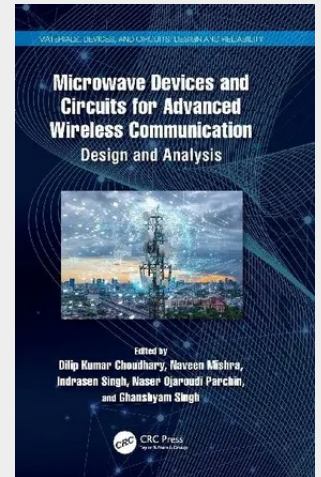


Microwave Devices and Circuits for Advanced Wireless Communication

Design and Analysis

This book offers a comprehensive overview of design and analysis of microwave devices and circuits for 5G and beyond wireless communication systems. It focuses on modern microwave antennas, filters, metamaterials, and MIMO systems. It includes a design approach based on Artificial Intelligence and the practical use of microwave devices and circuits in commercial, medical, and military applications. Microwave Devices and Circuits for Advanced Wireless Communications: Design and Analysis explores the performance of microwave devices and circuits by highlighting the difficulties encountered by researchers and designers such as latency, interoperability, wireless coexistence, data streaming, safety, security, and privacy. The book explores the most important aspects of antenna design, including radiation pattern control, impedance matching with bandwidth improvement, and gain enhancement. It also examines different categories of metasurfaces, including frequency-selective surfaces (FSS) and electromagnetic bandgap (EBG) structures, and their distinct roles in antenna design. Additionally, the book examines concepts such as ultra-wideband (UWB) radar for 5G millimeter wave applications, and advanced techniques such as synthetic aperture radar (SAR), beam-forming, compressed sensing, and diffraction tomography for enabling high-resolution imaging across wider application areas. The authors also present an overview on applying machine learning (ML) techniques to advanced wireless communication for signal-processing tasks such as signal denoising, equalization, and modulation recognition. They then discuss the potential significance of UAV communication systems in achieving seamless connection, quality of service (QoS), as well as the difficulties and potential remedies involved in building dependable networks using UAVs. Throughout the book the authors offer a critical assessment of the strengths and limitations of each topic and approach presented, thus providing valuable guidance for future research in this exciting field. This book will be helpful for graduate students, researchers, and engineers working in the area of design and reliability of circuits for microwave and communication systems.

This book offers an overview of design and analysis of microwave devices and circuits for 5G and beyond wireless communication systems. It also includes design approach based on Artificial Intelligence and practical use of microwave devices and circuits in commercial, medical and military applications.



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