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Conformance assessment of radio base stations regarding lightning protection and earthing

Recommendation ITU-T K.119



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Recommendation ITU-T K.119

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Summary

Recommendation ITU-T K.119 provides the technical requirements and measurement methods to assess the validity and reliability of the lightning protection and earthing system of radio base stations (RBSs). It focuses on the quality control in the process of construction, acceptance, inspection and maintenance.

Normally, the conformance assessment is carried out during and immediately after the construction period and it results in the commissioning of the installation to start its operation. Routine inspections are scheduled in order to assure the maintenance of the lightning protection and earthing characteristics, during the operation life of the installation.

Depending on the function and installation location, the lightning protection system of an RBS can be partitioned into 4 parts which consist of an air-termination and down conductor system, earthing system, equipotential bonding network and surge protective devices (SPDs). The conformance assessment is directed to these parts, and may consist in visual inspection, measurement, analysis and other applicable methods.

The assessment requirements of each part for commissioning and routine inspections are presented in clauses 8 to 11 separately. In addition, management rules are introduced in clause 12, which are effective for conformance maintenance during the operation life of the RBS.

History

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Assessment, conformance, earthing, lightning protection, radio base station.

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Recommendation ITU-T K.119

Conformance assessment of radio base stations regarding lightning protection and earthing

1 Scope

This Recommendation provides the technical requirements and measurement methods to assess the validity and reliability of the lightning protection and earthing system of radio base stations (RBS). It focuses on the quality control of the processes of construction, acceptance, inspection and maintenance.

The detailed requirements for the lightning protection of RBSs are provided by [ITU-T K.56], [ITU-T K.112] and their references.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- [ITU-T K.56] Recommendation ITU-T K.56 (2010), *Protection of radio base stations against lightning discharges*.
- [ITU-T K.111] Recommendation ITU-T K.111 (2015), *Protection of surrounding structures of telecommunication towers against lightning*.
- [ITU-T K.112] Recommendation ITU-T K.112 (2015), *Lightning protection, earthing and bonding: practical procedures for radio base stations*.
- [IEC 61643-11] IEC 61643-11 (2010), *Low-voltage surge protective devices – Part 11: Surge protective devices connected to low-voltage power systems – Requirements and test methods*.
- [IEC 61643-21] IEC 61643-21 (2012), *Low voltage surge protective devices – Part 21: Surge protective devices connected to telecommunications and signalling networks – Performance requirements and testing methods*.
- [IEC 62305-3] IEC 62305-3 (2010), *Protection against lightning – Part 3: Physical damage to structures and life hazard*.

3 Definitions

3.1 Terms defined elsewhere

The definitions contained in the references apply to this Recommendation. Some of them are reproduced here for convenience.

3.1.1 earth conductor [b-ITU-T Handbook]: A conductor or group of conductors connecting the earth electrode to the earth collector. In the case of partly buried connections, this definition is valid only for the sections which are electrically insulated from the ground, the sections in contact with the ground forming part of the earth electrode.

3.1.2 earthing network [ITU-T K.112]: The part of an earthing installation that is restricted to the earth electrodes and their interconnections.

3.1.3 one-port SPD [b-IEC 61643-11]: SPD having no intended series impedance.

NOTE – A one port SPD may have separate input and output connections.

3.1.4 two-port SPD [b-IEC 61643-11]: SPD having a specific series impedance connected between separate input and output connections.

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.2.1 commissioning: Acceptance of the whole installation that is carried out when all the work has been finished and the installation complies with the design criteria.

3.2.2 final inspection: Inspection that is carried out when all the work has been finished.

3.2.3 follow-up inspection: Inspection performed during the construction work in order to verify the compliance of the installation with the design criteria.

NOTE – Follow-up inspection is normally required for parts of the installation that are not accessible afterwards (e.g., earthing network).

3.2.4 routine inspection: Inspection that is carried out at regular intervals during the operational life of the installation.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

AC	Alternating Current
DC	Direct Current
LPL	Lightning Protection Level
MET	Main Earthing Terminal
MOV	Metal Oxide Varistor
RBS	Radio Base Station
SPD	Surge Protective Device

5 Conventions

None.

6 General

In order to ensure the validity and reliability of the lightning protection and earthing system, its assessment and maintenance should be carried out throughout the entire lifetime of the radio base station. According to the different requirements during the construction period and the operation period, the assessment can be divided into two categories: commissioning and routine inspections.

Effective management procedures also have to be implemented for conformance assessment, such as documentation management and a periodic inspection schedule. Moreover, the conformance assessment shall be implemented by skilled professionals and the measuring equipment (e.g., earthing resistance meter) shall have a valid calibration.