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4G: LTE/LTE-Advanced for Mobile Broadband LTE-Advanced Introduction to Mobile Network Engineering: GSM, 3G-WCDMA, LTE and the Road to 5G Evolved Cellular Network Planning and Optimization for UMTS and LTE An Introduction to LTE 4G: LTE/LTE-Advanced for Mobile Broadband Entity Authentication and Personal Privacy in Future Cellular Systems Design, Deployment and Performance of 4G-LTE Networks From GSM to LTE Single Carrier FDMA From GSM to LTE-Advanced LTE and the Evolution to 4G Wireless Mobile Terminal Receiver Design LTE and the Evolution to 4G Wireless Modeling and Dimensioning of Mobile Wireless Networks LTE-Advanced and Next Generation Wireless Networks From GSM to LTE-Advanced Pro and 5G LTE for 4G Mobile Broadband LTE for Public Safety UAV Communications for 5G and Beyond 5G Mobile Communications LTE-A Cellular Networks From LTE to LTE-Advanced Pro and 5G Fundamentals of LTE LTE Cellular Narrowband Internet of Things (NB-IoT) Cellular Internet of Things Converged Communications LTE-Advanced DRX Mechanism for Power Saving 3G Evolution From GSM to LTE-Advanced Pro and 5G Mobile Wimax An Introduction to LTE LTE - The UMTS Long Term Evolution Heterogeneous Networks in LTE-Advanced Cellular Internet of Things Radio Protocols for LTE and LTE-Advanced Fiber-Wireless Convergence in Next-Generation Communication Networks Essentials of LTE and LTE-A Cellular Internet of Things Multimedia Transport Over Lte

4G: LTE/LTE-Advanced for Mobile Broadband May 24 2022 LTE (Long Term Evolution) is the 3GPP's (3rd Generation Partnership Project) new standard and accompanying technologies that mobile network operators such as ATT, Verizon and TeliaSonera are adopting for their networks. To move to higher-speed networks that can cater to customer demand for mobile broadband multimedia applications, the 3GPP has developed the latest LTE-Advanced (LTE Release 10) standard, which will be fixed in December 2010. This book focuses on LTE and LTE-Advanced, and provides engineers with real insight and understanding into the why and how of the standard and its related technologies. This book is written by engineers from Ericsson--the world's leading telecommunications supplier--who was heavily involved in the development of the standard. Follow-up to the very successful 3G Evolution, now focusing on LTE and LTE Advanced standard and its accompanying technologies Complete and clear explanation of LTE Advanced by the people who played a leading role in its development, which will enable engineers to quickly grasp the latest 3GPP Release 10 standard and implement it in their products Not a contributed book as most others on this topic are: this book gives an integrated introduction to the technologies and the standard

LTE for 4G Mobile Broadband May 12 2021 Understand the new technologies of the LTE standard and their impact on system performance improvements with this practical guide.

4G: LTE/LTE-Advanced for Mobile Broadband Oct 29 2022 This book focuses on LTE with full updates including LTE-Advanced (Release-11) to provide a complete picture of the LTE system. Detailed explanations are given for the latest LTE standards for radio interface architecture, the physical layer, access procedures, broadcast, relaying, spectrum and RF characteristics, and system performance. Key technologies presented include multi-carrier transmission, advanced single-carrier transmission, advanced receivers, OFDM, MIMO and adaptive antenna solutions, radio resource management and protocols, and different radio network architectures. Their role and use in the context of mobile broadband access in general is explained, giving both a high-level overview and more detailed step-by-step explanations. This book is a must-

have resource for engineers and other professionals in the telecommunications industry, working with cellular or wireless broadband technologies, giving an understanding of how to utilize the new technology in order to stay ahead of the competition. New to this edition: In-depth description of CoMP and enhanced multi-antenna transmission including new reference-signal structures and feedback mechanisms Detailed description of the support for heterogeneous deployments provided by the latest 3GPP release Detailed description of new enhanced downlink control-channel structure (EPDDCH) New RF configurations including operation in non-contiguous spectrum, multi-bands base stations and new frequency bands Overview of 5G as a set of well-integrated radio-access technologies, including support for higher frequency bands and flexible spectrum management, massive antenna configurations, and ultra-dense deployments Covers a complete update to the latest 3GPP Release-11 Two new chapters on HetNet, covering small cells/heterogeneous deployments, and CoMP, including Inter-site coordination Overview of current status of LTE release 12 including further enhancements of local-area, CoMP and multi-antenna transmission, Machine-type-communication, Device-to-device communication

Design, Deployment and Performance of 4G-LTE Networks Mar 22 2022 This book provides an insight into the key practical aspects and best practice of 4G-LTE network design, performance, and deployment Design, Deployment and Performance of 4G-LTE Networks addresses the key practical aspects and best practice of 4G networks design, performance, and deployment. In addition, the book focuses on the end-to-end aspects of the LTE network architecture and different deployment scenarios of commercial LTE networks. It describes the air interface of LTE focusing on the access stratum protocol layers: PDCP, RLC, MAC, and Physical Layer. The air interface described in this book covers the concepts of LTE frame structure, downlink and uplink scheduling, and detailed illustrations of the data flow across the protocol layers. It describes the details of the optimization process including performance measurements and troubleshooting mechanisms in addition to demonstrating common issues and case studies based on actual field results. The book provides detailed performance analysis of key features/enhancements such as C-DRX for Smartphones battery saving, CSFB solution to support voice calls with LTE, and MIMO techniques. The book presents analysis of LTE coverage and link budgets alongside a detailed comparative analysis with HSPA+. Practical link budget examples are provided for data and VoLTE scenarios. Furthermore, the reader is provided with a detailed explanation of capacity dimensioning of the LTE systems. The LTE capacity analysis in this book is presented in a comparative manner with reference to the HSPA+ network to benchmark the LTE network capacity. The book describes the voice options for LTE including VoIP protocol stack, IMS Single Radio Voice Call Continuity (SRVCC). In addition, key VoLTE features are presented: Semi-persistent scheduling (SPS), TTI bundling, Quality of Service (QoS), VoIP with C-DRX, Robust Header Compression (RoHC), and VoLTE Vocoders and De-Jitter buffer. The book describes several LTE and LTE-A advanced features in the evolution from Release 8 to 10 including SON, eICIC, CA, CoMP, HetNet, Enhanced MIMO, Relays, and LBS. This book can be used as a reference for best practices in LTE networks design and deployment, performance analysis, and evolution strategy. Conveys the theoretical background of 4G-LTE networks Presents key aspects and best practice of 4G-LTE networks design and deployment Includes a realistic roadmap for evolution of deployed 3G/4G networks Addresses the practical aspects for designing and deploying commercial LTE networks. Analyzes LTE coverage and link budgets, including a detailed comparative analysis with HSPA+. References the best practices in LTE networks design and deployment, performance analysis, and evolution strategy Covers infrastructure-sharing scenarios for CAPEX and OPEX saving. Provides key practical aspects for supporting voice services over LTE, Written for all 4G engineers/designers working in networks design for operators, network deployment engineers, R&D engineers, telecom consulting firms, measurement/performance tools firms, deployment subcontractors, senior

undergraduate students and graduate students interested in understanding the practical aspects of 4G-LTE networks as part of their classes, research, or projects.

