

CERTIFICATE OF COMPLIANCE

Certificate Number 20190131-E469960
Report Reference E469960-20190124
Issue Date 2019-JANUARY-31

Issued to: TIGO ENERGY, INC.
420 BLOSSOM HILL RD 100
LOS GATOS CA 95032-4511

This certificate confirms that representative samples of PHOTOVOLTAIC RAPID SHUTDOWN SYSTEMS
PV Rapid Shutdown System (QIJS): Sunspec

Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources, UL 1741
CSA C22.2 NO. 107.1-01 General use Power Supplies

Additional Information: See the UL Online Certifications Directory at <https://iq.ulprospector.com> for additional information.

This *Certificate of Compliance* does not provide authorization to apply the UL Mark. Only the UL Follow-Up Services Procedure provides authorization to apply the UL Mark.

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CERTIFICATE OF COMPLIANCE

Certificate Number 20170522-E469960
Report Reference E469960-20140923
Issue Date 2017-May-22

Issued to: TIGO ENERGY, INC.
420 BLOSSOM HILL RD 100
LOS GATOS CA 95032-4511

**This is to certify that
representative samples of**


COMPONENT - DISTRIBUTED GENERATION POWER
SYSTEMS ACCESSORY EQUIPMENT;
COMPONENT - PHOTOVOLTAIC RAPID SHUTDOWN
SYSTEM EQUIPMENT
See addendum page for models

Have been investigated by UL in accordance with the
Standard(s) indicated on this Certificate.

Standard(s) for Safety: UL 1741 Standard for Inverters Converters and Controllers
for Use in Independent Power Systems,
CAN/CSA C22.2 No. 107.1-1, "General Use Power
Supplies."

Additional Information: See the UL Online Certifications Directory at
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that have been produced under UL's Component Recognition Program, UL's Recognized Component Mark:
 may be used in conjunction with the required Recognized Marks. The Recognized Component Mark is
required when specified in the UL Directory preceding the recognitions or under "Markings" for the individual
recognitions.

Recognized components are incomplete in certain constructional features or restricted in performance
capabilities and are intended for use as components of complete equipment submitted for investigation rather



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than for direct separate installation in the field. The final acceptance of the component is dependent upon its installation and use in complete equipment submitted to UL LLC.

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Models:

USR/CNR Component - Photovoltaic Junction Boxes: Photovoltaic Module Maximizer, Models MMJ-ES50: Smart Curve, TS4-O, TS4-L: Longer String, TS4-M and TS4-S.

USR/CNR – Photovoltaic Rapid Shutdown Equipment Components, Models TS4-O, TS4-L and TS4-S

Model numbers may be followed by alphanumeric suffixes representing non-safety critical features of the product



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DESCRIPTION

PRODUCT COVERED:

USL, CNL - PV Rapid Shutdown System (QIJS): Tigo Rapid Shutdown_TS4-S RSS System

GENERAL:

USL - indicates investigation to the Standard for Safety for Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources, UL 1741, Second Edition, dated January 28, 2010, including revisions through September 7, 2016. Including the Certification Requirement Decision dated April 2, 2105, for the evaluation of PVRSS Systems and Equipment.

CNL - indicates investigation to CAN/CSA C22.2 No. 107.1-3, "General Use Power Supplies." Reaffirmed 2011.

The Tigo Rapid Shutdown_TS4-S PVRSS consists of 3 components as indicated in this report that have been investigated to work together when installed by qualified personnel, and meet the requirements of NEC 690.12.

The 3 components consist of:

- A Tigo DC Interrupter.
- A Tigo Wireless Controller.
- A third party inverter (tested combinations shown in Table 1).

This report documents the combinations of equipment that were tested together to show compliance to the UL 1741 Certification Requirement Decision regarding evaluation of PVRSS Systems and Equipment.

Table 1

System Cat. No.	Subassembly Equipment	System Ratings
Photovoltaic rapid shutdown system		
Tigo Rapid Shutdown_TS4-S	DC Interrupter: Model TS4-S Wireless Controller: Model 150-10000-50 Inverters: SMA SB6.0-1SP-US-40 Rated 600Vdc input, 10Adc input per string (3 inputs provided) SMA SB5.0-1SP-US-40 Rated 600Vdc input, 10Adc input per string (3 inputs provided) Fronius Primo 8.2-1 208-240 Rated 1000Vdc input, 18Adc input Ingeteam Solis Inverters Solis-5K-2G-US Rated 600Vdc input, 15Adc input per string (2 inputs provided) SMA STP 12000TL-US-10 Rated 1000Vdc input, 14.5Adc input per string SMA STP 15000TL-US-10 Rated 1000Vdc input, 18.1Adc input per string SMA STP 20000TL-US-10 Rated 1000Vdc input, 24.1Adc input per string SMA STP 24000TL-US-10 Rated 1000Vdc input, 29.0Adc input per string SMA STP 30000TL-US-10 Rated 1000Vdc input, 36.1Adc input per string SMA SB3.0-1SP-US-40 Rated 600Vdc input, 16Adc input per string (3 inputs provided) SMA SB3.8-1SP-US-40 Rated 600Vdc input, 16Adc input per string (3 inputs provided) SMA SB7.0-1SP-US-40 Rated 600Vdc input, 32Adc input per string (3 inputs provided) SMA SB7.7-1SP-US-40 Rated 600Vdc input, 32Adc input per string (3 inputs provided)	Input: 75VDCmax 12Amax per module Output: 16-60VDC 12A max continuous output current 475W max continuous output power per module 1500VDC maximum system voltage, however limited by inverter DC system voltage.

