

Deutsche Akkreditierungsstelle

Anlage zur Akkreditierungsurkunde D-ZE-12089-01-00 nach DIN EN ISO/IEC 17065:2013

Gültig ab: 18.03.2024

Ausstellungsdatum: 18.03.2024

Inhaber der Akkreditierungsurkunde:

Kiwa Primara GmbH
Gewerbestraße 28-32, 87600 Kaufbeuren

mit dem Standort

Kiwa Primara GmbH
Gewerbestraße 28-32, 87600 Kaufbeuren

Die Zertifizierungsstelle erfüllt die Anforderungen gemäß DIN EN ISO/IEC 17065:2013, um die in dieser Anlage aufgeführten Konformitätsbewertungstätigkeiten durchzuführen. Die Zertifizierungsstelle erfüllt gegebenenfalls zusätzliche gesetzliche und normative Anforderungen, einschließlich solcher in relevanten sektoralen Programmen, sofern diese nachfolgend ausdrücklich bestätigt werden.

Die Anforderungen an das Managementsystem in der DIN EN ISO/IEC 17065 sind in einer für Zertifizierungsstellen relevanten Sprache verfasst und stehen insgesamt in Übereinstimmung mit den Prinzipien der DIN EN ISO 9001.

Zertifizierungen von Produkten, Prozessen und Dienstleistungen in den Bereichen:

Netzintegration und Systemdienstleistung von dezentralen Erzeugungseinheiten, Komponenten und Anlagen (Typ A und Typ B)

Der Zertifizierungsstelle ist die Anwendung der nachfolgend aufgeführten Anforderungsnormen mit unterschiedlichen Ausgabeständen gestattet, ohne dass es einer vorherigen Information und Zustimmung der DAkkS bedarf. Die Zertifizierungsstelle verfügt über eine aktuelle Liste aller Verfahren im flexiblen Akkreditierungsbereich.

Diese Urkundenanlage gilt nur zusammen mit der schriftlich erteilten Urkunde und gibt den Stand zum Zeitpunkt des Ausstellungsdatums wieder. Der jeweils aktuelle Stand der gültigen und überwachten Akkreditierung ist der Datenbank akkreditierter Stellen der Deutschen Akkreditierungsstelle zu entnehmen (www.dakks.de)

Anlage zur Akkreditierungsurkunde D-ZE-12089-01-00

Zertifizierung im Bereich Netzintegration und Systemdienstleistung von dezentralen Erzeugungseinheiten, Komponenten und Anlagen (Typ B) gemäß der Zertifizierungsprogramme:

SOP-9-1, Rev. 15	GCC Certification program
SOP-9-3, Rev. 09	EZE Certification Program
SOP-9-6, , Rev. 01	EZA Certification Program

Folgende Produkte werden im Bereich der Erneuerbaren Energien zertifiziert:

- Netzgeführte Photovoltaik Wechselrichter und Inselsysteme
- Batteriespeichersysteme
- Bi-Direktionale Ladegeräte und Ladestationen
- Blockheizkraftwerke BHKW, KWK
- Wechselrichter im Bereich Windenergieanlagen
- Anschlusskästen, Freischalter
- Kommunikationsgeräte
- Netzüberwachungsrelais
- Photovoltaik Trackeranlagen
- Erzeugungsanlagen Typ A und Typ B

Auf der Basis von:

Norm / Hausverfahren / Version	Titel der Norm oder des Hausverfahrens
Commission Regulation (EU) 2016/631 (EC RfG) 2016-04	Establishing a network code on requirements for grid connection of generators
ABNT NBR 16149 2013	Brasilien: Photovoltaic (PV) systems - Characteristics of the utility interface
ABNT NBR 16150 2013	Brasilien: Photovoltaic (PV) systems - Characteristics of the utility interface - Conformity test procedure
NDU-013, Dezembro 2017	Brasilien: Criteria for the connection of distributed generation accessing parties to the energisa distribution grid – low voltage connection.
BDEW Mittelspannungsrichtlinie 2008 + 1. Ergänzung 2009 + 2. Ergänzung 2010 + 3. Ergänzung 2011 + 4. Ergänzung 2013	Technische Richtlinie Erzeugungsanlagen am Mittelspannungsnetz Richtlinie für Anschluss und Parallelbetrieb von Erzeugungsanlagen am Mittelspannungsnetz