From GSM to LTE-Advanced Dec 19 2021 This revised edition of Communication Systems from GSM to LTE: An Introduction to Mobile Networks and Mobile Broadband Second Edition (Wiley 2010) contains not only a technical description of the different wireless systems available today, but also explains the rationale behind the different mechanisms and implementations; not only the ‘how’ but also the ‘why’. In this way, the advantages and also limitations of each technology become apparent. Offering a solid introduction to major global wireless standards and comparisons of the different wireless technologies and their applications, this edition has been updated to provide the latest directions and activities in 3GPP standardization up to Release 12, and importantly includes a new chapter on Voice over LTE (VoLTE). There are new sections on Building Blocks of a Voice Centric Device, Building Blocks of a Smart Phone, Fast Dormancy, IMS and High-Speed Downlink Packet Access, and Wi-Fi-Protected Setup. Other sections have been considerably updated in places reflecting the current state of the technology. • Describes the different systems based on the standards, their practical implementation and design assumptions, and the performance and capacity of each system in practice is analyzed and explained • Questions at the end of each chapter and answers on the accompanying website make this book ideal for self-study or as course material

Fiber-Wireless Convergence in Next-Generation Communication Networks Sep 23 2019 This book investigates new enabling technologies for Fi-Wi convergence. The editors discuss Fi-Wi technologies at the three major network levels involved in the path towards convergence: system level, network architecture level, and network management level. The main topics will be: a. At system level: Radio over Fiber (digitalized vs. analogic, standardization, E-band and beyond) and 5G wireless technologies; b. Network architecture level: NGPON, WDM-PON, BBU Hotelling, Cloud Radio Access Networks (C-RANs), HetNets. c. Network management level: SDN for convergence, Next-generation Point-of-Presence, Wi-Fi LTE Handover, Cooperative MultiPoint.

Single Carrier FDMA Jan 20 2022 Single Carrier Frequency Division Multiple Access (SC-FDMA) is a novel method of radio transmission under consideration for deployment in future cellular systems; specifically, in 3rd Generation Partnership Project Long Term Evolution (3GPP LTE) systems. SC-FDMA has drawn great attention from the communications industry as an attractive alternative to Orthogonal Frequency Division Multiple Access (OFDMA). Introduction to Single Carrier FDMA places SC-FDMA in the wider context of wireless communications, providing the reader with an in-depth tutorial on SC-FDMA technology. The book introduces the reader to this new multiple access technique that utilizes single carrier modulation along with orthogonal frequency multiplexing and frequency domain equalization, plus its applications in communications settings. It considers the similarities with and differences from orthogonal frequency division modulation, multiplexing, and multiple access used extensively in cellular, broadcasting, and digital subscriber loop applications. Particular reference is made to the peak power characteristics of an SC-FDMA signal as an added advantage over OFDMA. Provides an extensive overview of the principles of SC-FDMA and its relation to other transmission techniques. Explains how the details of a specific implementation influence the tradeoffs among various figures of merit. Describes in detail the configuration of the SC-FDMA uplink transmission scheme published by 3GPP. Features link level simulation of an uplink SC-FDMA system using MATLAB. This is an essential text for industry engineers who are researching and developing 3GPP LTE systems. It is suitable for engineers designing wireless network equipment, handsets, data cards, modules, chipsets, and test equipment as well as those involved in designing LTE infrastructure. It would also be of interest to academics, graduate students, and industry researchers

involved in advanced wireless communications, as well as business analysts who follow the cellular market.

3G Evolution Jun 01 2020 This very up-to-date and practical book, written by engineers working closely in 3GPP, gives insight into the newest technologies and standards adopted by 3GPP, with detailed explanations of the specific solutions chosen and their implementation in HSPA and LTE. The key technologies presented include multi-carrier transmission, advanced single-carrier transmission, advanced receivers, OFDM, MIMO and adaptive antenna solutions, advanced radio resource management and protocols, and different radio network architectures. Their role and use in the context of mobile broadband access in general is explained. Both a high-level overview and more detailed step-by-step explanations of HSPA and LTE implementation are given. An overview of other related systems such as TD SCDMA, CDMA2000, and WIMAX is also provided. This is a 'must-have' resource for engineers and other professionals working with cellular or wireless broadband technologies who need to know how to utilize the new technology to stay ahead of the competition. The authors of the book all work at Ericsson Research and are deeply involved in 3G development and standardisation since the early days of 3G research. They are leading experts in the field and are today still actively contributing to the standardisation of both HSPA and LTE within 3GPP. * Gives the first explanation of the radio access technologies and key international standards for moving to the next stage of 3G evolution: fully operational mobile broadband * Describes the new technologies selected by the 3GPP to realise High Speed Packet Access (HSPA) and Long Term Evolution (LTE) for mobile broadband * Gives both higher-level overviews and detailed explanations of HSPA and LTE as specified by 3GPP

LTE-Advanced DRX Mechanism for Power Saving Jul 02 2020 Resource allocation and power optimization is a new challenge in multimedia services in cellular communication systems. To provide a better end-user experience, the fourth generation (4G) standard Long Term Evolution/Long Term Evolution-Advanced (LTE/LTE-Advanced) has been developed for high-bandwidth mobile access to accommodate today's data-heavy applications. LTE/LTE-Advanced has adopted discontinuous reception (DRX) to extend the user equipment's battery lifetime, thereby further supporting various services and large amounts of data transmissions. By introducing the basics of mathematical analysis and performance evaluation of power-saving mechanisms in 3rd generation partnership project (3GPP) LTE and LTE-Advanced networks, the authors of this book aim to describe novel algorithms which could have better performance capabilities than previous methods. Chapter 1 gives the basic theory description of the 3GPP LTE network and 3GPP DRX power saving mechanism, empirical measurements of LTE network traffic and an overview of the basic LTE DRX model in the field of power saving techniques. Chapter 2 provides steps for deriving a 2-state analytical model up to a 4-state DRX model. The third and final chapter summarizes alternative methods for the implementation of LTE DRX. Contents 1. Basic Theory. 2. Analytical Semi-Markov Power-Saving Models. 3. Other Approaches for LTE Power Saving. About the Authors Scott A. Fowler is Associate Professor at Linköping University, Sweden, working with the Mobile Telecommunication (MT) group. He has served on several IEEE conferences/workshops as TPC to Chair, including Special Interest Groups coordinator for IEEE Communications Software (CommSoft) Technical Committee since 2012. His research interests include Quality of Service (QoS) support over heterogeneous networks, computer networks (wired, wireless), energy management, mobile computing, pervasive/ubiquitous, performance evaluation of networks and security. Abdelhamid Mellouk is Full Professor at the University of Paris-Est Créteil VdM (UPEC, ex. Paris 12), Networks & Telecommunications (N&T) Department (IUT C/V) and LiSSi Laboratory in France. He is a founder of the Network Control Research activity with extensive international academic and industrial collaborations. His general area of research is in adaptive real-time control for high-speed new generation dynamic wired/wireless networking in order to maintain acceptable Quality of

Service/Experience for added-value services. Naomi Yamada is a research associate at Linköping University, Sweden.