CERTIFICATE OF COMPLIANCE

Certificate Number 20151102-E469960
Report Reference E469960-20140923
Issue Date 2015-NOVEMBER-02

Issued to: TIGO ENERGY, INC.
420 BLOSSOM HILL RD 100
LOS GATOS CA 95032-4511

This is to certify that
representative samples of

COMPONENT - DISTRIBUTED GENERATION POWER
SYSTEMS ACCESSORY EQUIPMENT
Photovoltaic Junction Boxes: Photovoltaic Module
Maximizer, Models MMJ-ES50: SmartCurve, TS4-O, TS4-L:
Longer String, TS4-M and TS4-S.

Model numbers may be followed by alphanumeric suffixes
representing non-safety critical features of the product.

Have been investigated by UL in accordance with the
Standard(s) indicated on this Certificate.

Standard(s) for Safety:

UL 1741, Inverters Converters and Controllers for Use in
Independent Power Systems
CSA C22.2 No. 107.1, General Use Power Supplies

Additional Information:

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Recognized components are incomplete in certain constructional features or restricted in performance
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CERTIFICATE OF COMPLIANCE

Certificate Number 20170130-E480975
Report Reference E480975-20170106
Issue Date 2017-JANUARY-30

Issued to: TIGO ENERGY, INC
420 BLOSSOM HILL RD 100
LOS GATOS CA 95032-4511

**This is to certify that
representative samples of**

COMPONENT - PHOTOVOLTAIC RAPID SHUTDOWN
SYSTEM EQUIPMENT

See addendum page for models

Have been investigated by UL in accordance with the
Standard(s) indicated on this Certificate.


Standard(s) for Safety:

UL 1741 - Standard for Safety for Inverters, Converters,
Controllers and Interconnection System Equipment for Use
With Distributed Energy Resources
CAN/CSA-C22.2 No. 107.1-01 - General Use Power
Supplies


Additional Information:

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CERTIFICATE OF COMPLIANCE

Certificate Number 20170130-E480975
Report Reference E480975-20170106
Issue Date 2017-JANUARY-30

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USR/CNR Photovoltaic Rapid Shutdown Equipment Component – Tigo Access Point Gateway, Model 150-10000-50



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SYSTEMS ACCESSORY EQUIPMENT;
COMPONENT - PHOTOVOLTAIC RAPID SHUTDOWN
SYSTEM EQUIPMENT
See addendum page for models

Have been investigated by UL in accordance with the
Standard(s) indicated on this Certificate.

Standard(s) for Safety: Standard for Inverters Converters and Controllers for Use in
Independent Power Systems, UL 1741
CAN/CSA C22.2 No. 107.1-1, "General Use Power Supplies."

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Models:

USR/CNR Component - Photovoltaic Junction Boxes: Photovoltaic Module Maximizer, Models MMJ-ES50: Smart Curve, TS4-O, TS4-L: Longer String, TS4-M and TS4-S.

USR/CNR – Photovoltaic Rapid Shutdown Equipment Components, Models TS4-O and TS4-L

Model numbers may be followed by alphanumeric suffixes representing non-safety critical features of the product



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CERTIFICATE OF COMPLIANCE

Certificate Number 20170228-E469960
Report Reference E469960-20170224
Issue Date 2017-FEBRUARY-28

Issued to: TIGO ENERGY, INC.
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LOS GATOS CA 95032-4511

This is to certify that representative samples of PHOTOVOLTAIC RAPID SHUTDOWN SYSTEMS
PV Rapid Shutdown System (QIJS): TAP1 RSS System

Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: UL 1741, Standard for Safety for Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources.
CSA C22.2 NO. 107.1-01 General use Power Supplies.

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File E469960
Project 4787851445

PHOTOVOLTAIC RAPID SHUTDOWN SYSTEMS

TIGO ENERGY, INC.
LOS GATOS CA

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TAP1 RSS SYSTEM

General – The TAP1 RSS System consists of the following parts.

1. Photovoltaic Junction Box/DC Attenuator – R/C (QIJW2/8) Tigo Energy, Model TS4-O.
Alternate – R/C (QIJW2/8) Tigo Energy, Model TS4-L.
2. Wireless Controller (Tigo Access Point) – R/C (QIJW2/8), Tigo Energy, model 150-00000-50.
3. Inverter – Evaluated to UL 1741, see Table 1 for complete list tested with this system.

