

Preface

Recent advances in wireless communication technologies have had a transformative impact on society and have directly contributed to several economic and social aspects of daily life. Increasingly, the untethered exchange of information between devices is becoming a prime requirement for further progress, which is placing an ever greater demand on wireless bandwidth. The ultra wideband (UWB) system marks a major milestone in this progress. Since 2002, when the FCC allowed the unlicensed use of low-power, UWB radio signals in the 3.1–10.6 GHz frequency band, there has been significant synergistic advance in this technology at the circuits, architectural and communication systems levels. This technology allows for devices to communicate wirelessly, while coexisting with other users by ensuring that its power density is sufficiently low so that it is perceived as noise to other users.

UWB is expected to address existing needs for high data rate short-range communication applications between devices, such as computers and peripherals or consumer electronic devices. In the long term, it makes available spectrum to experiment with new signaling formats such as those based on very short pulses of radio-frequency (RF) energy. As such it represents an opportunity to design fundamentally different wireless systems which rely on the bandwidth of the signals to enhance the data rate or which use the available bandwidth for diverse applications such as ranging and biomedical instrumentation.

This book offers its readers a comprehensive overview of the state of the art of the physical implementation of ultra wideband transceivers. It addresses system level aspects, architectural design issues, circuit level implementation challenges as well as emerging challenges in the field. The material assumes the reader has a basic familiarity with wireless communication systems and RF integrated circuit design.

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