Norm / Hausverfahren / Version	Titel der Norm oder des Hausverfahrens
Commission Regulation (EU) 2016/631 (EC RfG) 2016-04	Establishing a network code on requirements for grid connection of generators
VDE-AR-N 4110 2018-11	Technische Regeln für den Anschluss von Kundenanlagen an das Mittelspannungsnetz und deren Betrieb (TAR Mittelspannung)
VDE-AR-N 4120 2018-11	Technische Regeln für den Anschluss von Kundenanlagen an das Hochspannungsnetz und deren Betrieb (TAR Hochspannung)
VDE-AR-N 4130 2018-11	Technische Anschlussregeln Höchstspannung, Stand: 11-2018
FGW TR3, Rev. 26	Bestimmung der elektrischen Eigenschaften von Erzeugungseinheiten und -anlagen, Speicher sowie für deren Komponenten am Mittel-, Hoch- und Höchstspannungsnetz
FGW TR4, Rev. 10	Anforderungen an Modellierung und Validierung von Simulationsmodellen der elektrischen Eigenschaften von Erzeugungseinheiten und -anlagen, Speicher sowie deren Komponenten
FGW TR8 , Rev. 9	Zertifizierung der elektrischen Eigenschaften von Erzeugungseinheiten und -anlagen, Speicher sowie für deren Komponenten am Stromnetz
VDE-AR-N 4105 2018-11	Erzeugungsanlagen am Niederspannungsnetz-Technische Mindestanforderungen für Anschluss und Parallelbetrieb von Erzeugungsanlagen am Niederspannungsnetz
DIN VDE V 0124-100 2020-06	Netzintegration von Erzeugungsanlagen- Niederspannungs-Prüfanforderungen an Erzeugungseinheiten vorgesehen zum Anschluss und Parallelbetrieb am Niederspannungsnetz
DIN VDE 0126-1-1 (VDE V 0126-1-1) 2013-08	Selbsttätige Schaltstelle zwischen einer netzparallelen Eigenerzeugungsanlage und dem öffentlichen Niederspannungsnetz
VDE FNN Hinweis Anschluss und Betrieb von Speichern am Niederspannungsnetz Version 6	Anschluss und Betrieb von Speichern am Niederspannungsnetz

Anlage zur Akkreditierungsurkunde D-ZE-12089-01-00

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Commission Regulation (EU) 2016/631 (EC RfG) 2016-04	Establishing a network code on requirements for grid connection of generators
C10/11 edition 2.2 2021-03	Belgien: SPECIFIC TECHNICAL PRESCRIPTIONS REGARDING POWER-GENERATING PLANTS OPERATING IN PARALLEL TO THE DISTRIBUTION NETWORK
CEI 0-16 2019-04 CEI 0-16; V1 2020-12 CEI 0-16; V2 2021-06	Italien: Reference technical rules for the connection of active and passive consumers to the HV and MV electrical networks of distribution Company
CEI 0-21 2019-04 CEI 0-21; V1 2020-12	Italien: Reference technical rules for the connection of active and passive users to the LV electrical Utilities
G59/2 2010	Vereinigtes Königreich: Recommendations for the Connection of Embedded Generating Plant to the Public Electricity Suppliers Distribution Systems
G59 Issue 3 Amendment 3 2018-02	Recommendations for the connection of generating plant to the distribution systems of licensed distribution network operators
G99/1 G99 Amendment 1 Rev.9 2018	Vereinigtes Königreich: Requirements for the connection of generation equipment in parallel with public distribution networks on or after 27 April 2019
G83/2 2012	Vereinigtes Königreich: Recommendations for the Connection of Small-scale Embedded Generators (Up to 16A per Phase) in Parallel with Public Low-Voltage Distribution Network
G98/1 G98 Amendment 1 Rev.7 2018	Vereinigtes Königreich: Requirements for the connection of Fully Type Tested Micro-generators (up to and including 16 A per phase) in parallel with public Low Voltage Distribution Networks on or after 27 April 2019
G98/NI Issue 1	Nord Irland: Requirements for the connection of Fully Type Tested Micro-generators (up to and including 16A per phase) in parallel with public Low Voltage Distribution Networks in Northern Ireland on or after 27 April 2019

Anlage zur Akkreditierungsurkunde D-ZE-12089-01-00

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Commission Regulation (EU) 2016/631 (EC RfG) 2016-04	Establishing a network code on requirements for grid connection of generators
G99/NI Issue 1	Nord Irland: Requirements for the connection of generation equipment in parallel with public distribution networks in Northern Ireland on or after 27 April 2019
MEA 2013	Thailand: Grid-Connected Inverter Regulation
PEA 2013	Thailand: Grid-connected Inverter Regulation Provincial Electricity Authority
NA/EEA-NE7 - CH 2020	Schweiz: Empfehlung Netzanschluss für Energieerzeugungsanlagen: Technische Anforderungen für den Anschluss und Parallelbetrieb in NE3 und NE7.
Nam Power, Version 6	Namibia: Renewable Energy Facilities Technical Guidelines for Point of Common Coupling
NTCO 2013	Chile: TECHNICAL STANDARD FOR CONNECTION AND OPERATION OF SMALL DISTRIBUTED GENERATION UNITS IN MEDIUM VOLTAGE NETWORKS
Procedimiento técnico Chilectra 2010-10	Chile General Technical Procedure of Connection and Operation of PMGD in Low Voltage Installations
Ord. 30 2013	Rumänien: Technical conditions for connecting photovoltaic power stations to power grids of public interest
PVVC-V10, Annex 6.2 2012	Spanien : Procedure for verification validation and certification of the requirements of the PO 12.3 on the response of wind farms and photovoltaic plants in the event of voltage dips
PO12.3 2006	Spanien: Resolution of the General Secretariat of Energy, which approves a set of procedures of technical technical and instrumental character necessary to carry out the proper technical management of the Electric System.

