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Communication Systems

for the Mobile Information Society

Companion Website

WILEY

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Preface

Wireless technologies such as GSM/UMTS, wireless LAN, 802.16 (WiMAX), and Bluetooth have revolutionized the way we communicate and exchange data by making services like telephony and Internet access available at anytime and from almost anywhere. Today, a great variety of technical publications offer background information about these technologies but they all fall short in one way or another. Books covering these technologies usually describe only one of the systems in detail and are generally too complex as a first introduction. The Internet is also a good source, but the articles one finds are usually too short and superficial or only deal with a specific mechanism of one of the systems. Because of this, it was difficult for me to recommend a single publication to students in my telecommunication classes, which I've been teaching in addition to my chosen profession as a wireless systems consultant. This book aims to change this.

All wireless technologies discussed in the book continue to evolve, with increasing transmission speeds being the driving goal. This book covers some of the evolutions such as HSDPA and HSUPA enhancements, which deliver increased transmission speeds in UMTS networks, and EDGE, which does the same thing for GPRS. As WiMAX already offers high transmission speeds for stationary users (802.16d), the evolution path of this system introduces mobility. Therefore, the mobility extension of WiMAX (802.16e) is also discussed.

Beyond speed and mobility improvements, research is being performed into how future multi-mode wireless devices can offer anytime, anywhere connectivity. The challenge of this approach is determining how to offer a seamless transition from one radio technology to another for users roaming out of the coverage area of a network. As this book describes the similarities and differences between the major radio technologies, which will form the basis of such 4G networks, it also provides a wealth of information for readers involved in this area of research.

Each of the six chapters in this book gives a detailed introduction and overview of one of the wireless systems mentioned above. Special emphasis has also been put into explaining the thoughts and reasoning behind the development of each system. Not only the 'how', but also the 'why' is of central importance in each chapter. Furthermore, comparisons are made between the different technologies to show the differences and commonalities of the systems. For some applications, several technologies compete directly with each other, while in other cases only a combination of different wireless technologies creates a practical application for the end user. For readers who want to test their understanding of a system, each chapter concludes with a list of questions. For further investigation, all chapters contain references to the relevant standards and other documents. These provide an ideal additional source to find out more about a specific system or topic.