

LTE-Advanced Air Interface Technology

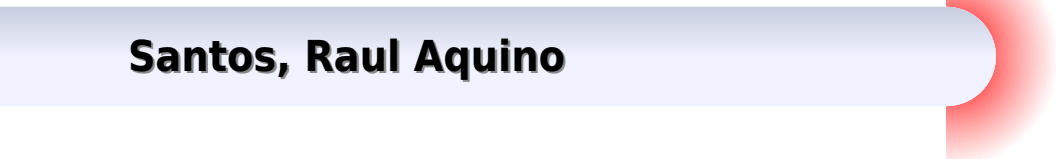
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Lte Advanced Air Interface Technology

Santos, Raul Aquino



Lte Advanced Air Interface Technology:

LTE-Advanced Air Interface Technology Xincheng Zhang,Xiaojin Zhou,2012-09-05 Opportunities are at hand for professionals eager to learn and apply the latest theories and practices in air interface technologies Written by experienced researchers and professionals LTE Advanced Air Interface Technology thoroughly covers the performance targets and technology components studied by 3GPP for LTE Advanced Besides being an explanatory text about LTE Advanced air interface technology this book exploits the technical details in the 3GPP specification and explains the motivation and implication behind the specifications After a general description of wireless cellular technology evolution and the performance targets and major technical features of LTE Advanced LTE Advanced Air Interface Technology discusses various innovative technical features in detail including Innovative concepts in carrier aggregation techniques Collaborative multipoint CoMP theory and performance analysis Enhanced multiantenna solutions or multiple input multiple output MIMO technology in particular multiuser and multilayer MIMO Relaying issues Self organizing and heterogeneous networks Interference suppression and enhanced intercell interference coordination eICIC technology This book opens the door of LTE A technology for practitioners in any stage of wireless communications Beginning with basic communication principles the book demonstrates how a complete wireless theory is built Readers can work independently on original case studies and simulation programming examples with an emphasis on technology and performance Designed for professionals interested in gaining an upper hand this book is the ideal educational and informative resource in the emerging field of air interface technology SAE and the Evolved Packet Core Magnus Olsson,Catherine Mulligan,Stefan Rommer,Shabnam Sultana,Lars Frid,2009-08-01 This book provides a clear concise complete and authoritative introduction to System Architecture Evolution SAE standardization work and its main outcome the Evolved Packet Core EPC including potential services and operational scenarios After providing an insightful overview of SAE s historical development the book gives detailed explanations of the EPC architecture and key concepts as an introduction In depth technical descriptions of EPC follow including thorough functional accounts of the different components of EPC protocols network entities and procedures Case studies of deployment scenarios show how the functions described within EPC are placed within a live network context while a description of the services that are predicted to be used shows what EPC as a core network can enable This book is an essential resource for professionals and students who need to understand the latest developments in SAE and EPC the engine that connects broadband access to the internet All of the authors have from their positions with Ericsson been actively involved in GPRS SAE and 3GPP from a business and

technical perspective for many years Several of the authors have also been actively driving the standardization efforts within 3GPP There is no doubt that this book which appears just when the mobile industry starts its transition away from legacy GSM GPRS and UMTS networks into the future will become the reference work on SAE LTE There are no better qualified persons than the authors of this book to provide both communication professionals and an interested general public with insights into the inner workings of SAE LTE Not only are they associated with one of the largest mobile network equipment vendors in the world they have all actively contributed to and in some cases been the driving forces behind the development of SAE LTE within 3GPP from the foreword by Dr Ulf Nilsson TeliaSonera R D Mobility Core and Connectivity The authors have done an excellent job in writing this book Their familiarity with the requirements concepts and solution alternatives as well as the standardization work allows them to present the material in a way that provides easy communication between Architecture and Standards groups and Planning Operational groups within service provider organizations from the foreword by Dr Kalyani Bogineni Principal Architect Verizon Up to date coverage of SAE including the latest standards development Easily accessible overview of the architecture and concepts defined by SAE Thorough description of the Evolved Packet Core for LTE fixed and other wireless accesses Comprehensive explanation of SAE key concepts security and Quality of Service Covers potential service and operator scenarios including interworking with existing 3GPP and 3GPP2 systems Detailed walkthrough of network entities protocols and procedures Written by established experts in the SAE standardization process all of whom have extensive experience and understanding of its goals history and vision

