ITRI
Industrial Technology
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MEASUREMENT SERVICE REPORT

Industrial Technology Research Institute

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工業技術研究院
Industrial Technology
Research Institute

Test Report

Date Issued：2021-12-02
Report No .：11055C01031-2-3-02
Version：A

Service Item：日照計累積照度比對英文測試報告

Brand Name：-----
Model(Item No./Style)：-----
Serial No.：-----

Client
Company Name：日灝能源科技

Address：新北市板橋區溪福里金門街 369 巷 11 號 7 樓

Result of Service Item, performed by ITRI Laboratory, is specified on the next/ following page(s).
This report, including a signature page and content, is a total of 11 pages. The validity of this report no longer exists if signature page and content are separated.

Industrial Technology Research Institute Measurement Service Report Industrial Technology Research Institute

Chao Yang Huang

Vice President and General Director
Green Energy and Environment
Research Laboratories

Department Manager

工業技術研究院
Industrial Technology
Research Institute

Commission Information:

Sample name：Pyranometer
Brand name、Model no.、Serial no.：Refer to table 1
Duration of test：November 04 to November 30, 2021

Laboratory Information:

Lab. name: Photovoltaics System Testing Laboratory
Address of Lab.: Rm. 415, BF., No. 360, Gaofa 2nd Rd., Guiren Dist., Tainan City 711, Taiwan (R.O.C.)
Tel: +886-6-3636861
Fax: +886-6-3032029

宋洪義

Approval Signatory ----------

宋洪義

Testing Lab. Head ----------

I. Test Results and Descriptions:

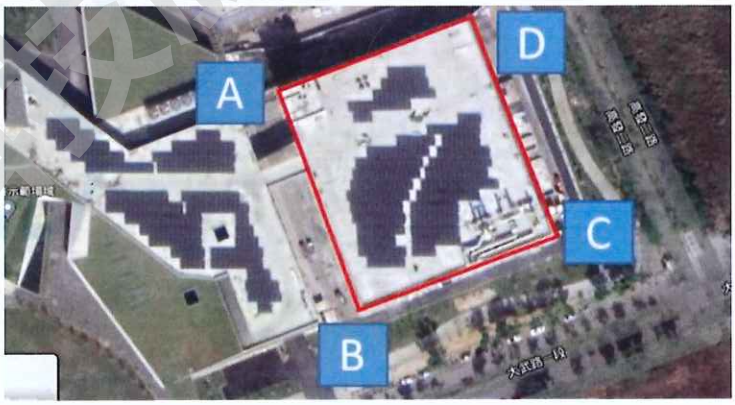
1. Information of pyranometer

Table 1

Item	Brand name	Model no.	Serial no.	Provider
Table A	Hukseflux	SR30-D1	6586	ITRI-GEL-R300-Photovoltaics System Testing Laboratory
Table B	Deltaohm	PYRA03AC	21013200	日灝能源
Table C	Hukseflux	SR05-D2A2	9379	日灝能源

2. Documentation:

Table 2

Customer information	日灝能源科技股份有限公司	
Test site address	Roof of Building C, No. 360, Gaofa 2nd Rd., Guiren Dist., Tainan City 郵遞區號 , Taiwan (R.O.C.) 台南市歸仁區高發二路 360 號 C 棟屋頂	
Site information		
Latitude , Longitude	A(22°55'15.4"N 120°17'29.6"E) B(22°55'13.0"N 120°17'30.6"E) C(22°55'13.8"N 120°17'32.8"E) D(22°55'16.1"N 120°17'31.8"E)	
Data acquisition timing and reporting	Sampling	3 seconds
	Recording	1 minute
	Reporting	28 days (2021/09/03~2021/09/30)
Angle of pyranometer	Global horizontal irradiance	

3. Measured parameters:

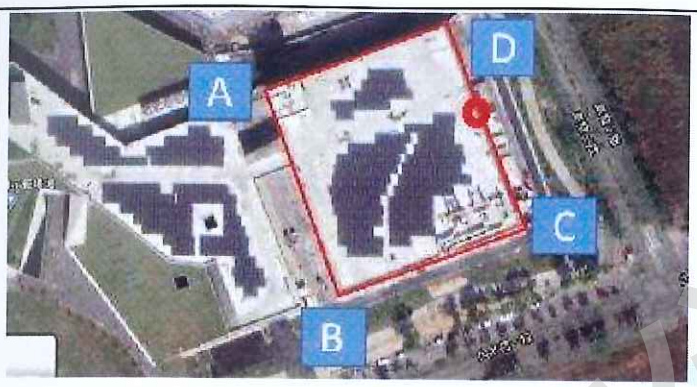
Table A		
Measured parameters	Global horizontal irradiance	
Number of sensor	1 pcs	
Manufacturer	Hukseflux	
Mode/Serial No.	SR30-D1/6586	
Sensor locations	   Pyranometer at the red circle	
Sensor maintenance	Recalibration	(1) Once per year (2) Report No.: N/A

Sensor type	Classified	
■ Thermopile pyranometers	■ Class A	■ Secondary standard per ISO 9060 ☐ High quality per WMO Guide No. 8 (Uncertainty ≤ 3 % for hourly totals)
	☐ Class B	☐ First class per ISO 9060 ☐ Good quality per WMO Guide No. 8 (Uncertainty ≤ 8 % for hourly totals)
	☐ Class C	Any:_____
☐ PV reference cell ☐ PV reference module	☐ Class A	Uncertainty ≤ 3 % from (100 ~1500) W·m^2
	☐ Class B	Uncertainty ≤ 8 % from (100 ~1500) W·m^2
	☐ Class C	Any:_____
☐ Photodiode sensors	☐ Class A	Not applicable:_____
	☐ Class B	Not applicable:_____
	☐ Class C	Any:_____

