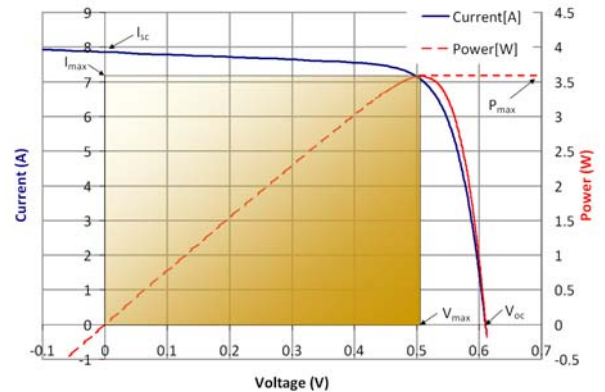


Solar Cell Certification Service

KEEP YOUR CALIBRATION CURRENT! THE SOLAR CELL CERTIFICATION SERVICE FROM VLSI STANDARDS ALLOWS USERS TO KEEP THEIR SOLAR CELLS CERTIFIED AND TRACEABLE.

Pictured on the left is a sample Certificate of Calibration for a measured solar cell. On the right is a typical I-V scan result.



SERVICE DESCRIPTION

The Solar Cell Certification Service is a process by which customers submit their own solar cells to be measured and certified. Customers may choose between certifications and traceability paths to the National Renewable Energy Laboratory (NREL) in the United States, the National Institute of Advanced Industrial Science and Technology (AIST) in Japan or to the Physikalisch Technische Bundesanstalt (PTB) in Germany. The certification is accredited by NIST. Each solar cell is individually calibrated. Spectral response data is also included.

Each cell will receive a Certificate of Calibration and an individual VLSI Standards serial number for historical reference. The Certificate of Calibration reports the certified values and uncertainties of the measured values, and is written in accordance with ISO 17025. It documents the basis of traceability of the cell and can be used as part of a quality program complying with ISO requirements.

SERVICE SPECIFICATIONS

SERVICE LEVEL 1

I_{sc} (50 mA to 15 A), V_{oc} 0.3 V to 60 V, Fill Factor 0-100%, I_{max} & V_{max} ; P_{max} 1 mW to 180W, Area to 156 mm x 156 mm. (Spectral correction taken into account if provided by customer.)

SERVICE LEVEL 2

I_{sc} (50 mA to 15 A), V_{oc} 0.3 V to 60 V, Fill Factor 0-100%, I_{max} & V_{max} ; P_{max} 1 mW to 180W, Area to 156 mm x 156 mm, **PLUS Spectral mismatch correction (or M), Spectral response (or QE).**

SERVICE LEVEL 3

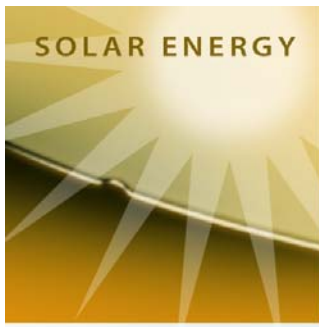
I_{sc} (50 mA to 15 A), V_{oc} 0.3 V to 60 V, Fill Factor 0-100%, I_{max} & V_{max} ; P_{max} 1 mW to 180W, Area to 156 mm x 156 mm, **PLUS Spectral mismatch correction (or M), Spectral response (or QE).**

Temperature dependence of I_{sc} , V_{oc} , and efficiency between 15°C and 75°C, data provided at 15°C, 25°C, 50°C, and 75°C.

PLEASE ENSURE THAT YOUR CELL MEETS THESE REQUIREMENTS:

- Cell dimension limits: 156 mm x 156 mm
- Solar cell current limit: 15 A
- The cell must come with bus bars or electrical connectors for measurements.





Solar Cell Certification Service Service Model Numbers

Service Model	I/V	Fill Factor	$I_{max}, V_{max}, P_{max}$	Area	Efficiency	Spectral Response Measurements	Temperature Dependence Measurements	Traceability
SCCS-SL1-N	Yes	Yes	Yes	Yes	Yes	See Note 1.	No	NREL
SCCS-SL1-P	Yes	Yes	Yes	Yes	Yes	See Note 1.	No	PTB
SCCS-SL1-A	Yes	Yes	Yes	Yes	Yes	See Note 1.	No	AIST
SCCS-SL2-N	Yes	Yes	Yes	Yes	Yes	Yes	No	NREL
SCCS-SL2-P	Yes	Yes	Yes	Yes	Yes	Yes	No	PTB
SCCS-SL2-A	Yes	Yes	Yes	Yes	Yes	Yes	No	AIST
SCCS-SL3-N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NREL
SCCS-SL3-P	Yes	Yes	Yes	Yes	Yes	Yes	Yes	PTB
SCCS-SL3-A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	AIST

Note 1. Spectral correction taken into account if provided by customer.