Multihomed Communication with SCTP (Stream Control Transmission Protocol) Victor C.M. Leung,Eduardo Parente Ribeiro,Alan Wagner,Janardhan Iyengar,2012-12-19 Although multihomed communication is a rapidly emerging trend for next generation networks no known book explores multihomed communication with the Stream Control Transmission Protocol SCTP Filling this void Multihomed Communication with SCTP Stream Control Transmission Protocol explains this innovative feature that allows an endpoint to simultaneously maintain and use multiple points of connectivity to the network making it possible for fixed and mobile users to connect to the Internet via multiple service providers or last hop technologies Among the topics addressed the book covers Support of node mobility between networks Concurrent multipath transfer using SCTP multihoming Low delay communication and multimedia applications High performance computing using commodity hardware and software SCTP support in the INET framework and its analysis in the Wireshark packet analyzer SCTP application interface Ideal for researchers and programmers this forward looking reference describes SCTP multihoming concepts and implementation applications of multihoming across different domains and proposed extensions such as multipath transfer and mobility Although the book is aimed at those with an advanced background it also covers the fundamental concepts and mechanisms of SCTP multihoming to help anyone get up to speed on SCTP

Intelligent Sensor Networks Fei Hu,Qi Hao,2012-12-15 In the last decade wireless or wired sensor networks have attracted much attention However most designs target general

sensor network issues including protocol stack routing MAC etc and security issues This book focuses on the close integration of sensing networking and smart signal processing via machine learning Based on their world class research the authors present the fundamentals of intelligent sensor networks They cover sensing and sampling distributed signal processing and intelligent signal learning In addition they present cutting edge research results from leading experts

Leading Effective Virtual Teams Nancy M. Settle-Murphy, 2012-12-13 A proliferation of new technologies has lulled many into thinking that we actually have to think less about how we communicate In fact communicating and collaborating across time distance and cultures has never been more complex or difficult Written as a series of bulleted tips drawn from client experiences and best practices *Leading Effective Virtual Teams Overcoming Time and Distance to Achieve Exceptional Results* presents practical tips to help leaders engage and motivate their geographically dispersed project team members If you re a leader of any type of virtual team and want to help your team members collaborate more effectively then buy this book You will learn how to Build trust and cultivate relationships virtually across your team Design and facilitate virtual meetings that are focused and engaging Influence without authority Motivate and galvanize a virtual team for top performance Blend asynchronous and synchronous communications for better virtual collaboration Navigate cross cultural and generational differences in the absence of vital visual cues Assess skills strengths aptitudes and preferences from afar Handle other tough issues that can trip up virtual teams The ideas in this book are based on Nancy Settle Murphy s decades of experience working as a change management consultant facilitator and trainer for project teams around the world Designed to be read section by section in any order this book shares approaches and techniques to help you address some of the toughest challenges virtual team leaders face including keeping team members engaged from afar *Ad Hoc Mobile Wireless Networks* Subir Kumar Sarkar, T.G. Basavaraju, C. Puttamadappa, 2016-04-19 The military the research community emergency services and industrial environments all rely on ad hoc mobile wireless networks because of their simple infrastructure and minimal central administration Now in its second edition *Ad Hoc Mobile Wireless Networks Principles Protocols and Applications* explains the concepts mechanism design and *Next Generation Mobile Broadcasting* David Gomez-Barquero, 2013-03-26 This book provides an overview of the past present and future in mobile multimedia broadcasting The first part of the book supplies an overview of the new generation mobile broadcasting technologies currently available The second part describes the cutting edge mobile broadcast technology known as DVB NGH Digital Video Broadcasting Next Generation Handheld which is expected to significantly outperform existing technologies in both capacity and coverage The book is edited by a member of the DVB NGH standardization group and contains contributions from the different standardization groups worldwide *Security and Privacy in Smart Grids* Yang Xiao, 2016-04-19 Presenting the work of prominent researchers working on smart grids and related fields around the world *Security and Privacy in Smart Grids* identifies state of the art approaches and novel technologies for smart grid communication and

