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Bonding configurations and earthing at remote electronic sites

Recommendation ITU-T K.35

ITU-T

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Bonding configurations and earthing at remote electronic sites

Summary

Bonding configurations, earthing, and the type of power distribution for equipment located at remote electronic sites are proposed, which are intended to promote harmony of installation and equipment configurations while providing for personnel safety and electromagnetic compatibility.

With the popularization of 5G mobile communication, the number of outdoor communication equipment is increasing rapidly. In order to reduce costs, outdoor electronic equipment cabinets (EECs) substitute outdoor shelters for telecommunication systems. Telecommunication equipment (baseband units (BBUs)), power supply equipment, battery, temperature control equipment, optical transmission equipment and other ancillary equipment can be installed in these outdoor cabinets.

Recommendation ITU-T K.35 (2018) gives the definition of electronic equipment cabinet (EEC), earthing, bonding, but it is not detailed. For example, the surge protective device (SPD) configuration in the outdoor cabinet, the setting of the earthing terminal (main earthing terminal, optical cable dedicated earthing terminal), and the bonding of the equipment in the cabinet are not specified in detail. It is difficult for users of standards to obtain effective specifications and guidelines.

China industrial standard YD/T 1537-2015, *Outdoor cabinets for telecommunication system*, had defined EEC as "integrated access outdoor cabinet" and "base station outdoor cabinet" depending on the application situation. This standard provides more information on lightning protection and earthing.

History

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Bonding, earthing, electronic equipment cabinet (EEC), electronic equipment enclosure (EEE), safety.

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The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

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Introduction

Electronic equipment enclosures remotely located from telecommunication buildings are increasingly being used to contain a variety of telecommunication equipment. Differences such as size, shape and local environmental stresses give rise to the need for electromagnetic compatibility measures that differ from those at telecommunication buildings [ITU-T K.27] or at customer premises [ITU-T K.66].

The nomenclature and measures of this Recommendation are intended to promote harmony of installation and equipment configurations while providing for personnel safety and electromagnetic compatibility.

Although the bonding configurations and earthing measures of this Recommendation contribute to the reduction of electrical surge energy that reaches installed equipment, surge protectors, as described in [ITU-T K.11], may be needed on the conductors of wire-line cables. Furthermore, the equipment must be capable of resisting the residual surges that reach it. Equipment resistibility is described in [ITU-T K.20].

Recommendation ITU-T K.35

Bonding configurations and earthing at remote electronic sites

1 Scope

This Recommendation covers bonding configurations and earthing for equipment located at remote electronic sites such as switching or transmission huts, cabinets or controlled environmental vaults with only one level, a need for a.c. mains power service and a floor space of about 100 m² without an antenna tower on the roof of the building as well as nearby; but which are more substantial than small electronic housings, such as carrier repeaters or distribution terminals. Experience in the operation of electronic equipment enclosures shows that the use of a bonding configuration and earthing that are coordinated with equipment capability and with electrical protection devices has the following attributes:

- promotes personnel safety and reduces fire hazards;
- enables signalling with earth return (functional earthing);
- minimizes service interruptions and equipment damage caused by lightning, exposures to power lines and faults in internal d.c. power supplies;
- minimizes radiated and conducted emissions and susceptibility;
- improves system tolerance to discharge of electrostatic energy.

Within this framework, this Recommendation:

- a) is a guide to bonding configurations and earthing of telecommunication equipment in electronic equipment enclosures;
- b) is intended to comply with safety requirements imposed by [IEC 60364 series] or national standardizing bodies on a.c. power installations;
- c) is intended for installation of new electronic equipment enclosures;
- d) treats coordination with electrical protection devices, but does not provide details of protective measures specific to electronic equipment enclosures;
- e) utilizes the shielding contribution of effective elements of the structure and its contents;
- f) addresses the bonding of cable shields;
- g) is intended to facilitate electromagnetic compatibility of telecommunication equipment;
- h) does not include protection against lightning electromagnetic pulses (LEMPs).

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.11] Recommendation ITU-T K.11 (2009), *Principles of protection against overvoltages and overcurrents*.