Norm / Hausverfahren / Version	Titel der Norm oder des Hausverfahrens
Commission Regulation (EU) 2016/631 (EC RfG) 2016-04	Establishing a network code on requirements for grid connection of generators
P.O.12.2 2018	Spanien: GENERATION AND DEMAND FACILITIES: MINIMUM DESIGN, EQUIPMENT, OPERATION, COMMISSIONING AND SAFETY REQUIREMENTS. +DISCLAIMER PO 12.2
RD 661 2007	Spanien : Royal Decree 661/2007, of May 25, which regulates the activity of production of electric energy in a special regime..
RD 1663 2000	Spanien: ROYAL DECREE 1663/2000, of September 29, on connection of photovoltaic installations to the low voltage network.
RD 1699 2011	Spanien: Royal Decree 1699/2011, of November 18, which regulates the connection to the grid of small power electric power production facilities.
RD 647 2020	Spanien: Royal Decree 647/2020, of 7 July, regulating aspects necessary for the implementation of the grid codes for the connection of certain electrical installations.
UNE 206006 IN 2011	Spanien : Ensayos de detección de funcionamiento en isla de multiples inversores fotovoltaicos conectados a red en paralelo Performance tests for islanding detection of multiple grid-connected photovoltaic inverters in parallel
UNE 206007-1 IN 2013	Spanien : Requisitos de conexión a la red eléctrica Parte 1: Inversores para conexión a la red de distribución Requirements for connecting to the power system. Part 1: Grid-connected inverters.

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Commission Regulation (EU) 2016/631 (EC RfG) 2016-04	Establishing a network code on requirements for grid connection of generators
UNE 206007-2 IN 2014	Spanien : Requisitos de conexión a la red eléctrica Parte 2: Requisitos relativos a la seguridad del sistema para instalaciones constituidas por inversores Requirements for connecting to the power system. Part 2: Requirements concerning system security for installations containing inverters.
UNE 217001 IN 2015	Spanien : Requisitos y ensayos para sistemas que eviten el vertido de energía a la red de distribución Requirements and tests for systems intended to avoid the energy transmission to the distribution network
UNE 217001 2020	Spanien : Tests for systems that avoid energy discharge into the distribution network to the distribution network
UNE 217002 2020	Spanien : Inversores para conexión a la red de distribución Ensayos de los requisitos de inyección de corriente continua a la red, generación de sobretensiones y sistema de detección de funcionamiento en isla Grid connected inverters. Testing of requirements for DC grid injection, overvoltage generation and island operation detection system
RD244 (nur Anexo I) 2019	Spanien : Royal Decree 244/2019, of April 5, which regulates the administrative, technical and economic conditions of the self-consumption of electric energy.
NTS Version 2.1	Spanien : Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631

Anlage zur Akkreditierungsurkunde D-ZE-12089-01-00

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Commission Regulation (EU) 2016/631 (EC RfG) 2016-04	Establishing a network code on requirements for grid connection of generators
TED/749 2020	Spanien : Technical requirements for connection to the network necessary for the implementation of the connection network codes.
Portaria n.º73 2020	Portugal : Non-exhaustive requirements for connecting generating modules to the Public Service Electricity Network (RESP).
Grid Connection Code for RPPs in South Africa - Version 3.1 2022-02	Süd Afrika: GRID CONNECTION CODE FOR RENEWABLE POWER PLANTS (RPPs) CONNECTED TO THE ELECTRICITY TRANSMISSION SYSTEM (TS) OR THE DISTRIBUTION SYSTEM (DS) IN SOUTH AFRICA
NRS 097-2-1, Edition 2.1 2017	Süd Afrika: Grid interconnection of embedded generation, Part 2: Small-scale embedded generation, Section 1: Utility interface
SEI REF 04 Version V7	Frankreich : Protection de decouplage pour le raccordement d'une production decentralisée en HTA et en BT dans les zones non interconnectées. Decoupling protection for the connection of decentralized production in MV and LV in non-interconnected areas.
Enedis-NOI-RES_13E Version 6	Frankreich : Protections des installations de production raccordées au réseau public de distribution Protection of generating facilities connected to the public distribution system
ENEDIS-PRO-RES_64E Version 3	Frankreich : Performance control procedures for High Voltage (HV) Generation installations connected to the Public Distribution Network managed by Enedis
Enedis-PRO-RES_10E Version 6	Frankreich : Description and study of decoupling protections for the connection of Generation Facilities connected to the Public Distribution Network

Anlage zur Akkreditierungsurkunde D-ZE-12089-01-00

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Commission Regulation (EU) 2016/631 (EC RfG) 2016-04	Establishing a network code on requirements for grid connection of generators
UTE C 15-712-1 2013-07	Frankreich : Photovoltaic installations connected to the public distribution network
XP C15-712-3 2019-05	Frankreich: Photovoltaic installations with energy storage and connected to a public distribution network Only chapters: 1, 2, 6.3.3, 9.2, 14.1, 14.5, 15.2.3
SODO, Priloga 5	Tschechien: SISTEMSKA OBRATOVALNA NAVODILA za distribucijsko omrežje električne energije (SODO), 2010, Priloga 5
ÖVE / ÖNORM E 8001-4-712/A2 2016 ÖVE / ÖNORM E 8001-4-712 2009 ÖVE / ÖNORM E 8001-4-712/A1 2014	Österreich: Errichtung von elektrischen Anlagen mit Nennspannungen bis AC 1000 V und DC 1500 V - Teil 4-712: Photovoltaische Energieerzeugungsanlagen - Errichtungs- und Sicherheitsanforderungen
TOR D4 V2.3 2016-07	Österreich: Technische und organisatorische Regeln für Betreiber und Benutzer von Netzen Teil D: Besondere technische Regeln Hauptabschnitt D4: Parallelbetrieb von Erzeugungsanlagen mit Verteilnetzen
TOR Erzeuger Typs A	Österreich: Anschluss und Parallelbetrieb von Stromerzeugungsanlagen des Typs A und Kleinstenergieanlagen
TOR Erzeuger Typs B	Österreich: Anschluss und Parallelbetrieb von Stromerzeugungsanlagen des Typs B
TOR Erzeuger Typs C	Österreich: Anschluss und Parallelbetrieb von Stromerzeugungsanlagen des Typs C
TOR Erzeuger Typs D	Österreich: Anschluss und Parallelbetrieb von Stromerzeugungsanlagen des Typs D

Norm / Hausverfahren / Version	Titel der Norm oder des Hausverfahrens
Commission Regulation (EU) 2016/631 (EC RfG) 2016-04	Establishing a network code on requirements for grid connection of generators
OVE-Richtlinie R 25 2020-03	Österreich: Prüfanforderungen an Erzeugungseinheiten (Generatoren) vorgesehen zum Anschluss und Parallelbetrieb an Niederspannungs-Verteilernetzen
TR ssPV 2014	Ägypten: Technical Requirements for Connecting Small Scale PV (ssPV) Systems to Low Voltage Distribution Networks
TF 3.2.1	Dänemark: Technical Regulation 3.2.1 for electricity generation facilities with a rated current of 16 A per phase or lower
TR 3.3.1 Rev.2 2019-12	Dänemark: Technical regulation 3.3.1 for battery plants
Dansk Energi Type A and B Version 1.2 2019-02	Dänemark: Technical requirements for connection of power-generating plants to the low-voltage grid (≤ 1 kV)
Dansk Energi Type B, C and D Version 1.2 2019-02	Dänemark: Technical requirements for connection of power-generating plants to the medium and high-voltage grid (> 1 kV)
EN 50549-1 2019	Requirements for generating plants to be connected in parallel with distribution networks Part 1: Connection to a LV distribution network - Generating plants up to and including Type B
EN 50549-2 2019	Requirements for generating plants to be connected in parallel with distribution networks Part 2: Connection to a MV distribution network - Generating plants up to and including Type B
EN 50549-10 2022	Requirements for generating plants to be connected in parallel with distribution networks - Part 10: Tests for conformity assessment of generating units
DIN EN 50438 2014 VDE 0435-901 2014-06	Requirements for the connection of micro-generators in parallel with public low-voltage distribution networks
IEC 61727 2004	Photovoltaic (PV) systems - Characteristics of the utility interface

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Commission Regulation (EU) 2016/631 (EC RfG) 2016-04	Establishing a network code on requirements for grid connection of generators
IEC 62116 2014 EN 62116 2014 DIN EN 62116 2014 VDE 0126-2 2014	Test procedure of islanding prevention measures for utility-interconnected photovoltaic inverters
DEWA DRRG Standards Version 2.0 Edition 2016-03	Dubai: Standards for distributed renewable resources generators connected to the distribution network.
Renewables Standards Version 1.0 2013-11	Dubai: Renewables Standards
VJV2018	Finnland: Grid Code Specifications for Power Generating Facilities
Statnett 15/00250-12	Norwegen: Statnett's proposal for the practical implementation of the EU regulation for connection of production (NC-RfG)
Wymogi ogólnego stosowania wynikające z Rozporządzenia Komisji (UE) 2016/631 z dnia 14 kwietnia 2016 r. ustanawiającego kodeks sieci dotyczący wymogów w zakresie przyłączenia jednostek wytwórczych do sieci (NC RfG)	Polen: The TSO's proposal for general use under the Commission Regulation (EU) 2016/631 of 14 April 2016 establishing a network code on the requirements for the supply of generating units to the grid (NC RfG)
20210426_zasady-wykorzysta_certyfikatow_v.1.2 Warunki i procedury wykorzystania certyfikatów NC RfG - wersja 1.2	Polen: Warunki i procedury wykorzystania certyfikatów w procesie przyłączenia modułów wytwarzania energii do sieci elektroenergetycznych Bedingungen und Verfahren für die Verwendung von Zertifikaten im Prozess Anschluss von Stromerzeugungsmodulen an das Netz Energietechnik

Anlage zur Akkreditierungsurkunde D-ZE-12089-01-00

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Commission Regulation (EU) 2016/631 (EC RfG) 2016-04	Establishing a network code on requirements for grid connection of generators
PPDS 2021	Tschechien: RULES FOR THE PARALLEL OPERATION OF MANUFACTURING AND ACCUMULATION DEVICES THE NETWORK OF THE DISTRIBUTION SYSTEM OPERATOR

