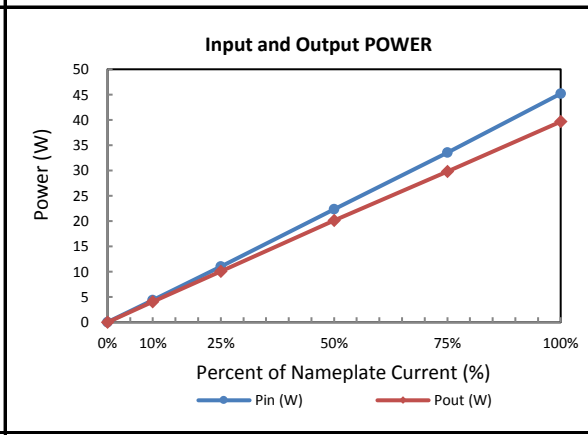
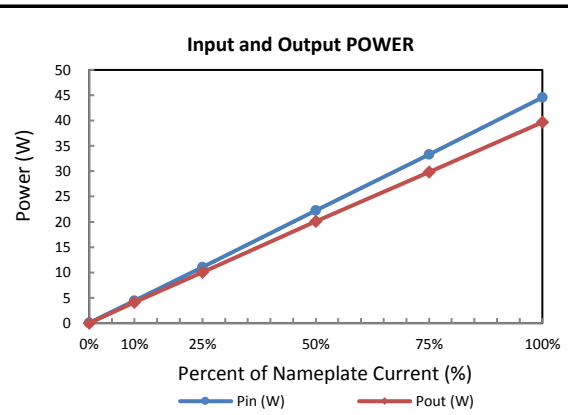


Fig.2





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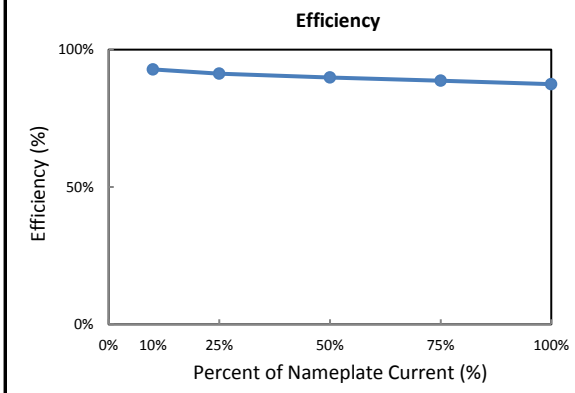
V190672 -3	115V/60Hz						230V/50Hz					
	No load	Active power values					No load	Active power values				
Load	**0%**	**10%**	**25%**	**50%**	**75%**	**100%**	**0%**	**10%**	**25%**	**50%**	**75%**	**100%**
Iout (A)	--	0.34	0.83	1.67	2.50	3.34	--	0.34	0.83	1.67	2.50	3.34
Vout (V)		11.98	11.94	11.87	11.79	11.72		11.98	11.94	11.87	11.80	11.73
Pout (W)		4.04	9.96	19.87	29.46	39.11		4.04	9.94	19.88	29.47	39.16
Fin (Hz)	60	60	60	60	60	60	50	50	50	50	50	50
Iin (A)	0.01	0.11	0.24	0.45	0.63	0.79	0.02	0.06	0.14	0.26	0.38	0.51
Vin (V)	115.26	115.26	115.24	115.22	115.20	115.18	230.19	230.18	230.16	230.16	230.15	230.13
Pin (W)	0.04	4.36	10.91	22.12	33.20	44.73	0.06	4.39	10.92	22.04	32.90	44.01
THDv (%)	0.18	0.07	0.21	0.23	0.24	0.27	0.14	0.06	0.07	0.12	0.16	0.18
PF (W/VA)	0.03	0.35	0.39	0.43	0.46	0.49	0.02	0.30	0.34	0.37	0.37	0.38
Power consumed (W)	**0.04**	0.31	0.95	2.25	3.75	5.62	**0.06**	0.35	0.98	2.17	3.44	4.85
Efficiency	--	92.8%	91.3%	89.8%	88.7%	87.4%	--	92.1%	91.0%	90.2%	89.6%	89.0%
Average Efficiency	--	--	**89.30%**				--	--	**89.93%**			

Fig.1



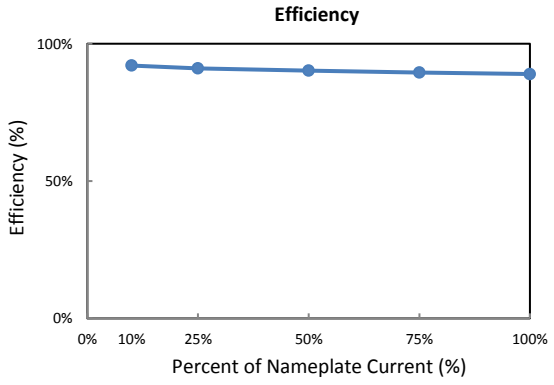
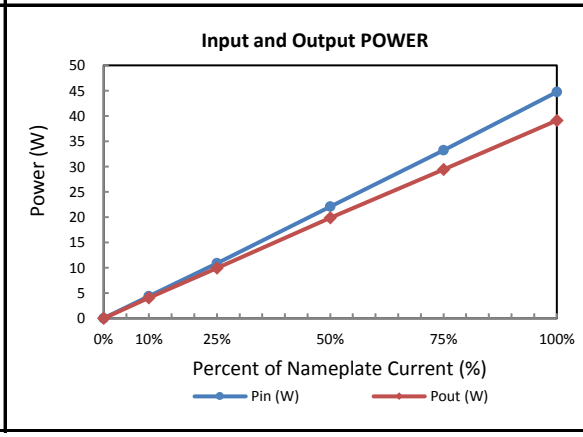
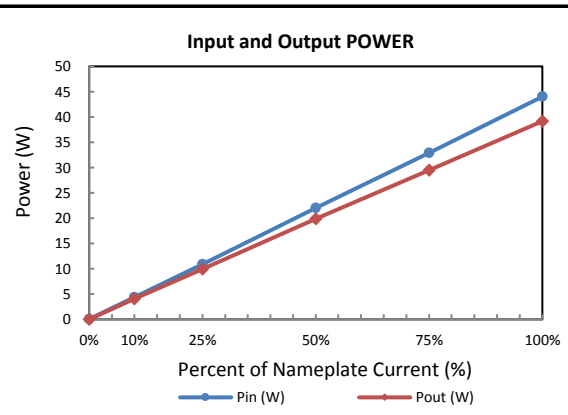


Fig.2





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8. Product Photo: