



**ITRI**  
Industrial Technology  
Research Institute

本報告屬日灝能源科技股份有限公司所有，請勿複製

## MEASUREMENT SERVICE REPORT

Industrial Technology Research Institute

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Chutung, Hsinchu, Taiwan 31040, R.O.C.

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## Directions & Reminders

1. This Measurement Service is conducted on the Sample(s) provided by the CLIENT according to the terms and conditions mutually agreed by both parties.
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4. This Report, including its original and copy, shall be invalid unless affixed with ITRI authorized chops and reviewed and approved by the chief of the ITRI lab.



# Test Report

Date Issued : 2021-09-02

Report No. : 11055C01031-2-1-02

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 : 日灝能源科技股份有限公司

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 9 pages.  
The validity of this report no longer exists if signature page and content are separated.



Vice President and General Director  
Green Energy and Environment  
Research Laboratories

Department Manager





**Commission Information:**

Sample name : Pyranometer

Brand name 、 Model no. 、 Serial no. : Refer to table 1

Duration of test : August 10 to August 28, 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.)

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宋洪義

Approval Signatory

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宋洪義

Testing Lab. Head

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**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:

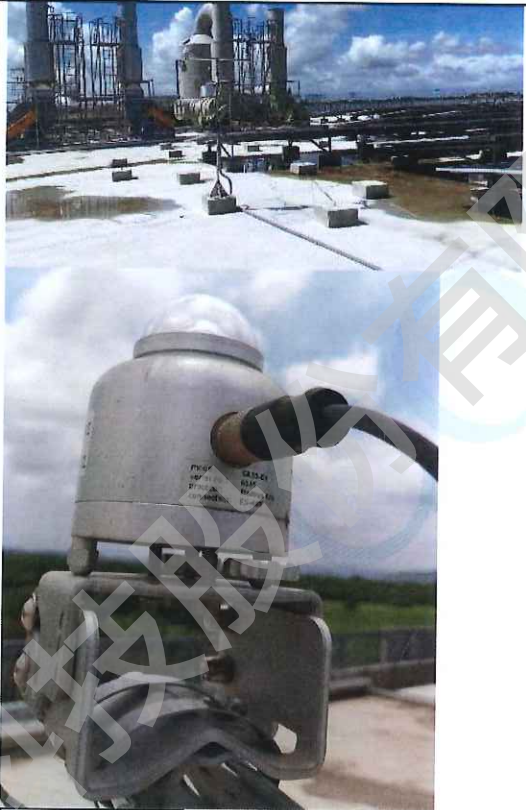
Table 2	
Customer information	日灝能源科技股份有限公司
Test site address	Roof of Building C, No. 360, Gaofa 2nd Rd., Guiren Dist., Tainan City 郵遞區號, Taiwan (R.O.C.) 台南市歸仁區高發二路 360 號 C 棟屋頂
Site information	
Latitude , Longitude	A(22°55'15.4"N 120°17'29.6"E) B(22°55'13.0"N 120°17'30.6"E) C(22°55'13.8"N 120°17'32.8"E) D(22°55'16.1"N 120°17'31.8"E)
Data acquisition timing and reporting	Sampling 3 seconds
	Recording 1 minute
	Reporting 19 days (2021/08/10~2021/08/28)
Angle of pyranometer	Global horizontal irradiance

## 3. Measured parameters:

Table A
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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.: 10907C03567-1-1-03
Sensor type	Classified	
<input checked="" type="checkbox"/> Thermopile pyranometers	<input checked="" type="checkbox"/> Class A	<input checked="" type="checkbox"/> Secondary standard per ISO 9060 <input type="checkbox"/> High quality per WMO Guide No. 8 (Uncertainty $\leq 3\%$ for hourly totals)
	<input type="checkbox"/> Class B	<input type="checkbox"/> First class per ISO 9060 <input type="checkbox"/> Good quality per WMO Guide No. 8 (Uncertainty $\leq 8\%$ for hourly totals)
	<input type="checkbox"/> Class C	Any: _____



<input type="checkbox"/> PV reference cell <input type="checkbox"/> PV reference module	<input type="checkbox"/> Class A	Uncertainty $\leq 3\%$ from (100 ~1500) $\text{W}\cdot\text{m}^2$
	<input type="checkbox"/> Class B	Uncertainty $\leq 8\%$ from (100 ~1500) $\text{W}\cdot\text{m}^2$
	<input type="checkbox"/> Class C	Any: _____
<input type="checkbox"/> Photodiode sensors	<input type="checkbox"/> Class A	Not applicable: _____
	<input type="checkbox"/> Class B	Not applicable: _____
	<input type="checkbox"/> Class C	Any: _____