security It investigates the fundamental aspects and applications of smart grid security and privacy and reports on the latest advances in the range of related areas making it an ideal reference for students researchers and engineers in these fields The book explains grid security development and deployment and introduces novel approaches for securing today s smart grids Supplying an overview of recommendations for a technical smart grid infrastructure the book describes how to minimize power consumption and utility expenditure in data centers It also Details the challenges of cybersecurity for smart grid communication infrastructures Covers the regulations and standards relevant to smart grid security Explains how to conduct vulnerability assessments for substation automation systems Considers smart grid automation SCADA system security and smart grid security in the last mile The book s chapters work together to provide you with a framework for implementing effective security through this growing system Numerous figures illustrations graphs and charts are included to aid in comprehension With coverage that includes direct attacks smart meters and attacks via networks this versatile reference presentsactionable suggestions you can put to use immediately to prevent such attacks

Building Next-Generation Converged Networks Al-Sakib Khan Pathan,Muhammad Mostafa Monowar,Zubair Md. Fadlullah,2013-01-29 Providing a comprehensive introduction to next generation networks this book strikes a balance between how and why things work and making them work It examines Internet architectures and protocols network management and traffic engineering embedded systems and sensor networks web services cloud technologies and next generation wireless networking Containing the contributions of top industry experts and academics the book investigates new technologies such as IPv6 over Low Power Wireless Personal Area Networks 6LoWPAN architectures and standards mobility and security

5G NR Modelling in MATLAB Tulsi Pawan Fowdur,Madhavsinh Indoonundon,Dragorad A. Milovanovic,Zoran S. Bojkovic,2024-06-30 5G is the fifth generation of wireless technology and NR stands for a new radio interface and radio access technology for cellular networks i e a physical connection method for radio based communication It is a powerful platform that supports a wide range of services that includes enhanced mobile broadband massive machine type communication and ultra reliability and low latency covering several vertical industries such as e health transportation energy media and factories automation This book provides a detailed description of the fundamental aspects of 5G It gives an in depth coverage of the network architecture of 5G by considering both the network reference point architecture and the service based architecture It also describes all the user and control plane protocols including the standalone and non standalone architecture options The radio access technologies such as the waveforms used in 5G the multi access and duplexing techniques as well as the resource allocation schemes are treated in details Additionally the physical layer signal processing blocks of 5G NR are covered in depth with elaborate numerical examples to illustrate the functioning of each block in the 5G downlink transmitter and receiver chain The main originality of this book is the detailed illustration of the 5G NR pre processing steps as well as Matlab simulation models with explanation on the codes to allow for a seamless understanding of the principles In general

this book is meant for anyone with a basic engineering background who would be interested to acquire a solid foundation in the fundamental concepts of 5G NR

