

Deutsche Akkreditierungsstelle

Annex to the Accreditation Certificate D-ZE-11326-01-00 according to DIN EN ISO/IEC 17065:2013

Valid from: 23.02.2024

Date of issue: 23.02.2024

Holder of accreditation certificate:

**DEWI-OCC Offshore and Certification Centre GmbH
Contrescarpe 45, 28195 Bremen**

with the location

**DEWI-OCC Offshore and Certification Centre GmbH
Contrescarpe 45, 28195 Bremen**

The certification body meets the requirements of DIN EN ISO/IEC 17065:2013 to carry out the conformity assessment activities listed in this annex. The certification body meets additional legal and normative requirements, if applicable, including those in relevant sectoral schemes, provided that these are explicitly confirmed below.

The management system requirements of DIN EN ISO/IEC 17065 are written in the language relevant to the operations of certification bodies and they conform to the principles of DIN EN ISO 9001.

Certifications of products, processes and services in the fields:

On- and offshore wind turbines and their components; wind turbines, wind farm projects, small wind turbines and grid connection of decentralized power generating units and plants

Without previous information and agreement of the DAkkS- the certification body is allowed to use within the accreditation fields marked with * different revisions of the herewith specified Certification Schemes / Requirements Document.

The certification body maintains a current list of all Certification Schemes / Requirements Document within the flexible scope of accreditation.

This certificate annex is only valid together with the written accreditation certificate and reflects the status as indicated by the date of issue. The current status of any given scope of accreditation can be found in the directory of accredited bodies maintained by Deutsche Akkreditierungsstelle GmbH at <https://www.dakks.de>.

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1. On- and offshore wind turbines and their components; wind turbines, wind farm projects and small wind turbines

Document reference	Document title
ULID-006504 * 2021-12	Composite Material (for the Application in Wind Turbines) Type Approval Scheme
ULID-000037 * 2021-07	Monitoring Systems scheme
ULID 014215 * 2022-04	UL Type & Component Certification Scheme for Wind Turbines
IEC 61400-22 2010-05	Wind Turbines - Part 22: Conformity testing and certification of wind turbines
IS/IEC 61400-22 2018-06	Wind Turbines - Part 22: Conformity testing and certification of wind turbines
IECRE OD-501 * Edition 2.0 2018-05	Type and Component Certification Scheme
IECRE OD-502 * Edition 1.0 2018-10	Project Certification Scheme
Germanischer Lloyd * 2010	Guideline for the Certification of Wind Turbines
Germanischer Lloyd * 2012	Guideline for the Certification of Offshore Wind Turbines
DNV-DSS-904 * 2014-01	Type Certification of Wind Turbines
DNV-OSS-901 * 2012-06	Project Certification
DNV-SE-0074 * 2018-01 AMANDMENT 2021-09	Type and component certification of wind turbines according to IEC 61400-22
DNV-SE-0441 * 2016-06 AMANDMENT 2021-10	Type and component certification of wind turbines
DNV-SE-0073 * 2018-01 AMANDMENT 2021-09	Project certification of wind farms according to IEC 61400-22
DNV-SE-0190 * 2020-10 AMANDMENT 2021-09	Project certification of wind power plants

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Document reference	Document title
DNV-SE-0263 * 2016-03 AMANDMENT 2021-10	Certification of lifetime extension
DNV-SE-0436 * 2018-04 AMANDMENT 2021-09	Shop approval in renewable energy
DNV-SE-0439 * 2016-06 AMANDMENT 2021-10	Certification of condition monitoring
DNV-SE-0448 2021-10	Certification of service and maintenance activities in the wind energy industry
DNV-SE-0422 2021-09	Certification of Floating Wind Turbines
MCS 006 Issue 2.1 2014-01	Microgeneration Certification Scheme (MCS), Product Certification Scheme Requirements: Small Wind Turbines
Renewable UK 2014-01	Small Wind Turbine Standard
AWEA 9.1 Standard 2009	AWEA Small Wind Turbine Performance and Safety Standard
UL 6141 * 2016-05	Wind Turbines Permitting Entry of Personnel
UL 6142 * 2012-11	Standard for Safety for Small Wind Turbines
UL4143 * 2018-02	Standard for Wind Turbine Generator - Life Time Extension (LTE)
JSWTA 0001 2011-11	Small Wind Turbine Performance and Safety Standard (Japan Small Wind Turbine Association Standard)

