1. Record Nr. UNINA9910466475703321

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Titolo	A practical guide to EMC engineering / / Levent Sevgi
Pubbl/distr/stampa	Boston : , : Artech House, , [2017] [Piscataqay, New Jersey] : , : IEEE Xplore, , [2017]
ISBN	1-5231-1691-9 1-63081-400-8
Descrizione fisica	1 online resource (xvi, 304 pages) : illustrations, charts
Collana	Artech House electromagnetic series
Disciplina	621.382
Soggetti	Electromagnetic compatibility Electronic books.
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references (pages 289-292) and index.
Nota di contenuto	A Practical Guide to EMC Engineering; Contents; Preface; 1 Introduction; 1.1 Electromagnetic Compatibility; 1.2 EM Fields in Our Environment; 1.2.1 Low-Frequency Magnetic Field Coupling; 1.2.2 Power Absorption from EM Fields; 1.2.3 Electromagnetic Levels in Our Environment; 1.2.4 Epilogue; 1.2.5 Risk Assessment and Precautionary Principle; 1.2.6 Simple EM Calculations; 1.3 EU EMC Directives; 1.4 CE Marking Process; 1.5 EMC Institutions and EMC Standards; 1.5.1 Commercial EMC Standards; 1.5.2 Military EMC Standards; 1.6 EMC Limiting Values; 1.7 EMC Tests and Measurements. 1.8 EMC Engineering Philosophy1.9 Suggested EMC Approach; References; Bibliography; 2 Accreditation; 2.1 Introduction; 2.2 Accreditation; 2.3 Accreditation Institutions; 2.4 TURKAK; 2.5 EMC Tests and Measurements; 2.5.1 Features of EMC Tests and Measurements; 2.5.2 Calibration; 2.5.3 Reporting and Product Certification; 2.6 Proficiency Testing and Interlab Comparisons; References; Bibliography; 3 Electromagnetic Model; 3.1 Basic Electrical Engineering Theories; 3.2 Maxwell Equations; 3.3 EM Scattering, Diffraction, and Propagation; 3.3.1 EM Point and Line Sources; 3.3.2 EM Wave Polarization. 3.3.3 EM Plane Waves and Wave Impedance3.3.4 EM Power Density; 3.3.5 EM Problem Groups; 3.3.6 EM Propagation Modes; 3.4 EM

Materials and Skin Depth; 3.5 Electric and Magnetic Dipoles; 3.6 Typical Emissions; 3.7 EM Coupling Mechanisms; References; 4 Circuit Model; 4.1 Lumped Parameter Circuit Elements; 4.1.1 Conductor Wires; 4.1.2 Inductive Effect of a Conductor Wire; 4.1.3 Capacitive Effect of a Conductor Wire; 4.1.4 Realistic R/L/C Models; 4.2 Two-Port Circuit Definitions; 4.3 Resonance Circuits; 4.4 Cables and Transmission Line Model; 4.4.1 Characteristic Impedance.
4.4.2 Propagation Constant4.4.3 Voltage Reflection Coefficient; 4.4.4 Voltage Standing Wave Ratio (VSWR); 4.5 Grounding; 4.6 Common Mode and Differential Mode Currents; 4.7 Nonlinearity Effects; 4.8 Two-Port Circuits and S-Parameters; 4.9 Microstipline Circuits; 4.9.1 Characteristics of a Microstripline; 4.9.2 Basic Microstrip Circuits; 4.10 Crosstalk; References; Bibliography; 5 Antennas and Antenna Calibration; 5.1 Fundamental Antenna Terms; 5.2 Communication Antennas; 5.3 EMC Antennas; 5.3.1 Receive Antenna and Antenna Factor; 5.3.2 Transmit Antenna Factor; 5.4 Antenna Calibration.
5.5 Normalized Site Attenuation5.5.1 Theoretical NSA Calculations; 5.5.2 NSA Measurements; 5.5.3 Performing an Antenna Calibration; 5.5.4 Antenna Calibration with Pattern Measurements; 5.6 Loop Antennas; 5.7 Loop Antenna Calibration; 5.8 Antenna Arrays; 5.8.1 Arrays with Isotropic Radiators; 5.8.2 A MATLAB-Based ARRAY Package; 5.9 Antenna Types; 5.9.1 Electric and Magnetic Dipoles; 5.9.2 Wire Antennas; 5.9.3 Broadband EMC Antennas; 5.9.4 Log-Periodic Dipole Antenna; 5.9.5 Horn Antenna; References; Bibliography; 6 Noise and Frequency Analysis; 6.1 Fundamental Electromagnetic Signals; 6.2 Noise.

Sommario/riassunto

This practical new resource explores the fundamentals of EMC engineering and examines the concepts and underpinnings of electromagnetics. This book highlights the procedures from design to market for both technical and non-technical issues, including market control, accreditation, calibration, EMC tests and measurement, and EMC protection. Basic electrical engineering theories, Maxwell equations, EM scattering, diffraction and propagation in the electromagnetic model are presented. The circuit model, including lumped parameter circuit elements, two-port circuit definitions, grounding, common and differential model currents, and microstripline circuits are explored.n nThis book also covers antennas and antenna calibration, including communication antennas, normalized site attenuation (NSA), loop antennas, and loop antenna calibration (LAC). Noise and frequency analysis on fundamental electromagnetic signals, noise, and transforms is explained. Readers find insight into EMC test and measurement environments and devices. Time-saving MATLAB code is included in this resource to help engineers with their projects in the field.