Mobile Wimax Mar 30 2020 Presenting the new IEEE 802.16m standard, this is the first book to take a systematic, top-down approach to describing Mobile WiMAX and its next generation, giving detailed algorithmic descriptions together with explanations of the principles behind the operation of individual air-interface protocols and network components. Features: A systematic and detailed, top-down approach to the design of 4G cellular systems based on IEEE 802.16m and 3GPP LTE/LTE-Advanced technologies A systematic approach to understanding IEEE 802.16m radio access network and mobile WiMAX network architecture and protocols The first comprehensive technical reference on the design, development and performance evaluation of IMT-Advanced systems, including the theoretical background and design principles as well as implementation considerations About the author: The author, chief architect and technical lead of the IEEE 802.16m project at Intel Corporation, initiated and masterminded the development of the IEEE 802.16m standard and has been one of the leading technical drivers in its standardization process in IEEE. The author was also a leading technical contributor to the definition and development of requirements and evaluation methodology for the IMT-Advanced systems in ITU-R. Reflecting the author's 20+ years expertise and experience, the book provides an in-depth, systematic and structured technical reference for professional engineers, researchers, and graduate students working in cellular communication systems, radio air-interface technologies, cellular communications protocols, advanced radio access technologies for 4G systems, and broadband cellular standards. A systematic and detailed, top-down approach to the design of 4G cellular systems based on IEEE 802.16m and 3GPP LTE/LTE-Advanced technologies A systematic approach to understanding IEEE 802.16m radio access network and mobile WiMAX network architecture and protocols The first comprehensive technical reference on the design, development and performance evaluation of IMT-Advanced systems, including the theoretical background and design principles as well as implementation considerations

LTE for Public Safety Apr 11 2021 The aim of the book is to educate government agencies, operators, vendors and other regulatory institutions how LTE can be deployed to serve public safety market and offer regulatory / public safety features. It is written in such a way that it can be understood by both technical and non-technical personnel with just introductory knowledge in wireless communication. Some sections and chapters about public safety services offered by LTE network are intended to be understood by anyone with no knowledge in wireless communication.

LTE-Advanced Sep 28 2022 This text is an in-depth, systematic and structured technical reference on 3GPP's LTE-Advanced (Releases 10 and 11). Among the topics covered are the operation of individual components and how they fit into the overall system; in-depth information on upper protocol layers; implementation and deployment issues; and services.

Cellular Internet of Things Sep 04 2020 3.2.6.2 EC-SCH -- 3.2.6.3 EC-BCCH -- 3.2.6.4 EC-CCCH/D (EC-AGCH, EC-PCH) -- 3.2.6.5 EC-PDTCH/D -- 3.2.6.6 EC-PACCH/D -- 3.2.7 UPLINK LOGICAL CHANNELS -- 3.2.7.1 EC-CCCH/U (EC-RACH) -- 3.2.7.2 EC-PDTCH/U -- 3.2.7.3 EC-PACCH/U -- 3.2.8 EXTENDING COVERAGE -- 3.2.8.1 Defining Maximum Coupling Loss -- 3.2.8.2 Maximizing the Receiver Processing Gain -- 3.2.8.3 Improved Channel Coding -- 3.2.8.4 More Efficient HARQ -- 3.2.8.5 Increased Acquisition Time -- 3.2.9 INCREASING SYSTEM CAPACITY -- 3.3 IDLE AND CONNECTED MODE PROCEDURES -- 3.3.1 IDLE MODE PROCEDURES -- 3.3.1.1 Cell Selection -- 3.3.1.2 Cell Reselection -- 3.3.1.3 Extended Coverage System Information (EC SI) -- 3.3.1.4 Coverage Class Selection -- 3.3.1.5 Paging -- 3.3.1.6 Power Saving Mode -- 3.3.1.7 System Access Procedure -- 3.3.1.7.1 EC Packet Channel Request -- 3.3.1.7.2 Coverage Class Adaptation -- 3.3.1.7.3 Contention Resolution -- 3.3.1.7.4 Access Control -- 3.3.2

CONNECTED MODE PROCEDURES -- 3.3.2.1 Assignment and Allocation of Resources -- 3.3.2.1.1 Downlink -- 3.3.2.1.2 Uplink -- 3.3.2.2 Hybrid ARQ -- 3.3.2.2.1 EGPRS -- 3.3.2.2.2 EC-GSM-IoT -- 3.3.2.2.2.1 Downlink -- 3.3.2.2.2.2 Uplink -- 3.3.2.3 Link Adaptation -- 3.3.2.4 Power Control -- 3.3.3 BACKWARD COMPATIBILITY -- 3.3.4 IMPROVED SECURITY -- 3.3.5 DEVICE AND NETWORK CAPABILITIES -- 3.4 RELEASE 14 IMPROVEMENTS -- 3.4.1 IMPROVED POSITIONING OF DEVICES -- 3.4.2 IMPROVED COVERAGE FOR 23DBM DEVICES -- 3.4.3 NEW TS MAPPING IN EXTENDED COVERAGE -- REFERENCES -- 4 - EC-GSM-IOT PERFORMANCE -- 4.1 PERFORMANCE OBJECTIVES -- 4.2 COVERAGE -- 4.2.1 EVALUATION ASSUMPTIONS -- 4.2.1.1 Requirements on Logical Channels -- 4.2.1.1.1 Synchronization Channels -- 4.2.1.1.2 Control and Broadcast Channels -- 4.2.1.1.3 Traffic Channels -- 4.2.1.2 Radio-Related Parameters -- 4.2.2 COVERAGE PERFORMANCE -- 4.3 DATA RATE -- 4.4 LATENCY

Multimedia Transport Over Lte Jun 20 2019 Long Term Evolution (LTE) is the 4th Generation mobile technology as specified by 3rd Generation Partnership Project (3GPP) standard. It has an Internet Protocol (IP) based architecture which can support downlink speeds as high as 100 Mbps. This enables reliable real time (live) video streaming on mobile devices.One of the most significant changes with LTE compared to current and earlier cellular systems is that it is aimed at an all IP network where only packet switching is supported. Voice call will no longer be using separate circuit switched channels. This book will cover the technology and architecture of LTE.In this book we have studied and analyzed the throughput and the delay performance characteristics of standard voice and video calls employing Hybrid Automatic Repeat request (HARQ) Schemes at the Medium Access Control (MAC) layer. Also emphasis has been laid on improving the Quality of Service (QoS) of voice and video transmissions LTE. This involves a detailed study of the LTE protocol stack delay, and MAC and TCP performance in the LTE network.

