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**INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

DL/T 691-2019

**Calculation method of radio interference from high voltage
overhead power transmission lines**

高压架空输电线路无线电干扰计算方法

(English Translation)

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Foreword

This standard is revised on the basis of DL/T 691-1999 "Calculation Method for Radio Interference of High Voltage Overhead Transmission Lines". This revision the relevant contents of DL/T 691-1999 are included in this standard.

The main changes of this standard compared with DL/T 691-1999 are as follows.

- The range of radio interference calculation is extended to 1000kV;
- Extend the calculation formula of radio interference empirical method for double-circuit transmission lines on the same tower to the radio interference experience of multi-circuit transmission lines on the same tower Method calculation formula - Explain and refine the calculation steps of using excitation function method to calculate radio interference;
- Proposed the radio interference excitation function based on the UHV corona cage test in my country;
- The "same pole" in the original standard is changed to "same tower";
- The "power transmission" in the original standard has been changed to "power transmission".

This standard replaces DL/T 691-1999 from the date of implementation.

Appendix A and Appendix B of this standard are informative appendices.

This standard was proposed by the Standardization Management Center of the China Electricity Council.

This standard is under the jurisdiction and interpretation of the National Electromagnetic Compatibility Standardization Technical Committee (SAC/TC 246).

The organization responsible for drafting this standard. China Electric Power Research Institute Co., Ltd., North China Electric Power University, State Grid Co., Ltd., Power Planning Design Institute, State Grid Electric Power Research Institute Wuhan Nanrui Co., Ltd., State Grid Shandong Electric Power Company Electric Power Research Institute.

1 Scope

This standard recommends calculation methods for radio interference from high-voltage overhead transmission lines.

This standard is applicable to the calculation of radio interference of overhead transmission lines with voltage levels of 110kV~1000kV in normal operation.

The radio interference of transmission lines above 500m above sea level should be considered for correction.

2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version applies to this document.

For undated references, the latest version (including all amendments) applies to this document.

GB/T 4365-2003 Electrotechnical terminology electromagnetic compatibility (IEC 60050-161:1990, IDT) GB/T 15707-2017 Radio interference limits for high-voltage AC overhead transmission lines

3 Terms and definitions

The terms and definitions defined in GB/T 4365-2003 and GB/T 15707-2017 apply to this document.

4 Calculation of radio interference from AC transmission lines split and below

4.1 Calculation formula of radio interference field strength of single-phase conductor

4.2 Calculation formula for radio interference field strength of single circuit transmission line where.

E_i --the radio interference field strength at the direct distance D_i from the i -th phase conductor, in dB ($\mu\text{V/m}$);

$g_{\text{max}i}$ --the maximum effective value of the potential gradient on the surface of the i -th phase conductor, in kV/cm;

D_i --the direct distance from the i -th phase conductor to the reference point P (2m above the ground) (see Figure 1), in m;

r_i --The radius of the sub-conductor of the i th phase conductor, in cm;

x_i --The projection distance from point P to the i -th phase conductor, in m;

h_i --the minimum height of the wire to the ground, in m.

The radio interference field strength of the three-phase line is calculated according to the following calculation method. if the field strength of one phase is at least 3dB greater than the other two phases, then the latter can be ignored. The radio interference field strength of the three-phase line can be considered equal to the maximum one-phase field strength, otherwise the following formula.

4.3 Calculation formula for radio interference of multi-circuit transmission lines on the same tower for multi-circuit transmission lines on the same tower, the radio interference generated by each phase conductor in the multiphase conductor can be calculated according to formula (2), and the field strengths generated by the phases of the same name are geometrically added.

5.1 Overview

Based on the excitation function under heavy rain measured by the test line or corona cage, through a certain mode conversion, the radio of each phase wire is obtained Interference current, and then obtain the field generated by these currents, that is, radio interference. The calculation steps include. calculation of excitation function and modification of meteorological influence Positive; Calculate the distribution of radio interference field strength through mode conversion.

5.4 Calculation of radio interference field strength

There is a magnetic field H around the current-carrying conductor. There is a certain relationship between the high-frequency electric field and the magnetic field. The relationship between the magnetic field strength and the current is (see Figure 2).

7 Calculation of radio interference spectrum characteristics

Appendix C

(Informative appendix) Detailed calculation process of mode conversion method Calculate wire current distribution and radio interference using the method of analog conversion.