Anlage zur Akkreditierungsurkunde D-ZE-12089-01-00

Table 1: Details on type of product and the assessment activities for the certification according to the Spanish NTS standards

Product to certify	Assessment process	Certification basis
PGU: Photovoltaic inverter		Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631, as listed above(NTS V2.1). Technical standard for monitoring the compliance of power generating modules according to P.O. 12.2 SENP, as listed above (NTS SENP V1.1)
Limited Frequency Sensitive Mode-Overfrequency (LFSM-O) [5.1]	Test and/or Simulation ⁽¹⁾	
Limited Frequency Sensitive Mode-Underfrequency (LFSM-U) [5.2]	Test and/or Simulation ⁽¹⁾	
Frequency Sensitive Mode (FSM) [5.3]	Test and/or Simulation ⁽¹⁾	
Remote active power control capability and range [5.5]	Test	
Reactive power capability at maximum capacity and belowmaximum capacity [5.7]	Test	
Reactive power control in PPM[5.8]	Test	
Active power recovery after a fault [5.11]	Test	
Fault ride through capability of PPM connected below 110 kV [5.11]	Test	
Fault ride through capability of PPM connected above 110 kV [5.11]	Test	
Fast fault current injection at the connection point in case of symmetrical (3-phase) faults [5.11]	Test	
Fast fault current injection at the connection point in case of balanced (3-phase) faults and in case of unbalanced (1-phase or 2-phase) faults [5.11](only for NTS SENP V1.1)	Test	

Product to certify	Assessment process	Certification basis
Transient overvoltage withstand capability of PPM[5.11] (only for NTS SENP V1.1)	Test	
Capability to take part in island operation [5.13]	Simulation ⁽³⁾	
PGU: Wind turbine		
Limited Frequency Sensitive Mode-Overfrequency (LFSM-O) [5.1]	Test and/or Simulation ⁽¹⁾	<p>Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631, as listed above(NTS V2.1).</p> <p>Technical standard for monitoring the compliance of power generating modules according to P.O. 12.2 SENP, as listed above (NTS SENP V1.1)</p>
Limited Frequency Sensitive Mode-Underfrequency (LFSM-U) [5.2]	Test and/or Simulation ⁽¹⁾	
Frequency Sensitive Mode(FSM) [5.3]	Test and/or Simulation ⁽¹⁾	
Remote active power control capability and range [5.5]	Test	
Reactive power capability at maximum capacity and belowmaximum capacity [5.7]	Test	
Reactive power control in PPM[5.8]	Test	
Active power recovery after a fault [5.11]	Test	
Fault ride through capability of PPM connected below 110 kV [5.11]	Test	
Fault ride through capability of PPM connected above 110 kV [5.11]	Test	
Fast fault current injection at the connection point in case of symmetrical (3-phase) faults [5.11]	Test	
Fast fault current injection at the connection point in case of balanced (3-phase) faults	Test	

Anlage zur Akkreditierungsurkunde D-ZE-12089-01-00

Product to certify	Assessment process	Certification basis
and in case of unbalanced (1-phase or 2-phase) faults [5.11](only for NTS SENP V1.1)		<p>Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631, as listed above(NTS V2.1).</p> <p>Technical standard for monitoring the compliance of power generating modules according to P.O. 12.2 SENP, as listed above (NTS SENP V1.1)</p>
Transient overvoltage withstand capability of PPM[5.11] (only for NTS SENP V1.1)	Test	
Capability to take part in island operation [5.13]	Simulation ⁽³⁾	
PGU: Synchronous generator (e.g. but not exclusively directcoupled generators in combination with combustionengines, steam/gas turbines)		
Limited Frequency Sensitive Mode-Overfrequency (LFSM-O) [5.1]	Test and/or Simulation ⁽¹⁾	
Limited Frequency Sensitive Mode-Underfrequency (LFSM-U) [5.2]	Test and/or Simulation ⁽¹⁾	
Frequency Sensitive Mode (FSM) [5.3]	Test and/or Simulation ⁽¹⁾	
Remote active power controlcapability and range [5.5] (only for NTS SENP V1.1)	Test	
Reactive power capability at maximum capacity and belowmaximum capacity [5.7]	Test	
Power oscillation dampingcontrol [5.9]	Simulation	
Active power recovery after afault [5.11]	Test	
Fault ride through capability of SPGM connected below	Test	