Radio Protocols for LTE and LTE-Advanced Oct 25 2019 Provides a unique focus on radio protocols for LTE and LTE-Advanced (LTE-A) Giving readers a valuable understanding of LTE radio protocols, this book covers LTE (Long-Term Evolution) Layer 2/3 radio protocols as well as new features including LTE-Advanced. It is divided into two sections to differentiate between the two technologies' characteristics. The authors systematically explain the design principles and functions of LTE radio protocols during the development of mobile handsets. The book also provides essential knowledge on the interaction between mobile networks and mobile handsets. Among the first publications based on the 3GPP R10 specifications, which introduces LTE-A Beginning with an overview of LTE, topics covered include: Idle Mode Procedure; Packet Data Convergence Protocol and Public Warning Systems Presents the LTE radio interface protocol layers in a readable manner, to enhance the material in the standards publications From an expert author team who have been directly working on the 3GPP standards It is targeted at professionals working or intending to work in the area and can also serve as supplementary reading material for students who need to know how theory on the most extensively used mobile radio interface today is put into practice

Converged Communications Aug 03 2020 CONVERGED COMMUNICATIONS A one-of-a-kind exploration of the past, present, and future of telecommunications In Converged Communications: Evolution from Telephony to 5G Mobile Internet, telecommunications industry veteran Erkki Koivusalo delivers an essential reference describing how different communications systems work, how they have evolved from fixed telephone networks to the latest 5G mobile systems, and how the voice and data services converged. The central theme of the book is to build deeper understanding about incremental technological progress by introducing both state of the art and their predecessor technologies. The book explores four main areas, including fixed telephone systems, data communication systems, mobile cellular systems, and IP multimedia systems. It clearly explains architectures, protocols, and functional procedures, and discusses a variety of topics ranging from physical layer processes

to system level interactions. Converged Communications offers: In-depth treatments of fixed telephone and transmission systems, including operation of telephone exchanges and signaling systems Comprehensive explorations of data communication systems, including transmission of data over telephone lines and data network technologies, such as Ethernet and TCP/IP Incisive discussions of mobile cellular systems, including GSM, 3G, LTE, VoLTE and 5G Insightful analysis of incremental system evolution to justify various design choices made The book is supported with extensive online appendices, which covers communication system concepts, an overview of standardization, various technologies used in the past, state-of-the art technologies such as WLAN, cable modems, and FTTx, complementing the other systems described in the book which have evolved from the fixed telephone network. Perfect for network operators, system integrators, and communication system vendors, Converged Communications: Evolution from Telephony to 5G Mobile Internet will also earn a place in the libraries of undergraduate and graduate students studying telecommunications and mobile systems.

Entity Authentication and Personal Privacy in Future Cellular Systems Apr 23 2022 There are now (Q1 2009) more than 4 billion cellular subscribers in the world and this number is constantly growing. With this in mind it should be clear that use of mobile communication has already become both pervasive and ubiquitous. It has become a global commodity really. Entity Authentication and Personal Privacy in Future Cellular Systems aims at explaining and examining access security as it is found in mobile/cellular systems. A thorough investigation of how access security and personal privacy is handled in the 3GPP system is conducted. This includes both the 2G systems GSM/GPRS and the 3G system UMTS. The emerging fourth generation LTE architecture is also examined. The first part of the book deals exclusively with presenting access security as found in the 3GPP system. Particular attention is given to the authentication and key agreement procedures. The 3GPP systems have evolved and the access security architecture in LTE is substantially more advanced and mature than what you would find in GSM/GPRS, but even the LTE security architecture has its limitations. In part two of the book we go on to examine what is missing from the current cellular access security architectures. Some of the shortcomings found in GSM/GPRS and later UMTS have been partially addressed in LTE, but the burden of backwards compatibility has meant that many issues could not easily be resolved. Free from those restrictions, we shall see that one can provide substantially improved subscriber privacy and enhanced entity authentication, while also avoiding the delegated authentication control that all 3GPP systems have.The design of authentication protocols is discussed in depth, and this would also include looking into the role of formal verification in the design of security protocols.

Mobile Terminal Receiver Design Oct 17 2021 MOBILE TERMINAL RECEIVER DESIGN MOBILE TERMINAL RECEIVER DESIGN LTE and LTE-Advanced India This all-in-one guide addresses the challenges of designing innovative mobile handset solutions that offer smaller size, low power consumption, low cost, and tremendous flexibility, with improved data rates and higher performance. Readers are introduced to mobile phone system architecture and its basic building blocks, different air interface standards and operating principles, before progressing to hardware anatomy, software and protocols, and circuits for legacy and next-generation smart phones, including various research areas in 4G and 5G systems. Mobile Terminal Receiver Design/p? ulliexplains basic working principles, system architecture and specification detailsof legacy and possible next-generation mobile systems, from principle to practiceto product; covers in detail RF transmitter and receiver blocks, digital baseband processingblocks, receiver and transmitter signal processing, protocol stack, AGC, AFC, ATC,power supply, clocking; features important topics like connectivity and application modules with differentdesign solutions for tradeoff exploration; discusses multi-RAT design requirements, key design attributes such as

low powerconsumption, slim form factors, seamless I-RAT handover, sensitivity, and selectivity. It will help software, hardware, and radio frequency design engineers to understand the evolution of radio access technologies and to design competitive and innovative mobile solutions and devices. Graduates, postgraduate students, and researchers in mobile telecommunications disciplines will also find this book a handy reference.

LTE - The UMTS Long Term Evolution Jan 28 2020 "Where this book is exceptional is that the reader will not just learn how LTE works but why it works" Adrian Scrase, ETSI Vice-President, International Partnership Projects Following on the success of the first edition, this book is fully updated, covering the latest additions to LTE and the key features of LTE-Advanced. This book builds on the success of its predecessor, offering the same comprehensive system-level understanding built on explanations of the underlying theory, now expanded to include complete coverage of Release 9 and the developing specifications for LTE-Advanced. The book is a collaborative effort of more than 40 key experts representing over 20 companies actively participating in the development of LTE, as well as academia. The book highlights practical implications, illustrates the expected performance, and draws comparisons with the well-known WCDMA/HSPA standards. The authors not only pay special attention to the physical layer, giving an insight into the fundamental concepts of OFDMA-FDMA and MIMO, but also cover the higher protocol layers and system architecture to enable the reader to gain an overall understanding of the system. Key New Features: Comprehensively updated with the latest changes of the LTE Release 8 specifications, including improved coverage of Radio Resource Management RF aspects and performance requirements Provides detailed coverage of the new LTE Release 9 features, including: eMBMS, dual-layer beamforming, user equipment positioning, home eNodeBs / femtocells and pico cells and self-optimizing networks Evaluates the LTE system performance Introduces LTE-Advanced, explaining its context and motivation, as well as the key new features including: carrier aggregation, relaying, high-order MIMO, and Cooperative Multi-Point transmission (CoMP). Includes an accompanying website containing a complete list of acronyms related to LTE and LTE-Advanced, with a brief description of each (http://www.wiley.com/go/sesia_theumts) This book is an invaluable reference for all research and development engineers involved in implementation of LTE or LTE-Advanced, as well as graduate and PhD students in wireless communications. Network operators, service providers and R&D managers will also find this book insightful.

UAV Communications for 5G and Beyond Mar 10 2021 Explore foundational and advanced issues in UAV cellular communications with this cutting-edge and timely new resource UAV Communications for 5G and Beyond delivers a comprehensive overview of the potential applications, networking architectures, research findings, enabling technologies, experimental measurement results, and industry standardizations for UAV communications in cellular systems. The book covers both existing LTE infrastructure, as well as future 5G-and-beyond systems. UAV Communications covers a range of topics that will be of interest to students and professionals alike. Issues of UAV detection and identification are discussed, as is the positioning of autonomous aerial vehicles. More fundamental subjects, like the necessary tradeoffs involved in UAV communication are examined in detail. The distinguished editors offer readers an opportunity to improve their ability to plan and design for the near-future, explosive growth in the number of UAVs, as well as the correspondingly demanding systems that come with them. Readers will learn about a wide variety of timely and practical UAV topics, like: Performance measurement for aerial vehicles over cellular networks, particularly with respect to existing LTE performance Inter-cell interference coordination with drones Massive multiple-input and multiple-output (MIMO) for Cellular UAV communications, including beamforming, null-steering, and the performance of forward-link C&C channels 3GPP standardization for cellular-supported UAVs, including UAV traffic requirements, channel modeling, and

interference challenges Trajectory optimization for UAV communications Perfect for professional engineers and researchers working in the field of unmanned aerial vehicles, UAV Communications for 5G and Beyond also belongs on the bookshelves of students in masters and PhD programs studying the integration of UAVs into cellular communication systems.