Table B	
Measured parameters	Global horizontal irradiance
Number of sensor	1 pcs
Manufacturer	Deltaohm
Mode/Serial No.	PYRA03AC/21013200
Sensor locations	 

	 Pyranometer at the red circle	
Sensor maintenance	Recalibration	N/A
Sensor type	Classified	
■ Thermopile pyranometers	☐ Class A	☐ Secondary standard per ISO 9060 ☐ High quality per WMO Guide No. 8 (Uncertainty ≤ 3 % for hourly totals)
	☐ Class B	☐ First class per ISO 9060 ☐ Good quality per WMO Guide No. 8 (Uncertainty ≤ 8 % for hourly totals)
	■ Class C	Any: Second class pyranometer according to ISO 9060.
☐ PV reference cell ☐ PV reference module	☐ Class A	Uncertainty ≤ 3 % from (100 ~1500) W·m^2
	☐ Class B	Uncertainty ≤ 8 % from (100 ~1500) W·m^2
	☐ Class C	Any:_____
☐ Photodiode sensors	☐ Class A	Not applicable:_____
	☐ Class B	Not applicable:_____
	☐ Class C	Any:_____

Table C	
Measured parameters	Global horizontal irradiance
Number of sensor	1 pcs
Manufacturer	Hukseflux
Mode/Serial No.	SR05-D2A2/9379
Sensor locations	 

	 Pyranometer at the red circle	
Sensor maintenance	Recalibration	N/A
Sensor type	Classified	
■ Thermopile pyranometers	☐ Class A	☐ Secondary standard per ISO 9060 ☐ High quality per WMO Guide No. 8 (Uncertainty ≤ 3 % for hourly totals)
	☐ Class B	☐ First class per ISO 9060 ☐ Good quality per WMO Guide No. 8 (Uncertainty ≤ 8 % for hourly totals)
	■ Class C	Any: Second class pyranometer according to ISO 9060.
☐ PV reference cell ☐ PV reference module	☐ Class A	Uncertainty ≤ 3 % from (100 ~1500) W·m^2
	☐ Class B	Uncertainty ≤ 8 % from (100 ~1500) W·m^2
	☐ Class C	Any:_____
☐ Photodiode sensors	☐ Class A	Not applicable:_____
	☐ Class B	Not applicable:_____
	☐ Class C	Any:_____

4. Test result:

Date	Duration[Note 1]	Module no./SN		
		SR30-D1	LPPYRA03AC	SR05-D2A2
		6586	21013200	9379
2021/11/04	11:37:36[Note 2]~16:54:00	1.94	1.89	1.98
2021/11/05	06:28:39~16:54:30	3.86	3.71	3.87
2021/11/06	06:23:21~17:09:27	5.11	4.94	5.18
2021/11/07	06:23:57~17:04:39	4.59	4.41	4.61
2021/11/08	06:20:33~17:00:42	4.58	4.42	4.62
2021/11/09	06:44:15~17:05:21	3.76	3.68	3.78
2021/11/10	06:25:48~17:06:45	4.32	4.22	4.33
2021/11/11	06:35:12~17:04:48	4.38	4.23	4.35
2021/11/12	06:50:54~16:50:24	3.25	3.16	3.26
2021/11/13	06:36:24~17:01:57	4.10	4.00	4.12
2021/11/14	06:26:09~17:03:57	5.04	4.91	5.07
2021/11/15	06:24:48~17:05:18	4.94	4.75	4.95
2021/11/16	06:28:24~17:05:06	4.78	4.61	4.81
2021/11/17	06:30:33~17:02:57	4.24	4.06	4.23
2021/11/18	06:29:09~16:58:27	4.72	4.64	4.78
2021/11/19	06:31:42~17:02:45	4.88	4.75	4.92
2021/11/20	06:34:18~16:47:57	3.42	3.27	3.38
2021/11/21	06:34:06~17:04:42	4.06	3.91	4.04
2021/11/22	06:42:21~17:00:15	4.16	4.05	4.16
2021/11/23	06:40:45~17:00:15	2.72	2.65	2.69
2021/11/24	06:36:00~16:57:15	4.61	4.47	4.45
2021/11/25	07:14:30~16:29:54	1.55	1.51	1.52
2021/11/26	06:46:03~16:49:54	4.16	4.07	4.14
2021/11/27	06:32:15~16:36:33	3.09	2.99	3.08
2021/11/28	07:06:57~16:39:57	1.44	1.39	1.40
2021/11/29	06:43:48~16:50:15	2.34	2.24	2.29
2021/11/30	06:43:30~17:03:15	3.67	3.55	3.66
2021/11/04~2021/11/30 Summing the irradiance		103.73 kWh/m^2	100.46 kWh/m^2	103.68 kWh/m^2
Deviation(Benchmark:SR30-D1)		N/A	3.15 %	0.05 %

Note 1:According to process data for irradiance and PV-generated power should be restricted to the daylight hours of each day (sunrise to sunset, irradiance ≥ 20 W/m^2) to avoid extraneous night-time data values that introduce errors in analyses, unless such errors have been demonstrated to be negligible.

Note 2:Start to tset.

II. Descriptions:

1. Date and Location of Test

   The test was performed at the site address in table2, ITRI during the period from November 04, 2021 to November 30, 2021.

2. Test Methods : According to the IEC 61724-1:2017. III. References:

1. IEC 61724-1 : 2017, first edition, Photovoltaic system performance –Part 1: Monitoring.