On the basis of:	
IEC 61400-1 * Edition 4 2019-02	Wind Turbines - Part 1: Design requirements
IEC 61400-2 * Edition 3.0 2013-12	Wind Turbines - Part 2: Small wind turbines
IEC 61400-3 * Edition 1.0 2009-02	Wind turbines - Part 3: Design requirements for offshore wind turbines
IEC 61400-3-1 * Edition 1.0 2019-04	Wind energy generation systems - Part 3-1: Design requirements for fixed offshore wind turbines

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Document reference	Document title
IEC TS 61400-3-2 * Edition 1.0 2019-04	Wind energy generation systems - Part 3-2: Design requirements for floating offshore wind turbines
IEC 61400-4 * Edition 1.0 2012-12	Wind turbines - Part 4: Design requirements for wind turbine gearboxes
IEC 61400-5 * Edition 1.0 2020-06	Wind energy generation systems - Part 5: Wind turbine blades
IEC 61400-6 * Edition 1.0 2020-04	Wind energy generation systems - Part 6: Tower and foundation design requirements
IEC 61400-23 * Edition 1.0 2014-04	Wind turbines - Part 23: Full-scale structural testing of rotor blades
IEC 61400-24 * Edition 2.0 2019-07	Wind Turbines - Part 24: Lightning protection
IEC 61400-25-1 * Edition 2.0 2017-07	Wind turbines - Part 25-1: Communications for monitoring and control of wind power plants - Overall description of principles and models
IEC 61400-25-2 * Edition 2.0 2015-06	Wind turbines - Part 25-2: Communications for monitoring and control of wind power plants - Information models
IEC 61400-25-3 * Edition 2.0 2015-06	Wind turbines - Part 25-3: Communications for monitoring and control of wind power plants - Information exchange models
IEC 61400-25-4 * Edition 2.0 2016-11	Wind turbines - Part 25-4: Communications for monitoring and control of wind power plants - Mapping to communication profile
IEC 61400-25-5 * Edition 2.0 2017-09	Wind turbines - Part 25-5: Communications for monitoring and control of wind power plants - Conformance testing
IEC 61400-25-6 * Edition 2.0 2016-12	Wind turbines - Part 25-6: Communications for monitoring and control of wind power plants - Logical node classes and data classes for condition monitoring
Schriften des DIBt, Reihe B * Heft 8 2012-10	Richtlinie für Windenergieanlagen - Einwirkungen und Standsicherheitsnachweise für Turm und Gründung. - Korrigierte Fassung März 2015
DIN EN 50308 VDE 0127-100 * 2005-03 and technical Corrigendum 1 2008-11	Wind turbines - Protective measures - Requirements for design, operation and maintenance

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Document reference	Document title
ISO 13849-1 * 2015-12	Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design
ISO 13849-2 * 2012-10	Safety of machinery - Safety-related parts of control systems - Part 2: Validation
BSH 7004 * 2. Fortschreibung 2014-02	Standard Baugrunderkundung, Mindestanforderungen an die Baugrunderkundung und -untersuchung für Offshore-Windenergieanlagen, Offshore-Stationen und Stromkabel
BSH 7005 * 2015-07	Standard - Design of Offshore Wind Turbines with the supplements for "Construction Guidance", "Amendment Chapter 4", "Note on Grouted Connections" and "Note on Noise during Installation"
Danish Energy Agency * 2020-11	Executive Order from the Danish Ministry for Climate, Energy and Buildings No. 1773 dated 2020-11-30: "Bekendtgørelse om teknisk certificeringsordning for vindmøller" (Executive Order on a technical certification scheme for wind turbines)
DNVGL-RP-0363 * Rev. 4 Edition 2016-04	Recommended Practice Extreme temperature conditions for wind turbines
Germanischer Lloyd * Rev. 4 2011-10	GL Wind-Technical Note 067 - certification of wind turbines for extreme temperatures (here: cold climate)

2. Certification of grid connection of decentralized power generating units and plants in the field of renewable energies