From GSM to LTE-Advanced Pro and 5G Apr 30 2020 A revised edition of the text that offers a comparative introduction to global wireless standards, technologies, and their applications The revised and updated fourth edition of From GSM to LTE-Advanced Pro and 5G: An Introduction to Mobile Networks and Mobile Broadband offers an authoritative guide to the technical descriptions of the various wireless technologies currently in use. The author—a noted expert on the topic—explains the rationale behind their differing mechanisms and implementations while exploring the advantages and limitations of each technology. The fourth edition reflects the significant changes in mobile network technology that have taken place since the third edition was published. The text offers a new chapter on 5G NR that explores its non-standalone and standalone architecture. In the Wi-Fi chapter, additional sections focus on the new WPA3 authentication protocol, the new 802.11ax air interface and protocol extensions like 802.11k and 11v for meshed networks. This important book: Presents the various systems based on the standards, their practical implementation and design assumptions, and their performance and capacity Provides an in-depth analysis of each system in practice Offers an updated edition of the most current changes to mobile network technology Includes questions at the end of each chapter and answers on the accompanying website that make this book ideal for self-study or as course material Written for students and professionals of wireless technologies, the revised fourth edition of From GSM to LTE-Advanced Pro and 5G provides an in-depth review and description of the most current mobile networks and broadband.

Evolved Cellular Network Planning and Optimization for UMTS and LTE Jul 26 2022 Most books on network planning and optimization provide limited coverage of either GSM or WCDMA techniques. Few scrape the surface of HSPA, and even fewer deal with TD-SCDMA. Filling this void, Evolved Cellular Network Planning and Optimization for UMTS and LTE presents an accessible introduction to all stages of planning and optimizing UMTS, HSPA,

An Introduction to LTE Jun 25 2022 Following on from the successful first edition (March 2012), this book gives a clear explanation of what LTE does and how it works. The content is expressed at a systems level, offering readers the opportunity to grasp the key factors that make LTE the hot topic amongst vendors and operators across the globe. The book assumes no more than a basic knowledge of mobile telecommunication systems, and the reader is not expected to have any previous knowledge of the complex mathematical operations that underpin LTE. This second edition introduces new material for the current state of the industry, such as the new features of LTE in Releases 11 and 12, notably coordinated multipoint transmission and proximity services; the main short- and long-term solutions for LTE voice calls, namely circuit switched fallback and the IP multimedia subsystem; and the evolution and current state of the LTE market. It also extends some of the material from the first edition, such as inter-operation with other technologies such as GSM, UMTS, wireless local area networks and cdma2000; additional features of LTE Advanced, notably heterogeneous networks and traffic offloading; data transport in the evolved packet core; coverage and capacity estimation for LTE; and a more rigorous treatment of modulation, demodulation and OFDMA. The author breaks down the system into logical blocks, by initially introducing the architecture of LTE, explaining the techniques used for radio transmission and reception and the overall operation of the system, and concluding with more specialized topics such as LTE voice calls and the later releases of the specifications. This methodical approach enables readers to move on to tackle the specifications and the more advanced texts

with confidence.

Introduction to Mobile Network Engineering: GSM, 3G-WCDMA, LTE and the Road to 5G Aug 27 2022 Summarizes and surveys current LTE technical specifications and implementation options for engineers and newly qualified support staff Concentrating on three mobile communication technologies, GSM, 3G-WCDMA, and LTE—while majorly focusing on Radio Access Network (RAN) technology—this book describes principles of mobile radio technologies that are used in mobile phones and service providers' infrastructure supporting their operation. It introduces some basic concepts of mobile network engineering used in design and rollout of the mobile network. It then follows up with principles, design constraints, and more advanced insights into radio interface protocol stack, operation, and dimensioning for three major mobile network technologies: Global System Mobile (GSM) and third (3G) and fourth generation (4G) mobile technologies. The concluding sections of the book are concerned with further developments toward next generation of mobile network (5G). Those include some of the major features of 5G such as a New Radio, NG-RAN distributed architecture, and network slicing. The last section describes some key concepts that may bring significant enhancements in future technology and services experienced by customers. Introduction to Mobile Network Engineering: GSM, 3G-WCDMA, LTE and the Road to 5G covers the types of Mobile Network by Multiple Access Scheme; the cellular system; radio propagation; mobile radio channel; radio network planning; EGPRS - GPRS/EDGE; Third Generation Network (3G), UMTS; High Speed Packet data access (HSPA); 4G-Long Term Evolution (LTE) system; LTE-A; and Release 15 for 5G. Focuses on Radio Access Network technologies which empower communications in current and emerging mobile network systems Presents a mix of introductory and advanced reading, with a generalist view on current mobile network technologies Written at a level that enables readers to understand principles of radio network deployment and operation Based on the author's post-graduate lecture course on Wireless Engineering Fully illustrated with tables, figures, photographs, working examples with problems and solutions, and section summaries highlighting the key features of each technology described Written as a modified and expanded set of lectures on wireless engineering taught by the author, Introduction to Mobile Network Engineering: GSM, 3G-WCDMA, LTE and the Road to 5G is an ideal text for post-graduate and graduate students studying wireless engineering, and industry professionals requiring an introduction or refresher to existing technologies.

Cellular Internet of Things Jul 22 2019 Cellular Internet of Things: From Massive Deployments to Critical 5G Applications, Second Edition, gives insights into the recent and rapid work performed by the 3rd Generation Partnership Project (3GPP) and the Multefire Alliance (MFA) to develop systems for the Cellular IoT. Beyond the technologies, readers will learn what the mMTC and cMTC market segments look like, deployment options and expected performance in terms of system capacity, expected battery lifetime, data throughput, access delay time and device cost, regulations for operation in unlicensed frequency bands, and how they impact system design and performance. This new edition contains updated content on the latest EC-GSM IoT, LTE-M and NB-IoT features in 3GPP Release 15, critical communication, i.e. URLLC, specified in 3GPP Release 15 for both LTE and NR, LTE-M and NB-IoT for unlicensed frequency bands specified in the Multefire Alliance (MFA), and an updated outlook of what the future holds in Industrial IoT and drone communications, amongst other topics. Provides ubiquitous wireless connectivity for a diverse range of services and applications, describing their performance and how their specifications were developed to meet the most demanding requirements Describes licensed and unlicensed technologies based on 2G, 4G and 5G technologies and how they have evolved towards the Cellular IoT Presents the Narrowband Internet of Things technology and how GSM, LTE and NR have been designed to provide Cellular Internet of Things services Provides use cases that cover ultra-low complex systems connecting billions of devices (massive MTC, mMTC), critical MTC and cMTC based on Ultra-Reliable and Low

Latency Communications (URLLC) to meet strict latency and reliability requirements