Anlage zur Akkreditierungsurkunde D-ZE-12089-01-00

Product to certify	Assessment process	Certification basis
110 kV [5.11]		
Fault ride through capability ofSPGM connected above 110 kV [5.11]	Test	
Black start [5.12]	Test ⁽³⁾	
Capability to take part inisland operation [5.13]	Simulation ⁽³⁾	
Fast re-synchronisation capability [5.14]	Test	
ACPGM: STATCOM	Technical standard for monitoring thecompliance of power generating modules according to EU Regulation 2016/631, as listed above (NTS V2.1). Chapter 4.6.1.1	Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631, as listed above(NTS V2.1). Technical standard for monitoring the compliance of power generating modules according to P.O. 12.2 SENP, as listed above (NTS SENP V1.1)
ACPGM: PPC	Technical standard for monitoring thecompliance of power generating modules according to EU Regulation 2016/631, as listed above (NTS V2.1). Chapter 4.6.2.1	Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631, as listed above(NTS V2.1). Technical standard for monitoring the compliance of power generating modules according to P.O. 12.2 SENP, as listed above (NTS SENP V1.1)
ACPGM: Synchronous compensator	Technical standard for monitoring thecompliance of power generating modules according to EU Regulation 2016/631, as listed above (NTS V2.1). Chapter 4.6.3.1	Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631, as listed above(NTS V2.1). Technical standard for monitoring the compliance of power generating modules according to P.O. 12.2 SENP, as listed above (NTS SENP V1.1)
ACPGM: Battery storage systems	Technical standard for monitoring thecompliance of power generating modules	Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631, as listed

Product to certify	Assessment process	Certification basis
	<p>according to EU Regulation 2016/631, as listed above (NTS V2.1).</p> <p>Chapter 4.6.4</p>	<p>above(NTS V2.1).</p> <p>Technical standard for monitoring the compliance of power generating modules according to P.O. 12.2 SENP, as listed above (NTS SENP V1.1)</p>
<p>Validation of PGM simulation model</p>	<p>Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631, as listed above (NTS V2.1).</p> <p>Chapter 6.1</p>	<p>Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631, as listed above(NTS V2.1).</p> <p>Technical standard for monitoring the compliance of power generating modules according to P.O. 12.2 SENP, as listed above (NTS SENP V1.1)</p>
<p>Validation of PGU simulation model (photovoltaic inverter, wind turbine, synchronous generators)</p>	<p>Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631, as listed above (NTS V2.1).</p> <p>Chapter 6.2</p>	<p>Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631, as listed above(NTS V2.1).</p> <p>Technical standard for monitoring the compliance of power generating modules according to P.O. 12.2 SENP, as listed above (NTS SENP V1.1)</p>
<p>Validation of ACPGM simulation model (PPC, STATCOM, synchronous compensator, battery storage systems)</p>	<p>Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631, as listed above (NTS V2.1).</p> <p>Chapter 6.3</p>	<p>Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631, as listed above(NTS V2.1).</p> <p>Technical standard for monitoring the compliance of power generating modules according to P.O. 12.2 SENP, as listed above (NTS SENP V1.1)</p>
<p>Simulations of PGU (photovoltaic, wind turbines, synchronous generator) or ACPGM (PPC, STATCOM, synchronous compensator, battery storage systems) for Simulation Model Validation</p>	<p>Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631, as listed above (NTS V2.1).</p> <p>Chapter 6.2 and 6.3</p>	<p>Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631, as listed above(NTS V2.1).</p> <p>Technical standard for monitoring the compliance of power generating modules according to P.O. 12.2 SENP, as listed above (NTS SENP V1.1)</p>

Anlage zur Akkreditierungsurkunde D-ZE-12089-01-00

Product to certify	Assessment process	Certification basis
Wind and photovoltaic power plants (PPM)		
PPM: Type B except the cases indicated in NTS V2.1	Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631, as listed above (NTS V2.1).	Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631, as listed above (NTS V2.1). Technical standard for monitoring the compliance of power generating modules according to P.O. 12.2 SENP, as listed above (NTS SENP V1.1)
Final certificate based on the requirements: Limited Frequency Sensitive Mode-Overfrequency (LFSM-O) [5.1]	Certificate and Complementary Simulation ⁽²⁾	
Reactive power capability at maximum capacity and below maximum capacity [5.7]	Certificate and Complementary Simulation ⁽²⁾	
Reactive power control in PPM [5.8]	Certificate and Complementary Simulation ⁽²⁾	
Fault ride through capability of PPM connected below 110 kV [5.11]	Certificate and Simulation ⁽⁴⁾	
Active power recovery after a fault [5.11]	Certificate and Simulation ⁽⁴⁾	
Fast fault current injection at the connection point in case of symmetrical (3-phase) faults [5.11]	Certificate and Simulation ⁽⁴⁾	
PPM: Type C		
Final certificate based on the requirements:	Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631, as listed above (NTS V2.1).	Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631, as listed above (NTS V2.1). Technical standard for monitoring the compliance of power generating modules according to P.O. 12.2 SENP, as listed above (NTS SENP V1.1)
Limited Frequency Sensitive Mode-Overfrequency (LFSM-O) [5.1]	Certificate and Complementary Simulation ⁽²⁾	

