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Sistemi za proizvodnjo vetrne energije - 40. del: Elektromagnetna združljivost (EMC) - Zahteve in preskusne metode

Wind energy generation systems - Part 40: Electromagnetic compatibility (EMC) - Requirements and test methods

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33.100.01	Elektromagnetna združljivost na splošno	Electromagnetic compatibility in general

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TITLE:

Wind energy generation systems - Part 40: Electromagnetic Compatibility (EMC) - Requirements and test methods

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

WIND ENERGY GENERATION SYSTEMS -

Part 40: Electromagnetic compatibility (EMC) - Requirements and test method

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The text of this International Standard is based on the following documents:

Enquiry draft	Report on voting
XX/XX/FDIS	XX/XX/RVD

- 50 Full information on the voting for the approval of this International Standard can be found in
51 the report on voting indicated in the above table.
- 52 This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.
- 53 The committee has decided that the contents of this publication will remain unchanged until
54 the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data
55 related to the specific publication. At this date, the publication will be
- 56 • reconfirmed,
57 • withdrawn,
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1 1 Scope

2 This part of IEC 61400 provides the EMC requirements and test methods that apply to the
3 individual wind turbine and all the sub systems which are part of the wind turbine.

4 The current document applies to measurements on individual wind turbines and not multiple
5 wind turbines.

6 This standard defines the requirements and test methods for the verification of the wind
7 turbine performance against radiated emissions and the immunity of their components against
8 conducted and radiated phenomena.

9 2 This standard is applicable to wind turbines to be installed at offshore and 10 onshore locations. Normative references

11 The following documents are referred to in the text in such a way that some or all of their
12 content constitutes requirements of this document. For dated references, only the edition
13 cited applies. For undated references, the latest edition of the referenced document (including
14 any amendments) applies.

15 CISPR 11: 2024, Industrial, scientific and medical equipment - Radio-frequency disturbance
16 characteristics - Limits and methods of measurement.

17 IEC 61000-4-2:2008, Electromagnetic compatibility (EMC) - Part 4-2: Testing and
18 measurement techniques - Electrostatic discharge immunity test.

19 IEC 61000-4-3:2020, Electromagnetic compatibility (EMC) - Part 4-3: Testing and
20 measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test.

21 IEC 61000-4-4:2012, Electromagnetic compatibility (EMC) - Part 4-4: Testing and
22 measurement techniques - Electrical fast transient/burst immunity test.

23 IEC 61000-4-5:2014+AMD1:2017 CSV, Electromagnetic compatibility (EMC) - Part 4-5:
24 Testing and measurement techniques - Surge immunity test.

25 IEC 61000-4-6:2023, Electromagnetic compatibility (EMC) - Part 4-6: Testing and
26 measurement techniques - Immunity to conducted disturbances, induced by radio-frequency
27 fields.

28 IEC 61000-4-8:2009, Electromagnetic compatibility (EMC) - Part 4-8: Testing and
29 measurement techniques - Power frequency magnetic field immunity test.

30 IEC 61000-4-11:2020-COR:2022, Electromagnetic compatibility (EMC) - Part 4-11: Testing
31 and measurement techniques - Voltage dips, short interruptions and voltage variations
32 immunity tests.

33 IEC 61000-4-34:2005+AMD1:2009 CSV, Electromagnetic compatibility (EMC) - Part 4-34:
34 Testing and measurement techniques - Voltage dips, short interruptions and voltage
35 variations immunity tests for equipment with mains current more than 16 A per phase.

36 CISPR 16-2-3: 2016+AMD1:2019+AMD2:2023 CSV, Specification for radio disturbance and
37 immunity measuring apparatus and methods - Part 2-3: Methods of measurement of
38 disturbances and immunity - Radiated disturbance measurements

39 IEC 61000-6-2:2016, Generic standards - Immunity standard for industrial environments

40 CISPR 16-1-1:2019. Radio disturbance and immunity measuring apparatus

41 IEC 61400-1: wind turbines - Part 1: Design requirements

42 IEC 61400-2: wind turbines - Part 2: Small wind turbines.

43 IEC 61400-24:2019, wind turbines - Part 24: Lightning protection.

44 CISPR TR 16-2-5: 2008, Specification for radio disturbance and immunity measuring
45 apparatus and methods - Part 2-5: In situ measurements for disturbing emissions produced by
46 physically large equipment

47 CISPR 16-4-2: 2011+AMD1:2014+AMD2:2018 CSV, Specification for radio disturbance and
48 immunity measuring apparatus and methods - Part 4-2: Uncertainties, statistics and limit
49 modelling - Measurement instrumentation uncertainty

50 IEC 61400-21-1:2019, Wind energy generation systems - Part 21-1: Measurement and
51 assessment of electrical characteristics – wind turbines

52 **3 Terms and definitions**

53 For the purposes of this document, the following terms and definitions apply.

54 ISO and IEC maintain terminological databases for use in standardization at the following
55 addresses:

- 56 • IEC Electropedia: available at www.electropedia.org/
- 57 • ISO Online browsing platform: available at www.iso.org/obp
- 58 • IEC 61400-1
- 59 • IEC 61400-2
- 60 • CISPR 11

61 **4 Symbols and units**

62 Only generic symbols and units are used in this document.

63 **5 Abbreviations**

64 Only generic abbreviations are used in this document.

65 **6 Operating conditions during testing.**

66 Operating conditions specific for this standard are included in the relevant chapters.

67 7 Emission requirements

68 7.1 General

69 The wind turbine shall fulfil the emission requirements of this standard.

70 All subsystems shall fulfil the emission requirements of their product standard, product family
71 standards or the relevant generic standard.

72 7.2 Conducted Emissions

73 For radio protection purposes the magnetic field emissions of the whole wind turbine
74 enclosure are measured in this frequency range.

75 7.3 Radiated Emissions

76 7.3.1 General

77 Due to continuous variation of wind speed and other external influences the emissions of wind
78 turbines may vary during the measurements. Ambient signals and noise shall be distinguished from
79 emissions of the wind turbine.

80 An overview of a recommended test sequence is given in Figure 1 and Table 1.

81 Description of Figure 1:

82 The measurements shall be executed under the following conditions:

- 83 • Reference points and orientations of the antenna are given in 7.3.7.
- 84 • The adjustments of the EMI-Receiver are given in 7.3.7
- 85 • The operation modes of the wind turbine are given in 7.3.8.
- 86 • To distinguish the emission of the wind turbine from prevailing ambient emissions, all
87 measurements on one reference point of the antenna should be executed in sequence in
88 one (short time) block like shown in table 1. This to ensure minimum natural ambient
89 emissions variations influencing the measurements. The assessment for ambient
90 emission detection given in CISPR 16-2-3 Annex A4.3 to A5 shall be used.
- 91 • Discontinuous disturbances which occur sporadically shall be disregarded, like described
92 in CISPR 16-2-3 chapter 6.5.1.
- 93 • All measurements can be repeated multiple times.

94

95