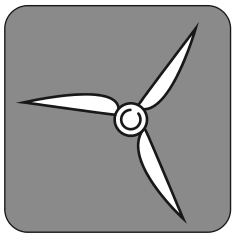
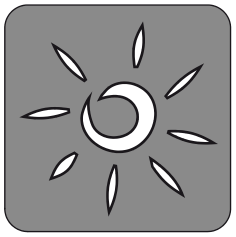
Technical Guidelines
for Power Generating Units and Systems

PART 9 (TG 9)





Determination of
High Frequency Emissions from
Renewable Power Generating Units

Revision 01
Dated 18/04/2016

FGW
renewable energies

Published by:
FGW e.V.
Fördergesellschaft Windenergie
und andere Erneuerbare Energien

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This guideline is an English translation of a prior German version. In any case of difference between both revisions of TR 9 the German version is valid. In the interest of easier legibility, a gender-neutral differentiation is not used here. Any gender-specific terminology always refers to both genders.

The following parts of the FGW Technical Guidelines are available:

Part 1: Determination of Noise Emission Values

Part 2: Determination of Power Curves and Standardised Energy Yield

Part 3: Determination of the Electrical Characteristics of Power Generating Units and Systems in MV, HV and EHV Grids

Part 4: Demands on Modelling and Validating Simulation Models of the Electrical Characteristics of Power Generating Units and Systems

Part 5: Determination and Application of Reference Yield

Part 6: Determination of Wind Potential and Energy Yield

Part 7: Operation and Maintenance of Power Plants for Renewable Energy

- **Category A:** Miscellaneous section
- **Category B3:** Specialist application notes for monitoring and testing foundations and supporting structures for wind turbines
- **Category D2:** State Event Cause Code for Power Generating Units (Zustands-Ereignis-Ursachen-Schlüssel; ZEUS)
- **Category D3:** Global Service Protocol (GSP)
- **Category D3 – Attachment A:** XML schema documentation

Part 8: Certification of the Electrical Characteristics of Power Generating Units and Systems in Medium-, High- and Highest-voltage Grids

Part 9: Determination of High Frequency Emissions from Renewable Power Generating Units

Foreword

The preparation of the Technical Guidelines at the FGW e.V. - Fördergesellschaft Windenergie und andere Erneuerbare Energien (in short: FGW) began in 1992 with the aim of presenting measuring methods allowing determination of reliable and comparable data for wind turbines (WTs) based on state-of-the-art technology. The measurements cover the fields of: power curve, noise emissions and electrical characteristics. The guidelines should serve as the foundation for assessment of WTs, e.g. in permit issues, when assessing grid connection options or for reliable yield calculations.

In the meantime, the individual Technical Guidelines and the test reports compiled by independent measuring institutes are widely recognised in their fields. Power curves form the basis for purchase agreements and finance commitments, measured noise emission values are adopted both for sales contracts and are used in the course of approval procedures, and the measured electrical characteristics are required by the transmission system operators for the purpose of calculations with regard to connections to their grids. In addition, the variety of power generating units has been extended with photovoltaic systems and combustion engines.

With the entry into force of these Technical Guidelines, another significant contribution to the legal security of operating power generating units has been achieved. This measuring regulation provides the basis for manufacturers and operators to provide evidence that EU-DIRECTIVE 2004/30/EU [14] and its national implementation into German law (Electromagnetic Compatibility of Equipment Act – EMC law) [12] are being observed.

Compilation of these guidelines

The contents of the Technical Guidelines are the responsibility of the respective technical committees and working groups. The following were involved in the compilation of these guidelines by the working groups:

- Manufacturers of 'power generating units' (in short: PGUs) and their components
- Operators of PGUs
- Institutes and universities
- Independent measuring institutes
- Engineering consultancies
- FGW e.V. - Fördergesellschaft Windenergie und andere Erneuerbare Energien.

Measurements and their recognition

Measurements in accordance with the Technical Guidelines can be carried out by any qualified measuring institute. A test report covering the measurements must be compiled. The significant results can be summarised in a test report extract applying the specifications provided in these guidelines (FGW master data sheet). It should be noted that, over and above the specifications described in these Technical Guidelines, the agency requested to recognise the measurements may place further demands on the measuring institute. For example, certifiers of PGU measurements require measuring institutes accredited to DIN EN ISO/IEC 17025 [17].

FGW conformity

Independent measuring institutes can emphasise the quality of their work by the use of a conformity seal. The seal is applied at the bottom of the test report (or extract from the test report). After supplying a proof of certain quality characteristics, independent measuring institutes can apply for an entitlement to use the conformity seal. These quality characteristics are published on the FGW e.V. website.

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