Opportunistic Spectrum Sharing and White Space Access Oliver Holland, Hanna Bogucka, Arturas Medeisis, 2015-04-22 Details the paradigms of opportunistic spectrum sharing and white space access as effective means to satisfy increasing demand for high speed wireless communication and for novel wireless communication applications This book addresses opportunistic spectrum sharing and white space access being particularly mindful of practical considerations and solutions In Part I spectrum sharing implementation issues are considered in terms of hardware platforms and software architectures for realization of flexible and spectrally agile transceivers Part II addresses practical mechanisms supporting spectrum sharing including spectrum sensing for opportunistic spectrum access machine learning and decision making capabilities aggregation of spectrum opportunities and spectrally agile radio waveforms Part III presents the ongoing work on policy and regulation for efficient and reliable spectrum sharing including major recent steps forward in TV White Space TVWS regulation and associated geolocation database approaches policy management aspects and novel licensing schemes supporting spectrum sharing In Part IV business and economic aspects of spectrum sharing are considered including spectrum value modeling discussion of issues around disruptive innovation that are pertinent to opportunistic spectrum sharing and white space access and business benefits assessment of the novel spectrum sharing regulatory proposal Licensed Shared Access Part V discusses deployments of opportunistic spectrum sharing and white space access solutions in practice including work on TVWS system implementations standardization activities and development and testing of systems according to the standards Discusses aspects of pioneering standards such as the IEEE 802.22 Wi-Fi standard the IEEE 802.11af White-Fi standard the IEEE Dynamic Spectrum Access Networks Standards Committee standards and the ETSI Reconfiguration Radio Systems standards Investigates regulatory and regulatory linked solutions assisting opportunistic spectrum sharing and white space access including geo location database approaches and licensing enhancements Covers the pricing and value of spectrum the economic effects and potentials of such technologies and provides detailed business assessments of some particularly innovative regulatory proposals The flexible and efficient use of radio frequencies is necessary to cater for the increasing data traffic demand worldwide This book addresses this necessity through its extensive coverage of opportunistic spectrum sharing and white space access solutions

Opportunistic Spectrum Sharing and White Space Access: The Practical Reality is a great resource for telecommunication engineers researchers and students

Cellular Communication Networks and Standards Wei Jiang, Bin Han, 2024-07-12 This textbook provides a comprehensive review of the evolution of mobile communications and networking from the birth of cellular networks to the forthcoming sixth generation mobile communications which is envisioned to be commercially deployed first in 2030 New students who are coming to wireless communications electrical engineering computer networking telecommunications and network engineering can benefit from this book by quickly grasping the whole history of cellular

networks understanding its trends This tutorial styled textbook provides a comprehensive overview but also provides details of the system design aspects of the various cellular generations up to 6G and how they build on each other The book also gives the student an overview of different cellular generations motivations core technologies architecture key performance indicators killer applications market drivers and the general main features of each The authors capture the big picture and fundamental drivers of wireless communication technologies and then motivate students to understand the importance of learning related subjects such as electromagnetics theory antenna design analog and digital circuits signal processing Internet protocols artificial intelligence etc The book features homework questions and case studies throughout

HSPA Performance and Evolution Pablo Tapia,Jun Liu,Yasmin Karimli,Martin Feuerstein,2009-03-03 Written from an operator's viewpoint HSPA Performance and Evolution explores the lessons learned and techniques developed for optimally deploying HSPA High Speed Packet Access The essential distinctions between rolling out HSPA compared to earlier UMTS and GSM technologies are explained covering the many issues that must be specifically handled Areas in standards which have been left open for interpretation causing significant differences between vendor implementations are identified and solutions explored This book is invaluable in enabling wireless operators to extract maximum performance offered by 3GPP's HSPA radio technology consisting of both downlink HSDPA and uplink HSUPA elements It focuses on real world performance sharing practical implementation methods and tradeoffs for deploying optimizing and maintaining networks using the HSPA air interface Examines algorithms equipment and performance perspectives to identify and explain HSPA Measures performance and sets network parameters for optimal tradeoffs Presents results from practical and real world network performances Explores the evolution of HSPA technology into HSPA and eventually next generation LTE technologies

Radio Resource Management in Multi-Tier Cellular Wireless Networks Ekram Hossain,Long Bao Le,Dusit Niyato,2013-11-25 Providing an extensive overview of the radio resource management problem in femtocell networks this invaluable book considers both code division multiple access femtocells and orthogonal frequency division multiple access femtocells In addition to incorporating current research on this topic the book also covers technical challenges in femtocell deployment provides readers with a variety of approaches to resource allocation and a comparison of their effectiveness explains how to model various networks using Stochastic geometry and shot noise theory and much more