Document reference	Document title
37-GC-P0853 Issue 9.0 2021-01	Evaluation of Grid Code Compliance
37-GC-P0867 Issue 1.0 2019-12 (international)	Global Certification Policy for Hybrid Power Systems

On the basis of:	
AS/NZS 4777.1 2016-09	Grid connection of energy systems inverters Part 1: Installation requirements
AS/NZS 4777.2 2015-10	Grid connection of energy systems via inverters Part 2: Inverter requirements
AS/NZS 4777.3 2005-05	Grid connection of energy systems via inverters Part 3: Grid protection requirements
EN50549-1 * 2020-10	Anforderungen für den Parallelbetrieb mit einem Verteilnetz vorgesehene Erzeugungsanlagen - Teil 1: Anschluss an das Niederspannungsverteilstromnetz bis einschließlich Typ B

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On the basis of:	
EN50549-1 * 2020-10	Anforderungen für den Parallelbetrieb mit einem Verteilnetz vorgesehene Erzeugungsanlagen - Teil 1: Anschluss an das Niederspannungsverteilstromnetz bis einschließlich Typ B
EN50549-2 * 2020-10	Anforderungen für zum Parallelbetrieb mit dem Verteilnetz vorgesehene Erzeugungsanlagen - Teil 2: Anschluss an das Mittelspannungsverteilstromnetz für Erzeugungsanlagen mit einschließlich Typ B
Engineering Recommendation G99 * Issue 1 Amendment 8 2021-09	Requirements for the connection of generation equipment in parallel with public distribution networks on or after 27 April 2019, energy network association
Engineering Recommendation G98 * Issue 1 Amendment 6 2021-09	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, energy network association
FGW-TG8, Rev. 9 * 2019-02	Technical Guidelines for Power Generating Units and Systems - Part 8 (TG8): Certification of the Electrical Characteristics of Power Generating Units and Systems in the Medium-, High- and Extra-High voltage Grids
FGW-TG4 , Rev. 9 * 2019-02	Technical Guidelines for Power Generating Units and Systems - Part 4 (TG4): Demands on Modeling and Validating Simulation Models of the Electrical Characteristics of Power Generating Units and Systems
VDE-AR-N 4105 * 2018-11	Generators connected to the low-voltage distribution network – Technical requirements for the connection to and parallel operation with low-voltage distribution networks
VDE-AR-N 4110 * 2018-11	Technical requirements for the connection and operation of customer installations to the medium voltage network (TAR medium voltage)
VDE-AR-N 4120 * 2018-11	Technical requirements for the connection and operation of customer installations to the high-voltage network (TCC High-Voltage)
VDE-AR-N 4130 * 2018-11	Technical requirements for the connection and operation of customer installations to the extra high voltage network (TAR extra high voltage)
CEI 0-16 * 2022-03	Reference technical rules for the connection of active and passive consumers to the HV and MV electrical networks of distribution Company

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On the basis of:	
CEI 0-21 * 2022-03	Reference technical rules for the connection of active and passive users to the LV electrical Utilities
The Grid Code Issue 5 Revision 38 2019-09	UK Grid Code by NETS for Power Generating Units and Stations >1MW
South African Grid Code Version 3.0 2019-08	Grid Connection Code for Renewable Power Plants (RPPs) connected to the Electricity Transmission System (TS) or the Distribution System (DS) in South Africa
PO 12.2 * 2018-02	Installations connected to the transmission network and equipment generator: minimum requirements for design, equipment, operation, commissioning and safety, operation, commissioning and safety PO 12.2 (SENP)
PO 12.3 * 2006-10	General Secretary of Energy, for which the operating procedure 12.3 Requirements for response to voltage dips approved wind farms
(EU) 2016/631 2016-07	Regulation (EU) 2016/631: Network Code on requirements for connection of generators to the network
NTS V2.1 * 2021-07	Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631 (Norma técnica de supervisión de la conformidad de los módulos de generación de electricidad según el Reglamento UE 2016-631) (Type of certified products and assessment activities for certification are described in Table 1) Including Annex on subsections 5.6, 5.9 and 5.10 of version 2.1 (of the 7/9/2021) of the NTS, dated 2021-11-18
NTS SENP V1.1 * 2021-07	Technical standard for monitoring the compliance of power generating modules according to P.O. 12.2 SENP (Norma técnica de supervisión de la conformidad de los módulos de generación de electricidad según el P.O. 12.2 SENP) (Type of certified products and assessment activities for certification are described in Table 1)
SAGC Issue 2 2014-03	The Saudi Arabian Grid Code Issue 02 - Revision 01 - March 2014
1 st SAGC 2016-05	The Saudi Arabian Grid Code 1 st Electronic Update as of May 2016
2 nd SAGC 2016-10	The Saudi Arabian Grid Code 2 nd Electronic Update as of October 2016
3 rd SAGC 2017-06	The Saudi Arabian Grid Code (3 rd) Electronic Update as of June 2017