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

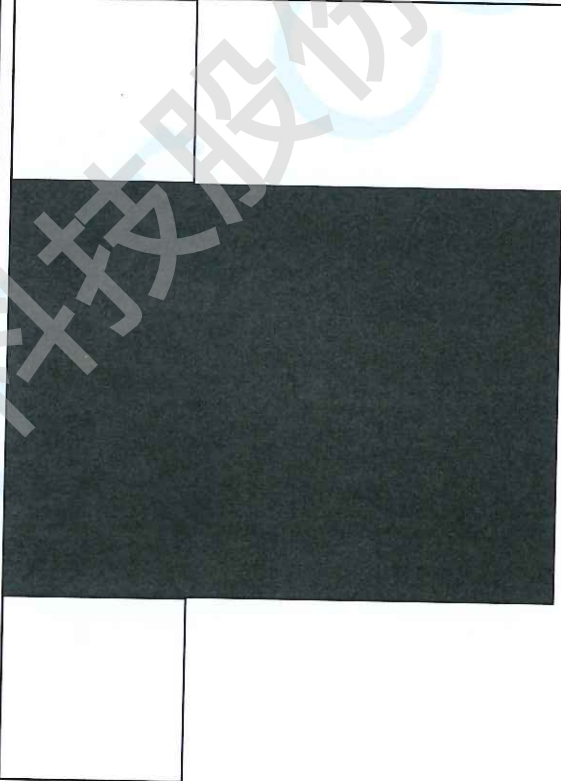


Sensor locations		
	Pyranometer at the red circle	
Sensor maintenance	Recalibration	N/A
Sensor type	Classified	
<input checked="" type="checkbox"/> Thermopile pyranometers	<input type="checkbox"/> Class A	<input type="checkbox"/> Secondary standard per ISO 9060 <input type="checkbox"/> High quality per WMO Guide No. 8 (Uncertainty $\leq 3\%$ for hourly totals)
	<input type="checkbox"/> Class B	<input type="checkbox"/> First class per ISO 9060 <input type="checkbox"/> Good quality per WMO Guide No. 8 (Uncertainty $\leq 8\%$ for hourly totals)
	<input checked="" type="checkbox"/> Class C	Any: <u>Second class pyranometer according to ISO 9060.</u>
<input type="checkbox"/> PV reference cell <input type="checkbox"/> PV reference module	<input type="checkbox"/> Class A	Uncertainty $\leq 3\%$ from (100 ~1500) $W \cdot m^{-2}$
	<input type="checkbox"/> Class B	Uncertainty $\leq 8\%$ from (100 ~1500) $W \cdot m^{-2}$
	<input type="checkbox"/> Class C	Any: _____
<input type="checkbox"/> Photodiode sensors	<input type="checkbox"/> Class A	Not applicable: _____





	<input type="checkbox"/> Class B	Not applicable: _____
	<input type="checkbox"/> 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		
Sensor maintenance	Recalibration	N/A
Sensor type	Classified	
<input checked="" type="checkbox"/> Thermopile pyranometers	<input type="checkbox"/> Class A	<input type="checkbox"/> Secondary standard per ISO 9060 <input type="checkbox"/> High quality per WMO Guide No. 8 (Uncertainty $\leq 3\%$ for hourly totals)



	<input type="checkbox"/> Class B	<input type="checkbox"/> First class per ISO 9060 <input type="checkbox"/> Good quality per WMO Guide No. 8 (Uncertainty $\leq 8\%$ for hourly totals)
	<input checked="" type="checkbox"/> Class C	Any: <u>Second class pyranometer according to ISO 9060.</u>
<input type="checkbox"/> PV reference cell <input type="checkbox"/> PV reference module	<input type="checkbox"/> Class A	Uncertainty $\leq 3\%$ from (100 ~1500) $\text{W}\cdot\text{m}^2$
	<input type="checkbox"/> Class B	Uncertainty $\leq 8\%$ from (100 ~1500) $\text{W}\cdot\text{m}^2$
	<input type="checkbox"/> Class C	Any: _____
<input type="checkbox"/> Photodiode sensors	<input type="checkbox"/> Class A	Not applicable: _____
	<input type="checkbox"/> Class B	Not applicable: _____
	<input type="checkbox"/> Class C	Any: _____

## 4. Test result:

Date	Duration <sup>Note 1</sup>	Module no./SN		
		SR30-D1	LPPYRA03AC	SR05-D2A2
		6586	21013200	9379
2021/8/10	11:21:57 <sup>Note 2</sup> ~17:40:06	0.67	0.64	0.66
2021/8/11	05:56:18~17:12:57	2.79	2.66	2.79
2021/8/12	05:58:57~17:30:18	2.25	2.15	2.24
2021/8/13	05:57:36~16:16:21	2.02	1.93	2.00
2021/8/14	05:46:09~17:22:24	2.03	1.95	2.01
2021/8/15	05:50:33~18:06:45	3.29	3.18	3.32
2021/8/16	05:54:30~18:08:00	2.86	2.72	2.85
2021/8/17	05:51:54~18:02:48	3.20	3.08	3.23
2021/8/18	05:51:21~17:50:36	1.52	1.44	1.51
2021/8/19	06:03:48~18:25:24	5.25	5.01	5.27
2021/8/20	05:59:30~18:12:06	7.21	6.89	7.23
2021/8/21	05:49:33~17:56:03	6.27	5.93	6.25





2021/8/22	05:52:12~18:18:06	6.62	6.30	6.63
2021/8/23	05:52:42~18:12:36	7.26	6.92	7.28
2021/8/24	05:52:39~11:04:24	2.29	2.14	2.25
2021/8/25	14:32:18~17:55:51	0.55	0.52	0.55
2021/8/26	05:54:39~16:25:54	6.28	5.99	6.29
2021/8/27	05:55:15~18:19:21	5.93	5.64	5.90
2021/8/28	05:57:24~10:10:24 <sup>Note 3</sup>	1.90	1.77	1.86
2021/07/05~2021/07/31 Summing the irradiance		107.32 kWh/m <sup>2</sup>	106.50 kWh/m <sup>2</sup>	138.73 kWh/m <sup>2</sup>
Deviation(Benchmark:SR30-D1)		N/A	4.17 %	0.01 %

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  $\geq 20 \text{ W/m}^2$ ) 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.

Note 3: The power system of the test site will be repaired on August 28, 2021.

## II. Descriptions:

### 1. Date and Location of Test

The test was performed at the site address in table2, ITRI during the period from August 10, 2021 to August 28, 2021.

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

### 3. Equipment of test

Standard equipment	Serial No.	Traceability Unit	Report No.	Traceability Date	Due Date
Irradiance	6586	ITRI-CMS	10907C03567-1-1-03	2020/10/08	2021/10/07

## III. References:

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