PART FOUR Local Broadband and Ad Hoc Networks

The last part of the book is devoted to the short-range local wireless networks. This part consists of five short chapters, three of them devoted to WLAN, one to WPAN, and one to wireless geolocation principles.

CHAPTER 10 INTRODUCTION TO WLANs

Emergence and growth of the WLAN industry relied heavily on the application domain for this technology, and these applications have changed with time. On the other hand, a number of transmission techniques, access methods, and frequency of operations have been examined for implementation of WLANs. A good understanding of the WLAN industry requires an overview of the applications and an explanation of the relation between the applications and the variety of technologies. Chapter 10 analyzes the evolutionary path of the WLAN industry and explains how it emerged as a technology for office and manufacturing environments and how it is currently heading towards home and personal area networking.

CHAPTER 11 IEEE 802.11 WLANs

Chapter 11 provides details of the IEEE 802.11 standard to demonstrate the technical aspects of a data-oriented wireless standard operating in unlicensed bands. The medium access technology for the IEEE 802.11 is CSMA/CD that sets this standard as a connectionless data-oriented standard. This feature eases the Internet access either by direct connection or connection through an existing wired LAN. Chapter 11 describes the objective of the IEEE 802.11 standard,

explains specifications of the PHY and MAC layer alternatives supported by this standard, and provides the details of mobility support mechanisms such as registration, handoff, power management, and security.

CHAPTER 12 WATM AND HIPERLAN

Chapter 12 is devoted to WATM activities and HIPERLAN standards. HIPERLAN-1 is similar to IEEE 802.11 and is considered a data-oriented WLAN standard. ATM and HIPERLAN-2 are voice-oriented WLANs. The medium access for these standards pays special attention to maintenance of the QoS, which makes them better suited for integration into the existing voice-oriented PSTN and cellular telephone networks. We start the chapter with an overview of the technical aspects of WATM and a short description of HIPERLAN-1. The rest of the chapter is devoted to a detailed description of the HIPERLAN-2 standard.

CHAPTER 13 AD HOC NETWORKING AND WPANs

WPANs are ad hoc networks designed to connect personal equipment to one another. Chapter 13 describes WPANs with particular emphasis on details of Bluetooth technology. The chapter starts with describing the IEEE 802.15 WPAN committee and Bluetooth and homeRF standardization activities. This discussion is followed by a detailed description of key aspects of Bluetooth technology and a detailed analysis of the interference between the IEEE 802.11 and Bluetooth technologies.

CHAPTER 14 WIRELESS GEOLOCATION SYSTEMS

Our final chapter is devoted to indoor geolocation and cellular positioning as emerging technologies to complement the WLAN and wireless WAN services. This chapter provides a generic architecture for wireless geolocation services, describes alternative technologies for implementation of these systems, and gives examples of evolving location-based services. Location-based services provide a fertile environment for the emergence of e- and m-commerce applications.