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On the basis of:	
4 th SAGC 2020-02	The Saudi Arabian Grid Code (4 th) Electronic Update as of February 2020
BDEW * 2008-06	Technical Guideline, Generating Plants Connected to the Medium-Voltage Network with FNN supplement, 2009-01, including the 2 nd supplement 2010-07, 3 rd supplement 2011-02, 4 th supplement 2013-01
12/X/STD(CONN)/GM/CEA 2007-02	Central Electricity Authority (Technical Standards for connectivity to the Grid) Regulations, 2007
12/X/STD(CONN)/GM/CEA 2013-10	Central Electricity Authority (Technical Standards for connectivity to the Grid) Amendment Regulations, 2013
12/X/STD(GRID)/GM/CEA 2010-06	Central Electricity Authority (Grid Standards), Regulations 2010
12/X/STD(CONN)/GM/CEA/ 2018 2019-02	Central Electricity Authority (Grid Standards), Regulations 2019
Dutch Grid Code 2020-04	Electricity Netcode, valid from 04-04-2020 until now
RoGA 2018-12	The general operational requirements resulting from Commission Regulation (EU) 2016/631 of 14 April 2016 establishing a network code on requirements for grid connection of generators
EqC V1.2 2021-04	Implementation of the requirements under the Commission Regulation (EU) 2016/631 of 14 April 2016 establishing a network code on requirements for grid connection of generators”, Version 1.2
NL Regulation V1.1 2019-12	Power-Generating Modules compliance verification Power-Generating Modules type B, C and D according to NC RfG and Netcode elektriciteit
PVVC Vers.11 * 2018-09	Verification, Validation and Certification Procedures for the Requirements of OP 12.3 and PO12.2 SENP on the response of the Wind and Photovoltaic Facilities in the Face of Hollows Tensile
Orden TED/749 2020	Orden TED/749/2020, de 16 de julio, por la que se establecen los requisitos técnicos para la conexión a la red necesarios para la implementación de los códigos de red de conexión.
Real Decreto 647 2020	Real Decreto 647/2020, de 7 de julio, por el que se regulan aspectos necesarios para la implementación de los códigos de red de conexión de determinadas instalaciones eléctricas.

Table 1: Type of products and the evaluation activities for the certification according to the Spanish NTS standards

Product to certify	Assessment process	Certification basis
<p>PGU: Photovoltaic inverter</p> <p>Limited Frequency Sensitive Mode-Overfrequency (LFSM-O) [5.1]</p> <p>Limited Frequency Sensitive Mode-Underfrequency (LFSM-U) [5.2]</p> <p>Frequency Sensitive Mode (FSM) [5.3]</p> <p>Remote active power control capability and range [5.5]</p> <p>Reactive power capability at maximum capacity and below maximum capacity [5.7]</p> <p>Reactive power control in PPM [5.8]</p> <p>Active power recovery after a fault [5.11]</p> <p>Fault ride through capability of PPM connected below 110 kV [5.11]</p> <p>Fault ride through capability of PPM connected above 110 kV [5.11]</p> <p>Fast fault current injection at the connection point in case of symmetrical (3-phase) faults [5.11]</p>	<p>Test and/or Simulation ⁽¹⁾</p> <p>Test and/or Simulation ⁽¹⁾</p> <p>Test and/or Simulation ⁽¹⁾</p> <p>Test</p> <p>Test</p> <p>Test</p> <p>Test</p> <p>Test</p> <p>Test</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>