Essentials of LTE and LTE-A Aug 23 2019 This practical, one-stop guide will quickly bring you up to speed on LTE and LTE-Advanced. With everything you need to know about the theory and technology behind the standards, this is a must-have for engineers and managers in the wireless industry. • First book of its kind describing technologies and system performance of LTE-A • Covers the evolution of digital wireless technology, basics of LTE and LTE-A, design of downlink and uplink channels, multi-antenna techniques and heterogeneous networks • Analyzes performance benefits over competing technologies, including WiMAX and 802.16m • Reflects the latest LTE Release-10 standards • Includes numerous examples, including extensive system and link results • Unique approach is accessible to technical and non-technical readers alike

LTE Cellular Narrowband Internet of Things (NB-IoT) Oct 05 2020 NB-IoT is the Internet of Things (IoT) technology used for cellular communication. NB-IoT devices deliver much better capability and performance, such as: increased area coverage of up to one kilometer; a massive number of devices—up to 200,000—per a single base-station area; longer battery lifetime of ten years; and better indoor and outdoor coverage for areas with weak signal, such as underground garages. The cellular NB-IoT technology is a challenging technology to use and understand. With more than 30 projects presented in this book, covering many use cases and scenarios, this book provides hands-on and practical experience of how to use the cellular NB-IoT for smart applications using ArduinoTM, Amazon Cloud, Google Maps, and charts. The book starts by explaining AT commands used to configure the NB-IoT modem; data serialization and deserialization; how to set up the cloud for connecting NB-IoT devices; setting up rules, policy, security certificates, and a NoSQL database on the cloud; how to store and read data in the cloud; how to use Google Maps to visualize NB-IoT device geo-location; and how to use charts to visualize sensor datasets. Projects for Arduino are presented in four parts. The first part explains how to connect the device to the mobile operator and cellular network; perform communication using different network protocols, such as TCP, HTTP, SSL, or MQTT; how to use GPS for geo-location applications; and how to upgrade NB-IoT modem firmware over the air. The second part explains the microcontroller unit and how to build and run projects, such as a 7-segment display or a real-time clock. The third part explains how NB-IoT can be used with sensor devices, such as ultrasonic and environmental sensors. Finally, the fourth part explains how NB-IoT can be used to control actuators, such as stepper motors and relays. This book is a unique resource for understanding practical uses of the NB-IoT technology and serves as a handbook for technical and non-technical readers who are looking for practicing and exercising the cellular NB-IoT technology. The book can be used by engineers, students, researchers, system integrators, mobile operators' technical staff, and electronics enthusiasts. To download the software which can be used with the book, go to: https://github.com/5ghub/NB-IoT About the Author: Hossam Fattah is a technology expert in 4G/5G wireless systems and networking. He received his Ph.D. in Electrical and Computer Engineering from University of British Columbia, Vancouver, Canada in 2003. He received his Master of Applied Science in Electrical and Computer Engineering from University of Victoria, Victoria, Canada in 2000. He completed his B.Sc. degree in Computers and Systems Engineering from Al-Azhar University, Cairo, Egypt in 1995. Between 2003 and 2011, he was in academia and industry, including Texas A&M University. Between 2011 and 2013, he was with Spirent Communications, NJ, USA. Since 2013, he has been with Microsoft, USA. He is also an affiliate associate professor at University of Washington, Tacoma, WA, USA, teaching graduate courses on IoT and distributed systems and collaborating on 5G research and innovations. He has had many patents and technical publications in conferences and journals. He is a registered professional Engineer with the Association of Professional Engineers, British Columbia, Canada. He is the author of the recent book 5G LTE Narrowband

Internet of Things (NB-IoT). His research interest is in wireless communications and radio networks and protocols, cellular quality of service, radio resource management, traffic and packet scheduling, network analytics, and mobility.

LTE-Advanced and Next Generation Wireless Networks Jul 14 2021 LTE- A and Next Generation Wireless Networks: ChannelModeling and Performance describes recent advances inpropagation and channel modeling necessary for simulating nextgeneration wireless systems. Due to the radio spectrum scarcity,two fundamental changes are anticipated compared to the currentstatus. Firstly, the strict reservation of a specific band for aunique standard could evolve toward a priority policy allowing theco-existence of secondary users in a band allocated to a primarysystem. Secondly, a huge increase of the number of cells isexpected by combining outdoor base stations with smaller cells suchas pico/femto cells and relays. This evolution is accompanied withthe emergence of cognitive radio that becomes a reality interminals together with the development of self-organizationcapabilities and distributed cooperative behaviors. The book is divided into three parts: Part I addresses the fundamentals (e.g. technologies, channelmodeling principles etc.) Part II addresses propagation and modeling discussing topicssuch as indoor propagation, outdoor propagation, etc. Part III explores system performance and applications (e.g.MIMO Over-the-air testing, electromagnetic safety, etc).

Fundamentals of LTE Nov 06 2020 The Definitive Guide to LTE Technology Long-Term Evolution (LTE) is the next step in the GSM evolutionary path beyond 3G technology, and it is strongly positioned to be the dominant global standard for 4G cellular networks. LTE also represents the first generation of cellular networks to be based on a flat IP architecture and is designed to seamlessly support a variety of different services, such as broadband data, voice, and multicast video. Its design incorporates many of the key innovations of digital communication, such as MIMO (multiple input multiple output) and OFDMA (orthogonal frequency division multiple access), that mandate new skills to plan, build, and deploy an LTE network. In Fundamentals of LTE , four leading experts from academia and industry explain the technical foundations of LTE in a tutorial style—providing a comprehensive overview of the standards. Following the same approach that made their recent Fundamentals of WiMAX successful, the authors offer a complete framework for understanding and evaluating LTE. Topics include Cellular wireless history and evolution: Technical advances, market drivers, and foundational networking and communications technologies Multicarrier modulation theory and practice: OFDM system design, peak-to-average power ratios, and SC-FDE solutions Frequency Domain Multiple Access: OFDMA downlinks, SC-FDMA uplinks, resource allocation, and LTE-specific implementation Multiple antenna techniques and tradeoffs: spatial diversity, interference cancellation, spatial multiplexing, and multiuser/networked MIMO LTE standard overview: air interface protocol, channel structure, and physical layers Downlink and uplink transport channel processing: channel encoding, modulation mapping, Hybrid ARQ, multi-antenna processing, and more Physical/MAC layer procedures and scheduling: channel-aware scheduling, closed/open-loop multi-antenna processing, and more Packet flow, radio resource, and mobility management: RLC, PDCP, RRM, and LTE radio access network mobility/handoff procedures

LTE and the Evolution to 4G Wireless Sep 16 2021 A practical guide to LTE design, test and measurement, this new edition has been updated to include the latest developments This book presents the latest details on LTE from a practical and technical perspective. Written by Agilent’s measurement experts, it offers a valuable insight into LTE technology and its design and test challenges. Chapters cover the upper layer signaling and system architecture evolution (SAE). Basic concepts such as MIMO and SC-FDMA, the new uplink modulation scheme, are introduced and explained, and the authors look into the challenges of verifying the designs of the receivers, transmitters and protocols of LTE systems. The latest information on RF and signaling conformance testing is delivered by authors participating in the

LTE 3GPP standards committees. This second edition has been considerably revised to reflect the most recent developments of the technologies and standards. Particularly important updates include an increased focus on LTE-Advanced as well as the latest testing specifications. Fully updated to include the latest information on LTE 3GPP standards Chapters on conformance testing have been majorly revised and there is an increased focus on LTE-Advanced Includes new sections on testing challenges as well as over the air MIMO testing, protocol testing and the most up-to-date test capabilities of instruments Written from both a technical and practical point of view by leading experts in the field

LTE-A Cellular Networks Jan 08 2021 In this book, three different methods are presented to enhance the capacity and coverage area in LTE-A cellular networks. The scope involves the evaluation of the effect of the RN location in terms of capacity and the determination of the optimum location of the relay that provides maximum achievable data rate for users with limited interference at the cell boundaries. This book presents a new model to enhance both capacity and coverage area in LTE-A cellular network by determining the optimum location for the RN with limited interference. The new model is designed to enhance the capacity of the relay link by employing two antennas in RN. This design enables the relay link to absorb more users at cell edge regions. An algorithm called the Balance Power Algorithm (BPA) is developed to reduce MR power consumption. The book pertains to postgraduate students and researchers in wireless & mobile communications.

