PART ONE Principles of Air-Interface Design

Part One consists of three chapters providing the technical background for the design of the air-interface for wireless networks.

CHAPTER 2 CHARACTERISTICS OF THE WIRELESS MEDIUM

Learning about the behavior of the wireless medium is essential to understand the reasoning behind specific designs for wireless communication protocols. In particular, the design of the physical and medium access protocols are highly affected by the behavior of the channel that varies substantially in different indoor and outdoor areas. Chapter 2 analyzes the behavior of the wireless medium and provides a number of models for the prediction of the channel behavior in different environments.

CHAPTER 3 PHYSICAL LAYER ALTERNATIVES

The diversity and complexity of transmission techniques in wireless systems are far more involved than those of wired networks. Chapter 3 provides a comprehensive coverage of major transmission techniques that are employed in voice-oriented cellular and PCS systems as well as data-oriented mobile data, WLAN, and WPAN systems. These modulation techniques are logically divided into pulse modulation, carrier modulation, and spread spectrum techniques, and under these headings different practical examples are described.

CHAPTER 4 WIRELESS MEDIUM ACCESS METHODS

This chapter is devoted to multiple access alternatives applied to wireless networks. It starts with description and comparison of the voice-oriented FDMA, TDMA, and CDMA access methods. Then it addresses CSMA and ALOHA-based random access techniques used in data-oriented wireless networks. The last part of the chapter analyzes the applied access methods for integration of the voice and data that have evolved to operate with the voice- and data-oriented networks.