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Product to certify	Assessment process	Certification basis
<p>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)</p> <p>Transient overvoltage withstand capability of PPM [5.11] (only for NTS SENP V1.1)</p> <p>Capability to take part in island operation [5.13]</p>	<p>Test</p> <p>Test</p> <p>Simulation⁽³⁾</p>	
<p>PGU: Wind turbine</p> <p>Limited Frequency Sensitive Mode-Overfrequency (LFSM-O) [5.1]</p> <p>Limited Frequency Sensitive Mode-Underfrequency (LFSM-U) [5.2]</p> <p>Frequency Sensitive Mode (FSM) [5.3]</p> <p>Remote active power control capability and range [5.5]</p> <p>Reactive power capability at maximum capacity and below maximum capacity [5.7]</p> <p>Reactive power control in PPM [5.8]</p> <p>Active power recovery after a fault [5.11]</p> <p>Fault ride through capability of PPM connected below 110 kV [5.11]</p>	<p>Test and/or Simulation ⁽¹⁾</p> <p>Test and/or Simulation ⁽¹⁾</p> <p>Test and/or Simulation ⁽¹⁾</p> <p>Test</p> <p>Test</p> <p>Test</p> <p>Test</p> <p>Test</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>

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Product to certify	Assessment process	Certification basis
<p>Fault ride through capability of PPM connected above 110 kV [5.11]</p> <p>Fast fault current injection at the connection point in case of symmetrical (3-phase) faults [5.11]</p> <p>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)</p> <p>Transient overvoltage withstand capability of PPM [5.11] (only for NTS SENP V1.1)</p> <p>Capability to take part in island operation [5.13]</p>	<p>Test</p> <p>Test</p> <p>Test</p> <p>Test</p> <p>Simulation⁽³⁾</p>	
<p>PGU: Synchronous generator (e.g. but not exclusively direct coupled generators in combination with combustion engines, steam/gas turbines)</p> <p>Limited Frequency Sensitive Mode-Overfrequency (LFSM-O) [5.1]</p> <p>Limited Frequency Sensitive Mode-Underfrequency (LFSM-U) [5.2]</p> <p>Frequency Sensitive Mode (FSM) [5.3]</p> <p>Remote active power control capability and range [5.5] (only for NTS SENP V1.1)</p>	<p>Test and/or Simulation ⁽¹⁾</p> <p>Test and/or Simulation ⁽¹⁾</p> <p>Test and/or Simulation ⁽¹⁾</p> <p>Test</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>

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Product to certify	Assessment process	Certification basis
<p>Reactive power capability at maximum capacity and below maximum capacity [5.7]</p> <p>Power oscillation damping control [5.9]</p> <p>Active power recovery after a fault [5.11]</p> <p>Fault ride through capability of SPGM connected below 110 kV [5.11]</p> <p>Fault ride through capability of SPGM connected above 110 kV [5.11]</p> <p>Black start [5.12]</p> <p>Capability to take part in island operation [5.13]</p> <p>Fast re-synchronisation capability [5.14]</p>	<p>Test</p> <p>Simulation</p> <p>Test</p> <p>Test</p> <p>Test</p> <p>Test⁽³⁾</p> <p>Simulation⁽³⁾</p> <p>Test</p>	
<p>ACPGM: STATCOM</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 4.6.1.1</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>ACPGM: PPC</p>	<p>Technical standard for monitoring the compliance of power generating</p>	<p>Technical standard for monitoring the compliance of power generating modules</p>

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Product to certify	Assessment process	Certification basis
	<p>modules according to EU Regulation 2016/631, as listed above (NTS V2.1).</p> <p>Chapter 4.6.2.1</p>	<p>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>ACPGM: Synchronous compensator</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 4.6.3.1</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>ACPGM: 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 4.6.4</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>