From LTE to LTE-Advanced Pro and 5G Dec 07 2020 This practical hands-on new resource presents LTE technologies from end-to-end, including network planning and the optimization tradeoff process. This book examines the features of LTE-Advanced and LTE-Advanced Pro and how they integrate into existing LTE networks. Professionals find in-depth coverage of how the air interface is structured at the physical layer and how the related link level protocols are designed and work. This resource highlights potential 5G solutions as considered in releases 14 and beyond, the migration paths, and the challenges involved with the latest updates and standardization process. Moreover, the book covers performance analysis and results, as well as SON specifications and realization. Readers learn about OFDMA, and how DFT is used to implement it. Link budgeting, parameter estimations, and network planning and sizing is explained. Insight into core network architecture is provided, including the protocols and signaling used for both data and voice services. The book also presents a detailed chapter on the end-to-end data transfer optimization mechanisms based on the TCP protocol. This book provides the tools needed for network planning and optimization while addressing the challenges of LTE and LTE-advanced networks.

Modeling and Dimensioning of Mobile Wireless Networks Aug 15 2021 This book is a must-read for all network planners and other professionals wishing to improve the quality and cost efficiency of 3G and LTE networks In this book, the authors address the architecture of the 2/3G network and the Long Term Evolution (LTE) network. The book proposes analytical models that make the analysis and dimensioning of the most important interfaces, i.e. WCDMA or Iub, possible. Furthermore, the authors include descriptions of fundamental technological issues in 2/3 G networks, basic traffic engineering models and frequent examples of the application of analytical models in the analysis and dimensioning of the interface of cellular networks. The specific knowledge included in the content will enable the reader to understand and then to prepare appropriate programming softwares that will allow them to evaluate quality parameters of cellular networks, i.e. blocking probabilities or call losses. Additionally, the book presents models for the analysis and dimensioning of the Wideband Code Division Multiple Access (WCDMA) radio interface and the Iub interface, both carrying a mixture of Release 99 traffic (R99) and High-Speed Packet Access (HSPA) traffic streams. Finally, the analytical models presented in the book can be also used in the process of modeling and optimization of LTE networks. Key

Features: Describes the architecture and the modes of operation of the cellular 2/3/4G systems and the LTE network Covers the traffic theory and engineering within the context of mobile networks Presents original analytical methods that enable their users to dimension selected interfaces of cellular networks Discusses models for the analysis and dimensioning of the Wideband Code Division Multiple Access (WCDMA) radio interface and the Iub interface, both carrying a mixture of Release 99 traffic (R99) and High-Speed Packet Access (HSPA) traffic streams Includes problems as well as an accompanying website containing solutions, software tools and interactive flash animations (http://wiley.teletraffic.pl) This book will be an invaluable guide for professional engineers (radio planning engineers, optimization engineers, transmission engineers, core network engineers, Service Management engineers) working in the areas of mobile wireless networks technology, not only in optimization process, but also in profitability assessment of newly implemented services (i.e. in NPV - Net Present Value analysis), and researchers and scientists. Advanced students in the fields of mobile communications networks and systems will also find this book insightful.

Heterogeneous Networks in LTE-Advanced Dec 27 2019 A comprehensive summary of theoretical and practical developments in LTE Heterogeneous Networks The last decade has witnessed the proliferation of mobile broadband data and the trend is likely to increase in the coming years. Current cellular networks are ill equipped to deal with this surge in demand. To satisfy user demand and maximize profits, a new paradigm to operate networks is needed. Heterogeneous networks, that deploy an overlay of small cells with limited coverage and transmit power, over a macro coverage area is the solution by providing capacity and coverage where it is needed. This book presents a comprehensive overview of small cell based heterogeneous networks within the framework of 3GPP LTE-Advanced which is the major enabler of current and future heterogeneous networks. The book first establishes the basics of LTE standards 8 -10. Wherever relevant, the underlying theory of wireless communications is explained and the signaling and protocol aspects of LTE Releases 8-10 are presented. Next the book presents a systematic study of the inter cell interference (eICIC and FeICIC) mechanisms that have been standardized in LTE releases 10 and 11 to mitigate the interference arising in heterogeneous networks. From simple blank subframe design and implementation, the book discusses more advanced transceiver signal processing and carrier aggregation (CA) based mechanisms to improve performance. Besides data, control channel enhancements such as enhanced PDCCH (ePDCCH) are also discussed. Subsequently the book discusses the possibility of base stations being allowed to coordinate to manage interference. This technique, called CoMP, has the potential of vastly improving network performance. However several practical challenges first have to be overcome before this potential can be realized. The book presents the different CoMP categories introduced in LTE release 11, the required signal processing and the changes that were introduced in Release-11 for supporting CoMP. The book then presents the state of the art developments in heterogeneous networks that are currently taking place in 3GPP with the initiation of Release 12. A whole array of new technologies have been introduced such as dynamic switching of small cells, new carrier types with reduced control signaling, dynamic reconfiguration of TDD-LTE, joint configuration of TDD and FDD via carrier aggregation and lastly advanced MIMO signal processing with three dimensional beamforming. All these technologies will work in unison leading to efficient operations of small cells. The authors thus comprehensively summarize the advances in heterogeneous networks over the last couple of years as reflected in various LTE releases and then look ahead at what to expect in the future. Fully illustrated throughout and with an accompanying website including Matlab code for simulating heterogeneous networks, LTE channel models, and References to 3GPP specifications, contributions, and updates on recent standardization activities. The authors, being involved in LTE standardization, are well placed to give an excellent

view on this topic, including valuable background and design rationale. A comprehensive summary of wireless communications theory and practical developments in LTE heterogeneous networks. Authors are experts in this field and are active members in standardization proceedings, enabling up-to-date coverage of current developments Multiple case studies explain network design optimization of various heterogeneous network deployments. Accompanying website includes Matlab code for simulating heterogeneous networks, LTE channel models, and References to 3GPP specifications, contributions, and updates on recent standardization activities Essential reading for Engineers and practitioners in wireless industry.