Anlage zur Akkreditierungsurkunde D-ZE-12089-01-00

Product to certify	Assessment process	Certification basis
Limited Frequency Sensitive Mode-Underfrequency (LFSM-U) [5.2]	Certificate and Complementary Simulation ⁽²⁾	
Frequency Sensitive Mode(FSM) [5.3]	Certificate and Complementary Simulation ⁽²⁾	
Remote active power control capability and range [5.5]	Certificate	
Inertia emulation [5.6]	Certificate or Simulation ⁽³⁾	
Reactive power capability at maximum capacity and below maximum capacity [5.7]	Certificate and Complementary Simulation ⁽²⁾	
Reactive power control in PPM [5.8]	Certificate and Complementary Simulation ⁽²⁾	
Power oscillations damping for PPM [5.10]	Certificate or Simulation ⁽³⁾	
Active power recovery after a fault [5.11]	Certificate and Simulation ⁽⁴⁾	
Fault ride through capability of PPM connected below 110 kV [5.11]	Certificate and Simulation ⁽⁴⁾	
Fast fault current injection at the connection point in case of symmetrical (3-phase) faults [5.11]	Certificate and Simulation ⁽⁴⁾	
Capability to take part in island operation [5.13]	Certificate	
PPM: Type D		
Final certificate based on the requirements:	Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631, as listed above (NTS V2.1).	Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631, as listed above (NTS V2.1).
Limited Frequency Sensitive Mode-Overfrequency (LFSM-O) [5.1]	Certificate and Complementary Simulation	Technical standard for monitoring the compliance of power generating modules according to P.O. 12.2 SENP, as listed above (NTS SENP V1.1)

Anlage zur Akkreditierungsurkunde D-ZE-12089-01-00

Product to certify	Assessment process	Certification basis
	(2)	
Limited Frequency Sensitive Mode-Underfrequency (LFSM-U) [5.2]	Certificate and Complementary Simulation (2)	
Frequency Sensitive Mode(FSM) [5.3]	Certificate and Complementary Simulation (2)	
Remote active power control capability and range [5.5]	Certificate	
Inertia emulation [5.6]	Certificate or Simulation (3)	
Reactive power capability at maximum capacity and below maximum capacity [5.7] Reactive power control in PPM[5.8]	Certificate and Complementary Simulation (2)	
Power oscillations damping for PPM [5.8]	Certificate or Simulation	
Active power recovery after a fault [5.11]	Certificate and Simulation(4)	
Fault ride through capability of PPM connected below 110 kV [5.11]	Certificate and Simulation(4)	
Fault ride through capability of PPM connected above 110 kV [5.11]	Certificate and Simulation(4)	
Fast fault current injection at the connection point in case of symmetrical (3-phase) faults [5.11]	Certificate and Simulation(4)	
Capability to take part in island operation [5.13]	Certificate(3)	
Synchronous generator power plants (SPGM, e.g. but not exclusively direct coupled generators in combination with combustion engines, steam/gas turbines)		Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631, as listed
SPGM: Type B except the cases indicated in NTS V2.1	Technical standard for monitoring the compliance of power generating modules	

Anlage zur Akkreditierungsurkunde D-ZE-12089-01-00

Product to certify	Assessment process	Certification basis
Final certificate based on therequirements:	according to EU Regulation 2016/631, as listed above (NTS V2.1).	above(NTS V2.1). Technical standard for monitoring the compliance of power generating modules according to P.O. 12.2 SENP, as listed above (NTS SENP V1.1)
Limited Frequency Sensitive Mode-Overfrequency (LFSM-O) [5.1]	Certificate and Complementary Simulation ⁽²⁾	
Reactive power capability at maximum capacity and belowmaximum capacity [5.7]	Certificate and Complementary Simulation ⁽²⁾	
Fault ride through capability of synchronous generators connected below 110 kV [5.11]	Certificate and Simulation ⁽⁴⁾	
Active power recovery after a fault [5.11]	Certificate and Simulation ⁽⁴⁾	
SPGM: Type C	Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631, as listed above (NTS V2.1).	Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631, as listed above(NTS V2.1). Technical standard for monitoring the compliance of power generating modules according to P.O. 12.2 SENP, as listed above (NTS SENP V1.1)
Final certificate based on therequirements:		
Limited Frequency Sensitive Mode-Overfrequency (LFSM-O) [5.1]	Certificate and Complementary Simulation ⁽²⁾	
Limited Frequency Sensitive Mode-Underfrequency (LFSM-U) [5.2]	Certificate and Complementary Simulation ⁽²⁾	
Frequency Sensitive Mode(FSM) [5.3]	Certificate and Complementary Simulation ⁽²⁾	
Reactive power capability at maximum capacity and belowmaximum capacity [5.7]	Certificate and Complementary Simulation ⁽²⁾	
Active power recovery after a fault [5.11]	Certificate and Simulation ⁽⁴⁾	
Fault ride through capability	Certificate and Simulation ⁽⁴⁾	