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Product to certify	Assessment process	Certification basis
Validation of PGM simulation model	Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631, as listed above (NTS V2.1). Chapter 6.1	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)
Validation of PGU simulation model (photovoltaic inverter, wind turbine, synchronous generators)	Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631, as listed above (NTS V2.1). Chapter 6.2	
Validation of ACPGM simulation model (PPC, STATCOM, synchronous compensator, battery storage systems)	Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631, as listed above (NTS V2.1). Chapter 6.3	
Simulations of PGU (photovoltaic, wind turbines, synchronous generator) or ACPGM (PPC, STATCOM, synchronous compensator, battery storage systems) for Simulation Model Validation	Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631, as listed above (NTS V2.1). Chapter 6.2 and 6.3	
Wind and photovoltaic power plants (PPM)		
PPM: Type B except the cases indicated in NTS V2.1 Final certificate based on the requirements: Limited Frequency Sensitive Mode-Overfrequency (LFSM-O) [5.1] Reactive power capability at maximum capacity and below maximum capacity [5.7]	Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631, as listed above (NTS V2.1). Certificate and Complementary Simulation ⁽²⁾ Certificate and Complementary Simulation ⁽²⁾	Technical standard for monitoring the compliance of power generating modules according to EU Regulation 2016/631, as listed above (NTS V2.1).

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

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Product to certify	Assessment process	Certification basis
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 ⁽³⁾	
<p>PPM: Type D</p> <p>Final certificate based on the requirements:</p> <p>Limited Frequency Sensitive Mode-Overfrequency (LFSM-O) [5.1]</p> <p>Limited Frequency Sensitive Mode-Underfrequency (LFSM-U) [5.2]</p> <p>Frequency Sensitive Mode (FSM) [5.3]</p> <p>Remote active power control capability and range [5.5]</p> <p>Inertia emulation [5.6]</p> <p>Reactive power capability at maximum capacity and below maximum capacity [5.7]</p> <p>Reactive power control in PPM [5.8]</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>Certificate and Complementary Simulation⁽²⁾</p> <p>Certificate and Complementary Simulation⁽²⁾</p> <p>Certificate and Complementary Simulation⁽²⁾</p> <p>Certificate</p> <p>Certificate or Simulation⁽³⁾</p> <p>Certificate and Complementary Simulation⁽²⁾</p> <p>Certificate and Complementary Simulation⁽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>

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Product to certify	Assessment process	Certification basis
Power oscillations damping for PPM [5.8] Active power recovery after a fault [5.11]	Certificate or Simulation Certificate and Simulation ⁽⁴⁾	
Fault ride through capability of PPM connected below 110 kV [5.11] Fault ride through capability of PPM connected above 110 kV [5.11] Fast fault current injection at the connection point in case of symmetrical (3-phase) faults [5.11] Capability to take part in island operation [5.13]	Certificate and Simulation ⁽⁴⁾ Certificate and Simulation ⁽⁴⁾ Certificate and Simulation ⁽⁴⁾ Certificate ⁽³⁾	
<p>Synchronous generator power plants (SPGM, e.g. but not exclusively direct coupled generators in combination with combustion engines, steam/gas turbines)</p>		
<p>SPGM: Type B except the cases indicated in NTS V2.1</p> <p>Final certificate based on the requirements:</p> <p>Limited Frequency Sensitive Mode-Overfrequency (LFSM-O) [5.1]</p> <p>Reactive power capability at maximum capacity and below maximum capacity [5.7]</p> <p>Fault ride through capability of synchronous generators connected below 110 kV [5.11]</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>Certificate and Complementary Simulation ⁽²⁾</p> <p>Certificate and Complementary Simulation ⁽²⁾</p> <p>Certificate and Simulation⁽⁴⁾</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>
Active power recovery after a fault [5.11]	Certificate and Simulation ⁽⁴⁾	