5G Mobile Communications Feb 09 2021 This book provides a comprehensive overview of the emerging technologies for next-generation 5G mobile communications, with insights into the long-term future of 5G. Written by international leading experts on the subject, this contributed volume covers a wide range of technologies, research results, and networking methods. Key enabling technologies for 5G systems include, but are not limited to, millimeter-wave communications, massive MIMO technology and non-orthogonal multiple access. 5G will herald an even greater rise in the prominence of mobile access based upon both human-centric and machine-centric networks. Compared with existing 4G communications systems, unprecedented numbers of smart and heterogeneous wireless devices will be accessing future 5G mobile systems. As a result, a new paradigm shift is required to deal with challenges on explosively growing requirements in mobile data traffic volume (1000x), number of connected devices (10–100x), typical end-user data rate (10–100x), and device/network lifetime (10x). Achieving these ambitious goals calls for revolutionary candidate technologies in future 5G mobile systems. Designed for researchers and professionals involved with networks and communication systems, 5G Mobile Communications is a straightforward, easy-to-read analysis of the possibilities of 5G systems.

An Introduction to LTE Feb 27 2020 An Introduction to LTE explains the technology used by 3GPP Long Term Evolution. The book covers the whole of LTE, both the techniques used for radio communication between the base station and the mobile phone, and the techniques used for signalling communication and data transport in the evolved packet core. It avoids unnecessary detail, focussing instead on conveying a sound understanding of the entire system. The book is aimed at mobile telecommunication professionals, who want to understand what LTE is and how it works. It is invaluable for engineers who are working on LTE, notably those who are transferring from other technologies such as UMTS and cdma2000, those who are experts in one part of LTE but who want to understand the system as a whole, and those who are new to mobile telecommunications altogether. It is also relevant to those working in non technical roles, such as project managers, marketing executives and intellectual property consultants. On completing the book, the reader will have a clear understanding of LTE, and will be able to tackle the more specialised books and the 3GPP specifications with confidence. Key features - Covers the latest developments in release 10 of the 3GPP specifications, including the new capabilities of LTE-Advanced Includes references to individual sections of the 3GPP specifications, to help readers understand the principles of each topic before going to the specifications for more detailed information Requires no previous knowledge of mobile telecommunications, or of the mathematical techniques that LTE uses for radio transmission and reception

From GSM to LTE-Advanced Pro and 5G Jun 13 2021 A comparative introduction to major global wireless standards, technologies and their applications From GSM to LTE-Advanced Pro and 5G: An Introduction to Mobile Networks and Mobile Broadband, 3rd Edition provides technical descriptions of the various wireless technologies currently in use. It explains the rationales behind their differing mechanisms and implementations while exploring the advantages and limitations of each technology. This edition has been fully updated and substantially expanded to reflect the significant evolution in mobile network technology occurring over the past several

years. The chapter on LTE has been extensively enhanced with new coverage of current implementations of LTE carrier aggregation, mobility management, cell reselection and handover procedures, as well as the latest developments in 5G radio and core networks in 3GPP. It now features additional information on the TD-LTE air interface, IPv6 in mobile networks, Network Function Virtualization (NFV) and Narrowband Internet of Things (NB-IOT). Voice-over-LTE (VoLTE) is now treated extensively in a separate chapter featuring coverage of the VoLTE call establishment process, dedicated bearer setup, header compression, speech codec and bandwidth negotiation, supplementary service configuration and VoLTE emergency calls. In addition, extensive coverage of Voice-over-Wifi and mission critical communication for public safety organizations over LTE has been added. The WLAN chapter now provides coverage of WPA2-Professional with certificates for authentication in large deployments, such as the global Eduroam network and the new WLAN 60 GHz air interface. Bluetooth evolution has been addressed by including a detailed description of Bluetooth Low Energy (BLE) in the chapter devoted to Bluetooth. Describes the different systems based on the standards, their practical implementation and design assumptions, and the performance and capacity of each system in practice is analyzed and explained Questions at the end of each chapter and answers on the accompanying website make this book ideal for self-study or as course material.

LTE and the Evolution to 4G Wireless Nov 18 2021 A practical guide to LTE design, test and measurement, this new edition has been updated to include the latest developments This book presents the latest details on LTE from a practical and technical perspective. Written by Agilent's measurement experts, it offers a valuable insight into LTE technology and its design and test challenges. Chapters cover the upper layer signaling and system architecture evolution (SAE). Basic concepts such as MIMO and SC-FDMA, the new uplink modulation scheme, are introduced and explained, and the authors look into the challenges of verifying the designs of the receivers, transmitters and protocols of LTE systems. The latest information on RF and signaling conformance testing is delivered by authors participating in the LTE 3GPP standards committees. This second edition has been considerably revised to reflect the most recent developments of the technologies and standards. Particularly important updates include an increased focus on LTE-Advanced as well as the latest testing specifications. Fully updated to include the latest information on LTE 3GPP standards Chapters on conformance testing have been majorly revised and there is an increased focus on LTE-Advanced Includes new sections on testing challenges as well as over the air MIMO testing, protocol testing and the most up-to-date test capabilities of instruments Written from both a technical and practical point of view by leading experts in the field

Cellular Internet of Things Nov 25 2019 Cellular Internet of Things: Technologies, Standards and Performance gives insight into the recent work performed by the 3rd Generation Partnership Project (3GPP) to develop systems for the Cellular Internet of Things. It presents both the design of the new Narrowband Internet of Things (NB-IoT) technology and how GSM and LTE have evolved to provide Cellular Internet of Things services. The criteria used for the design and objectives of the standardization work are explained, and the technical details and performance of each technology is presented. This book discusses the overall competitive landscape for providing wireless connectivity, also introducing the most promising technologies in the market. Users will learn how cellular systems work and how they can be designed to cater to challenging new requirements that are emerging in the telecom industry, what the physical layers and procedures in idle and connected mode look like in EC-GSM-IoT, LTE-M, and NB-IoT, and what the expected performance of these new systems is in terms of expected coverage, battery lifetime, data throughput, access delay time and device cost. Provides a detailed introduction to the EC-GSM-IoT, LTE-M and NB-IoT technologies Presents network performance of the

3GPP cellular technologies, along with an analysis of the performance of non-cellular alternatives operating in unlicensed spectrum Includes prediction of true performance levels using state-of-the-art simulation models developed in the 3GPP standardization process

From GSM to LTE Feb 21 2022 A new edition of Wiley's Communication Systems for the Mobile Information Society, from the same author Wireless systems such as GSM, UMTS, LTE, WiMAX, Wi-Fi and Bluetooth offer possibilities to keep people connected while on the move. In this flood of technology, From GSM to LTE: An Introduction to Mobile Networks and Mobile Broadband enables readers to examine and understand each technology, and how to utilise several different systems for the best results. This book contains not only a technical description of the different wireless systems available today, but also explains the rationale behind the different mechanisms and implementations; not only the 'how' but also the 'why' is focused on. Thus the advantages and also limitations of each technology become apparent. Offering a solid introduction to major global wireless standards and comparisons of the different wireless technologies and their applications, this new edition has been updated to provide the latest directions and activities in 3GPP standardization reaching up to Release 10, and importantly includes a new chapter on LTE. The new LTE chapter covers aspects such as Mobility Management and Power Optimization, Voice over LTE, and Air Interface and Radio Network. Provides readers with an introduction to major global wireless standards and compares the different wireless technologies and their applications The performance and capacity of each system in practice is analyzed and explained, accompanied with practical tips on how to discover the functionality of different networks Offers approximately 25% new material, which includes a major new chapter on LTE and updates to the existing material including Release 4 BICN in relation to GSM Questions at the end of each chapter and answers on the accompanying website (http://www.wirelessmoves.com) make this book ideal for self study or as course material