Table 1

System Cat. No.	Subassembly Equipment	System Ratings
Photovoltaic rapid shutdown system		
*TAP1 RSS System	<p style="text-align: center;"><u>DC Optimizers :</u> Models TS4-O, TS4-R-O, TS4-R-O-DUO, TS4-L</p> <p style="text-align: center;"><u>Wireless Controller:</u> 150-00000-50</p> <p style="text-align: center;"><u>Inverters:</u> SMA SB6.0-1SP-US-40 Rated 600Vdc input, 10Adc input per string (3 inputs provided)</p> <p style="text-align: center;">SMA SB5.0-1SP-US-40 Rated 600Vdc input, 10Adc input per string (3 inputs provided)</p> <p style="text-align: center;">Huawei SUN2000-30KTL-US Rated 1000Vdc input, 25A input per string (3 inputs provided)</p> <p style="text-align: center;">KACO blueplanet 3.0TL1 M2 WMODUS39 Rated 600Vdc input, 13.2A input per string (2 inputs provided)</p> <p style="text-align: center;">Power-One PVI-4.2-OUTD-S-US-A Rated 600Vdc input, 16Adc input per string (2 inputs provided)</p> <p style="text-align: center;">Fronius Galvo 2.5-1 208-240 Rated 550Vdc input, 16.1Adc input</p> <p style="text-align: center;">Fronius Primo 8.2-1 208-240 Rated 1000Vdc input, 18Adc input</p> <p style="text-align: center;">Ingeteam INGECON SUN 40TL U M480 Rated 1000Vdc input, 40Adc</p> <p style="text-align: center;">Solectria Renewables PVI-23TL-480 Rated 1000Vdc input, 27A input per string (2 inputs provided)</p> <p style="text-align: center;">Solis Inverters Solis-5K-2G-US Rated 600Vdc input, 15Adc input per string (2 inputs provided)</p> <p style="text-align: center;">Solectria Renewables PVI-5200TL</p>	<p style="text-align: right;">Input: 8-90VDC, 12Amax per module</p> <p style="text-align: right;">Output: 8-90VDC , 12A max cont. output current, 475W max per module (700W when used with -DUO optimizer), 1500VDC maximum system voltage, however limited by inverter DC system voltage.</p>

	Rated 600Vdc input, 15A input per string (2 inputs provided)	
	Sungrow SG60KU-M Rated 1000Vdc input, 112A input	

TAP1 RSS System (cont.)	<p>Inverters (cont.):</p> <p>SMA STP 12000TL-US-10 Rated 1000Vdc input, 14.5Adc input per string</p> <p>SMA STP 15000TL-US-10 Rated 1000Vdc input, 18.1Adc input per string</p> <p>SMA STP 20000TL-US-10 Rated 1000Vdc input, 24.1Adc input per string</p> <p>SMA STP 24000TL-US-10 Rated 1000Vdc input, 29.0Adc input per string</p> <p>SMA STP 30000TL-US-10 Rated 1000Vdc input, 36.1Adc input per string</p> <p>SMA STP 50-US-40 Rated 1000 Vdc input, 20.0Adc input per string</p> <p>SMA SB3.0-1SP-US-40 Rated 600Vdc input, 16Adc input per string (3 inputs provided)</p> <p>SMA SB3.8-1SP-US-40 Rated 600Vdc input, 16Adc input per string (3 inputs provided)</p> <p>SMA SB7.0-1SP-US-40 Rated 600Vdc input, 32Adc input per string (3 inputs provided)</p> <p>SMA SB7.7-1SP-US-40 Rated 600Vdc input, 32Adc input per string (3 inputs provided)</p> <p>ABB UNO-8.6-TL-OUTD-S-US Rated 600Vdc input, 24Adc input per string (2 inputs provided)</p> <p>ABB UNO-7.6-TL-OUTD-S-US Rated 600Vdc input, 24Adc input per string (2 inputs provided)</p> <p>ABB UNO-DM-6.0-TL-PLUS-US Rated 600Vdc input, 20Adc input per string (2 inputs provided)</p> <p>ABB UNO-DM-5.0-TL-PLUS-US Rated 600Vdc input, 19Adc input per string (2 inputs provided)</p> <p>ABB UNO-DM-4.6-TL-PLUS-US Rated 600Vdc input, 16Adc input per string (2 inputs provided)</p> <p>ABB UNO-DM-3.8-TL-PLUS-US Rated 600Vdc input, 10Adc input per string (2 inputs provided)</p> <p>ABB UNO-DM-3.3-TL-PLUS-US Rated 600Vdc input, 10Adc input per string (2 inputs provided)</p>	
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LOS GATOS CA 95032-4511

This certificate confirms that representative samples of PHOTOVOLTAIC RAPID SHUTDOWN SYSTEMS
PV Rapid Shutdown System (QIJS): TS4 Optimizer

Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: UL 1741 - Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources,
CAN/CSA C22.2 No. 107.1-3 - General Use Power Supplies.

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