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Product to certify	Assessment process	Certification basis
<p>SPGM: Type C</p> <p>Final certificate based on the requirements:</p> <p>Limited Frequency Sensitive Mode-Overfrequency (LFSM-O) [5.1]</p> <p>Limited Frequency Sensitive Mode-Underfrequency (LFSM-U) [5.2]</p> <p>Frequency Sensitive Mode (FSM) [5.3]</p> <p>Reactive power capability at maximum capacity and below maximum capacity [5.7]</p> <p>Active power recovery after a fault [5.11]</p> <p>Fault ride through capability of synchronous generators connected below 110 kV [5.11]</p> <p>Black start [5.12]</p> <p>Capability to take part in island operation [5.13]</p> <p>Fast re-synchronisation capability [5.14]</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>Certificate and Complementary Simulation ⁽²⁾</p> <p>Certificate and Complementary Simulation ⁽²⁾</p> <p>Certificate and Complementary Simulation ⁽²⁾</p> <p>Certificate and Complementary Simulation ⁽²⁾</p> <p>Certificate and Simulation⁽⁴⁾</p> <p>Certificate and Simulation⁽⁴⁾</p> <p>Certificate⁽³⁾</p> <p>Certificate⁽³⁾</p> <p>Certificate</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>SPGM: Type D</p> <p>Final certificate based on the requirements:</p> <p>Limited Frequency Sensitive Mode-Overfrequency (LFSM-O) [5.1]</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>Certificate and Complementary Simulation ⁽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>

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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⁾	
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⁾	
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		
PPM: Non-peninsular territories 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)	Technical standard for monitoring the compliance of

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Product to certify	Assessment process	Certification basis
Limited Frequency Sensitive Mode-Overfrequency (LFSM-O) [5.1]	Certificate and Complementary Simulation ⁽²⁾	power generating modules according to P.O. 12.2 SENP, as listed above (NTS SENP V1.1)
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 ⁽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		

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Product to certify	Assessment process	Certification basis
<p>SPGM: Non-peninsular territories</p> <p>Final certificate based on the requirements:</p> <p>Limited Frequency Sensitive Mode-Overfrequency (LFSM-O) [5.1]</p> <p>Limited Frequency Sensitive Mode-Underfrequency (LFSM-U) [5.2]</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>Certificate and Complementary Simulation ⁽²⁾</p> <p>Certificate and Complementary Simulation ⁽²⁾</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>Frequency Sensitive Mode (FSM) [5.3]</p> <p>Remote power control capability and range [5.5]</p> <p>Reactive power capability at maximum capacity and below maximum capacity [5.7]</p> <p>Power oscillations damping for PPM [5.9]</p>	<p>Certificate and Complementary Simulation ⁽²⁾</p> <p>Certificate</p> <p>Certificate and Complementary Simulation⁽²⁾</p> <p>Certificate and Simulation</p>	

⁽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.

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Abbreviations used:

ACPGM	Additional components of the PGM (in Spanish: CAMGE)
AR	Anwendungsregel
AS/NZS	Australian / New Zealand Standard, Committee EL-043, Renewable Energy Power Supply Systems and Equipment
AWEA	American Wind Energy Association
BDEW	Bundesverband der Energie- und Wasserwirtschaft e.V.
BSH	Bundesamt für Seeschifffahrt und Hydrographie
CEA	Central Electricity Authority
CEI	Comitato Elettrotecnico Italiano
DIBt	Deutsches Institut für Bautechnik
EqC	Equipment Certificate
FERC	Federal Energy Regulatory Commission
FGW	FGW e.V. - Fördergesellschaft Windenergie und andere Erneuerbare Energien
IEC	International Electrotechnical Commission
JSWTA	Japan Small Wind Turbine Association Standard
MCS	Microgeneration Certification Scheme
NTS	Norma Técnica de Supervisión
PGM	Power Generating Module (in Spanish: MGE)
PGU	Power Generating Unit (in Spanish: UGE)
PPM	Power Park Module (in Spanish: MPE)
PPC	Power Plant Controller
P.O.	Procedimiento de operación Ministerio de Industria, Spain
PVVC	Procedure for verification validation and certification
Renewable UK	Formerly known as: British Wind Energy Association, Small Wind Turbine Performance and Safety Standard
RoGA	Requirements of Generator Application
SAGC	Saudi Arabian Grid Code, National Grid SA, Electricity & CO-Generation Regulation Authority
SENP	Sistema Eléctrico No Peninsular
SPGM	Synchronous Power Generating Module (in Spanish: MGES)
STATCOM	Static Synchronous Compensator
UL	Underwriters Laboratories
VDE	Verband der Elektrotechnik, Elektronik und Informationstechnik
37-GC-P0xxx	Certification procedures of DEWI-OCC Offshore and Certification Centre GmbH