

IEEE Standard Environmental and Testing Requirements for Communications Networking Devices Installed in Transmission and Distribution Facilities

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Abstract: Environmental testing requirements are defined for communications networking devices to be installed in transmission and distribution facilities. This standard establishes a common reproducible basis for designing and evaluating devices utilizing radio frequency (RF) up to 6 GHz, power line communications, and broadband over power line (BPL) technologies. It also requires immunity to five IEC electromagnetic compatibility standards for which there are no IEEE equivalent standards. This standard is an extension to IEEE Std 1613™-2009 and IEEE Std 1613a™-2011.

Keywords: common-mode disturbances, communications networking device, conducted RF, damped oscillatory magnetic fields, IEEE 1613.1™, immunity, power frequency magnetic fields, radiated, RFI hazards, surge

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Introduction

This introduction is not part of IEEE Std 1613.1-2013, IEEE Standard Environmental and Testing Requirements for Communications Networking Devices Installed in Transmission and Distribution Facilities.

This document is an extension of IEEE Std 1613TM-2009 and its amendment (IEEE Std 1613aTM-2011) from two perspectives. The scope has been broadened to include devices installed in all electric power facilities, not just substations, and includes the communications modules installed in Smart Meters. It adds two installation zones—(Zone A) inside a facility's building/control house or fenced area, and (Zone B) outside these buildings or fenced areas. Thus, it is expressly applicable for devices used for distribution automation and distributed generation. Added are the device testing and performance requirements for communications via radio frequency (RF), via power line carrier/communications, via Broadband over Power Line (BPL), or via Ethernet cable. Five IEC immunity tests have also been added as suggested in the SGIP-EMI Issues White paper [B5]^a with specific immunity levels for Zone A and Zone B substations. The test conditions and acceptance criteria in Annex A have been revised to help ensure that the transmit function of the device is exposed to the test conditions at some point during the tests in Clause 5 through Clause 12. This is a new requirement in this text, and may not be a requirement in other standards.

The requirements in Clause 6 of IEEE Std 1613-2009 regarding the application of the fast transient (EFT) test waveform for transverse mode testing of a device's input/output circuits have been deleted. Transverse mode testing for EFT is only required on dc power supply terminals rated 48 volts or above. Other than these changes and the reduced test levels in Zone B, all the remaining requirements in IEEE Std 1613-2009 are unchanged, and are applicable to IEEE 1613.1 devices. The same is also true—a device in compliance with IEEE Std 1613.1 also meets these remaining requirements in IEEE Std 1613-2009.

^a The numbers in brackets correspond to those of the bibliography in Annex B.

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1. Overview

1.1 Scope

This standard establishes the requirements for communications networking devices supporting electric transmission and distribution inside/outside an electric power substation. It addresses issues such as equipment enclosures, temperature ranges, electrical phenomena, and others that are characterized by a transmission and distribution environment. This includes the different communication methods used in these locations, such as wireless and power line carrier/communications.