Anlage zur Akkreditierungsurkunde D-ZE-12089-01-00

Product to certify	Assessment process	Certification basis
ofsynchronous generators connected below 110 kV [5.11]		
Black start [5.12]	Certificate ⁽³⁾	
Capability to take part in island operation [5.13]	Certificate ⁽³⁾	
Fast re-synchronisation capability [5.14]	Certificate	
SPGM: Type D Final certificate based on the requirements:	Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631, as listed above (NTS V2.1).	<p>Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631, as listed above (NTS V2.1).</p> <p>Technical standard for monitoring the compliance of power generating modules according to P.O. 12.2 SENP, as listed above (NTS SENP V1.1)</p>
Limited Frequency Sensitive Mode-Overfrequency (LFSM-O) [5.1]	Certificate and Complementary Simulation ⁽²⁾	
Limited Frequency Sensitive Mode-Underfrequency (LFSM-U) [5.2]	Certificate and Complementary Simulation ⁽²⁾	
Frequency Sensitive Mode (FSM) [5.3]	Certificate and Complementary Simulation ⁽²⁾	
Reactive power capability at maximum capacity and below maximum capacity [5.7]	Certificate and Complementary Simulation ⁽²⁾	
Power oscillations damping for SPGM [5.9]	Certificate and Simulation	
Active power recovery after a fault [5.11]	Certificate and Simulation ⁽⁴⁾	
Fault ride through capability of synchronous generators connected below 110 kV [5.11]	Certificate and Simulation ⁽⁴⁾	
Fault ride through capability of synchronous generators connected above 110 kV [5.11]	Certificate and Simulation ⁽⁴⁾	
Black start [5.12]	Certificate ⁽³⁾	

Anlage zur Akkreditierungsurkunde D-ZE-12089-01-00

Product to certify	Assessment process	Certification basis
Capability to take part in island operation [5.13]	Certificate ⁽³⁾	
Fast re-synchronisation capability [5.14]	Certificate	
Wind and photovoltaic power plants (PPM) in Spain's non-peninsular territories		<p>Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631, as listed above (NTS V2.1).</p> <p>Technical standard for monitoring the compliance of power generating modules according to P.O. 12.2 SENP, as listed above (NTS SENP V1.1)</p>
PPM: Non-peninsular territories	Technical standard for monitoring the compliance of power generating modules according to P.O. 12.2 SENP, as listed above (NTS SENP V1.1)	
Final certificate based on the requirements:		
Limited Frequency Sensitive Mode-Overfrequency (LFSM-O) [5.1]	Certificate and Complementary Simulation ⁽²⁾	
Limited Frequency Sensitive Mode-Underfrequency (LFSM-U) [5.2]	Certificate and Complementary Simulation ⁽²⁾	
Frequency Sensitive Mode (FSM) [5.3]	Certificate and Complementary Simulation ⁽²⁾	
Remote power control capability and range [5.5]	Certificate	
Inertia emulation [5.6]	Certificate or Simulation ⁽³⁾	
Reactive power capability at maximum capacity and below maximum capacity [5.7]	Certificate and Complementary Simulation ⁽²⁾	
Reactive power control in PPM [5.8]	Certificate and Complementary Simulation	

Anlage zur Akkreditierungsurkunde D-ZE-12089-01-00

Product to certify	Assessment process	Certification basis
	(2)	
Fast fault current injection at the connection point in case of balanced (3-phase) faults and in case of unbalanced (1-phase or 2-phase) faults [5.11]	Certificate and Simulation ⁽⁴⁾	
Power oscillations damping for PPM [5.10]	Certificate and Simulation	
Fault ride through capability of PPM [5.11]	Certificate and Simulation ⁽⁴⁾	
Transient overvoltage withstand capability of PPM [5.11]	Certificate and Simulation ⁽⁴⁾	
Synchronous generator power plants (SPGM, e.g. but not exclusively direct coupled generators in combination with combustion engines, steam/gas turbines) in Spain's non-peninsular territories		
SPGM: Non-peninsular territories	Technical standard for monitoring the compliance of power generating modules according to P.O. 12.2 SENP, as listed above (NTS SENP V1.1)	Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631, as listed above (NTS V2.1).
Final certificate based on the requirements:		Technical standard for monitoring the compliance of power generating modules according to P.O. 12.2 SENP, as listed above (NTS SENP V1.1)
Limited Frequency Sensitive Mode-Overfrequency (LFSM-O) [5.1]	Certificate and Complementary Simulation ⁽²⁾	
Limited Frequency Sensitive Mode-Underfrequency (LFSM-U) [5.2]	Certificate and Complementary Simulation ⁽²⁾	
Frequency Sensitive Mode (FSM) [5.3]	Certificate and Complementary Simulation ⁽²⁾	
Remote power control capability and range [5.5]	Certificate	
Reactive power capability at maximum capacity and	Certificate and Complementary	

Anlage zur Akkreditierungsurkunde D-ZE-12089-01-00

Product to certify	Assessment process	Certification basis
belowmaximum capacity [5.7]	Simulation ⁽²⁾	
Power oscillations damping forPPM [5.9]	Certificate and Simulation	

⁽¹⁾ Simulations are required in cases indicated in NTS.

⁽²⁾ Complementary simulations are required in cases indicated in NTS.

⁽³⁾ Not compulsory requirement in NTS.

⁽⁴⁾ Simulation only needed in cases described in NTS chapter 5.11.1

Verwendete Abkürzungen:

BDEW	Bundesverband der Energie- und Wasserwirtschaft e.V., Berlin (Deutschland)
CEI	Comitato Elettrotecnico Italiano, Mailand, ITA
DIN	Deutsches Institut für Normung e.V.
FGW	Fördergesellschaft Windenergie und andere Dezentrale Energien e.V., Berlin (Deutschland)
OVE	Austrian Electrotechnical Association, Wien, A
VDE	Verband der Elektrotechnik, Elektronik und Informationstechnik e.V., Frankfurt am Main (Deutschland)