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Generating UWB Signals

4.2.1 UWB Signal Design 4.2.2 Precision Signal Design; 4.2.3 Calculating Power for Repetitively Sent Pulses; 4.3 Signal Pulse Design Examples; 4.3.1 Pulse Design Constraints; 4.3.2 Choosing a Pulse Shape; 4.4 UWB System Band Plans; 4.5 Overlaying Precision Pulses; 4.6 Signal Modulation; 4.6.1 PPM Modulation; 4.6.2 M-ary Bi-Orthogonal Keying Modulation; 4.6.3 Pulse Polarity, BPSK, and QPSK Modulation; 4.6.4 Pulse Amplitude Modulation; 4.6.5 Transmitted Reference Modulation; 4.7 Summary; References; 5 Radiation of UWB Signals; Introduction; 5.1 Short Pulse Radiation Process
5.1.1 The Far-field of an Arbitrary Antenna 5.1.2 The Far-field of an Ideal Infinitesimal Radiator; 5.2 The Receiving Antenna; 5.2.1 The Arbitrarily Shaped Receiving Antenna; 5.2.2 The Infinitesimal Receiving Antenna; 5.2.3 Transmission in Free Space Between Constant Gain Antennas; 5.2.4 Transmission with a Constant Aperture Receiving Antenna; 5.3 Transmitted, Radiated, and Received Signals; 5.3.1 Simulations Using Wideband Signals; 5.3.2 UWB at Moderate Bandwidths; 5.4 Some Antenna Effects in UWB; 5.4.1 The TE₁₀ Mode Horn Antenna; 5.4.2 The Dipole-fed Parabolic Reflector Antenna 5.4.3 Wideband Antenna Considerations 5.5 Summary; References; 6 Propagation of UWB Signals; Introduction; 6.1 Signal Propagation in Free Space; 6.2 Propagation with a Ground Reflection; 6.2.1 UWB and Time-harmonic Signals with a Ground Reflection; 6.2.2 Design Example of a 2-GHz UWB Wide Signal; 6.2.3 EIRP of the 2-GHz Bandwidth Pulse; 6.2.4 Propagation of a 2-GHz-Wide UWB Signal Near the Ground; 6.3 Propagation of UWB Impulses in Multipath; 6.3.1 An Impulse Propagating through a Building; 6.3.2 Multipath and Delay Spread; 6.3.3 UWB Signals Propagating in Multipath 6.3.4 Relation to Maximum Rake Gain

Sommario/riassunto

Ultra-wideband (UWB) has been among the most controversial technologies of modern times. Its applications seem endless, its capabilities miraculous and yet it is so poorly understood. In this volume, the authors combine talents to de-mystify ultra-wideband radio and explain it in language that is accessible to non-technologists as well as technologists. They contrast UWB with conventional radio technology so that fundamental, technically accurate information devoid of specific technical and analytical details is accessible for marketing managers, business developers, engineering managers, tech
