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IEEE Guide on Electrostatic Discharge (ESD): Characterization of the ESD Environment

Sponsor

Surge-Protective Devices Committee
of the
IEEE Power Engineering Society

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Abstract: This guide describes the electromagnetic threat posed to electronic equipment and subassemblies by actual Electrostatic Discharge (ESD) events from humans and mobile furnishings. This guide organizes existing data on the subject of ESD in order to characterize the ESD surge environment. This guide is not an ESD test standard. It is intended to be a resource for equipment designers, and for preparers and users of ESD test standards. The manufacturing, handling, packaging, and transportation of individual electronic components, including integrated circuits, are not discussed, and this guide does not deal with mobile items such as automobiles, aircraft, or other masses of comparable size.

Keywords: electromagnetic, electrostatic discharge, ESD, surges

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Foreword

(This foreword is not a part of IEEE Std C62.47-1992, IEEE Guide for Electrostatic Discharge (ESD): Characterization of the ESD Environment.)

An electrostatic discharge (ESD) event can cause equipment malfunction as well as physical damage. Equipment malfunction may include corruption of data and equipment lock-ups. Physical damage may include equipment damage and even loss of life.

In order to achieve meaningful ESD immunity, the design of an entire system must be considered, both for direct discharge and for fields. Various design tools are available to assist in increasing the ESD immunity of electronic equipment. The utility of these tools is limited, however, if the character of the ESD threat is not understood.

There are standards for simulating the ESD environment at the equipment level. They have been published by several organizations, including IEC and ECMA; others are in preparation, including one by ASC C63. However, much has been learned about ESD since early versions of some of these standards were published. In addition, all of these standards are exclusively test standards; repeatability has been a major goal, sometimes at the expense of realism. Therefore, these standards are not necessarily fully accurate sources of information regarding the ESD threat itself; presentation of such information is typically not their purpose.

To date, no other organization has written a guide that describes the characteristics of the real-world ESD event itself. This guide has been written to fill that void. *This guide is not an ESD test standard*. Rather, it is intended to be a resource for equipment designers, and for preparers and users of ESD test standards. This guide will allow all those who are responsible for ESD immunity to judge the relative realism of proposed ESD tests by comparing them to the real-world ESD events described.

The reader of this guide is encouraged to use an appropriate test standard to define actual ESD immunity tests for equipment.

At the time this guide was completed, the working group on ESD had the following membership:

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At the time that it balloted and approved this standard for submission to the IEEE Standards Board, the Surge-Protective Devices Committee had the following membership:

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