Broadband Wireless Access Networks for 4G: Theory, Application, and Experimentation Santos, Raul Aquino,2013-12-31 With the increased functionality demand for mobile speed and access in our everyday lives broadband wireless networks have emerged as the solution in providing high data rate communications systems to meet these growing needs Broadband Wireless Access Networks for 4G Theory Application and Experimentation presents the latest trends and research on mobile ad hoc networks vehicular ad hoc networks and routing algorithms which occur within various mobile networks This publication smartly combines knowledge and experience from enthusiastic scholars and expert researchers in the area of

wideband and broadband wireless networks Students professors researchers and other professionals in the field will benefit from this book s practical applications and relevant studies

5G Mobile Communications Saad Asif,2018-07-20 This book will help readers comprehend technical and policy elements of telecommunication particularly in the context of 5G It first presents an overview of the current research and standardization practices and lays down the global frequency spectrum allocation process It further lists solutions to accommodate 5G spectrum requirements The readers will find a considerable amount of information on 4G LTE Advanced LTE Advance Pro 5G NR New Radio transport network technologies 5G NGC Next Generation Core OSS Operations Support Systems network deployment and end to end 5G network architecture Some details on multiple network elements end products such as 5G base station small cells and the role of semiconductors in telecommunication are also provided Keeping trends in mind service delivery mechanisms along with state of the art services such as MFS mobile financial services mHealth mobile health and IoT Internet of Things are covered at length At the end telecom sector s burning challenges and best practices are explained which may be looked into for today s and tomorrow s networks The book concludes with certain high level suggestions for the growth of telecommunication particularly on the importance of basic research departure from ten year evolution cycle and having a 20 30 year plan Explains the conceivable six phases of mobile telecommunication s ecosystem that includes R D standardization product network device application development and burning challenges and best practices Provides an overview of research and standardization on 5G Discusses solutions to address 5G spectrum requirements while describing the global frequency spectrum allocation process Presents various case studies and policies Provides details on multiple network elements and the role of semiconductors in telecommunication Presents service delivery mechanisms with special focus on IoT

Mobile WiMAX Sassan Ahmadi,2010-12-22 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 Mobile and Wireless Communications for IMT-Advanced and Beyond Afif Osseiran, Jose F. Monserrat, Werner Mohr, 2011-08-08 A timely addition to the understanding of IMT Advanced this book places particular emphasis on the new areas which IMT Advanced technologies rely on compared with their predecessors These latest areas include Radio Resource Management Carrier Aggregation improved MIMO support and Relaying Each technique is thoroughly described and illustrated before being surveyed in context of the LTE Advanced standards The book also presents state of the art information on the different aspects of the work of standardization bodies such as 3GPP and IEEE making global links between them Explores the latest research innovations to assess the future of the LTE standard Covers the latest research techniques for beyond IMT Advanced such as Coordinated multi point systems CoMP Network Coding Device to Device and Spectrum Sharing Contains key information for researchers from academia and industry engineers regulators and decision makers working on LTE Advanced and beyond **Broadband Access** Steven Gorshe, Arvind Raghavan, Thomas Starr, Stefano Galli, 2014-03-07 Written by experts in the field this book provides an overview of all forms of broadband subscriber access networks and technology including fiber optics DSL for phone lines DOCSIS for coax power line carrier and wireless Each technology is described in depth with a discussion of key concepts historical development and industry standards The book contains comprehensive coverage of all broadband access technologies with a section each devoted to fiber based technologies non fiber wired technologies and wireless technologies The four co authors breadth of knowledge is featured in the chapters comparing the relative strengths weaknesses and prognosis for the competing technologies Key Features Covers the physical and medium access layers OSI Layer 1 and 2 with emphasis on access transmission technology Compares and contrasts all recent and emerging wired and wireless standards for broadband access in a single reference Illustrates the technology that is currently being deployed by network providers and also the technology that has recently been or will soon be standardized for deployment in the coming years including vectoring wavelength division multiple access CDMA OFDMA and MIMO Contains detailed discussion on the following standards 10G EPON G PON XG PON VDSL2 DOCSIS 3.0 DOCSIS Protocol over EPON power line carrier IEEE 802.11 WLAN WiFi UMTS HSPA LTE and LTE Advanced

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