# Design, Deployment and Performance of 4G LTE Networks

A Practical Approach



Ayman ElNashar Mohamed A. El-saidny Mahmoud Sherif

WILEY

Michael W. Berry, Azlinah Mohamed, Bee Wah Yap

Design, Deployment and Performance of 4G-LTE Networks Ayman ElNashar, Mohamed A. El-saidny, Mahmoud Sherif, 2014-03-13 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 Design, Deployment and Performance of 4G-LTE Networks Ayman ElNashar, 2014 The book

presents analysis of LTE coverage and link budgets alongside a detailed comparative analysis with HSPA **Practical** Guide to LTE-A, Volte and IoT Ayman ElNashar, Mohamed A. El-saidny, 2018-08-27 Essential reference providing best practice of LTE A Volte and IoT Design deployment Performance and evolution towards 5G This book is a practical guide to the design deployment and performance of LTE A VoLTE IMS and IoT A comprehensive practical performance analysis for VoLTE is conducted based on field measurement results from live LTE networks Also it provides a comprehensive introduction to IoT and 5G evolutions Practical aspects and best practice of LTE A IMS VoLTE IoT are presented Practical aspects of LTE Advanced features are presented In addition LTE LTE A network capacity dimensioning and analysis are demonstrated based on live LTE LTE A networks KPIs A comprehensive foundation for 5G technologies is provided including massive MIMO eMBB URLLC mMTC NGCN and network slicing cloudification virtualization and SDN Practical Guide to LTE A VoLTE and IoT Paving the Way Towards 5G can be used as a practical comprehensive guide for best practices in LTE LTE A Volte IoT design deployment performance analysis and network architecture and dimensioning It offers tutorial introduction on LTE A IoT 5G networks enabling the reader to use this advanced book without the need to refer to more introductory texts Offers a complete overview of LTE and LTE A IMS VoLTE and IoT and 5G Introduces readers to IP Multimedia Subsystems IMS Performs a comprehensive evaluation of Volte CSFB Provides LTE LTE A network capacity and dimensioning Examines IoT and 5G evolutions towards a super connected world Introduce 3GPP NB IoT evolution for low power wide area LPWA network Provide a comprehensive introduction for 5G evolution including eMBB URLLC mMTC network slicing cloudification virtualization SDN and orchestration Practical Guide to LTE A VoLTE and IoT will appeal to all deployment and service engineers network designers and planning and optimization engineers working in mobile communications Also it is a practical guide for R D and standardization experts to evolve the LTE LTE A VoLTE and IoT towards 5G evolution Future Access Enablers for Ubiquitous and Intelligent Infrastructures Vladimir Poulkov, 2019-09-13 This book constitutes the refereed post conference proceedings of the Fourth International Conference on Future Access Enablers for Ubiquitous and Intelligent Infrastructures FABULOUS 2019 held in Sofia Bulgaria in March 2019 This year s conference topic covers Globalization through Advanced Digital Technologies as the digitalization in all spheres of life has an impressive influence on communication and daily life in general The 39 revised full papers were carefully reviewed and selected from 54 submissions The main topics deal with healthcare wellness applications IoT and sensor networks IoT security in the digital transformation era wireless communications and networks virtual engineering and simulations

Information and Communication Technology for Intelligent Systems (ICTIS 2017) - Volume 2 Suresh Chandra Satapathy, Amit Joshi, 2017-08-16 This volume includes 73 papers presented at ICTIS 2017 Second International Conference on Information and Communication Technology for Intelligent Systems The conference was held on 25th and 26th March 2017 in Ahmedabad India and organized jointly by the Associated Chambers of Commerce and Industry of India ASSOCHAM

Gujarat Chapter the G R Foundation the Association of Computer Machinery Ahmedabad Chapter and supported by the Computer Society of India Division IV Communication and Division V Education and Research The papers featured mainly focus on information and communications technology ICT and its applications in intelligent computing cloud storage data mining and software analysis The fundamentals of various data analytics and algorithms discussed are useful to researchers Simplified Robust Adaptive Detection and Beamforming for Wireless Communications Ayman ElNashar, 2018-06-11 This book presents an alternative and simplified approaches for the robust adaptive detection and beamforming in wireless communications It adopts several systems models including DS CDMA OFDM MIMO with antenna array and general antenna arrays beamforming model It presents and analyzes recently developed detection and beamforming algorithms with an emphasis on robustness In addition simplified and efficient robust adaptive detection and beamforming techniques are presented and compared with exiting techniques Practical examples based on the above systems models are provided to exemplify the developed detectors and beamforming algorithms Moreover the developed techniques are implemented using MATLAB and the relevant MATLAB scripts are provided to help the readers to develop and analyze the presented algorithms em style mso bidi font style normal Simplified Robust Adaptive Detection and Beamforming for Wireless Communications starts by introducing readers to adaptive signal processing and robust adaptive detection It then goes on to cover Wireless Systems Models The robust adaptive detectors and beamformers are implemented using the well known algorithms including LMS RLS IQRD RLS RSD BSCMA CG and SD The robust detection and beamforming are derived based on the existing detectors beamformers including MOE PLIC LCCMA LCMV MVDR BSCMA and MBER The adopted cost functions include MSE BER CM MV and SINR SNR **Future Access Enablers for Ubiquitous and Intelligent Infrastructures** Octavian Fratu, Nicolae Militaru, Simona Halunga, 2018-07-03 This book constitutes the refereed post conference proceedings of the Third International Conference on Future Access Enablers for Ubiquitous and Intelligent Infrastructures FABULOUS 2017 held in Bucharest Romania in October 2017 The 37 revised full papers were carefully reviewed and selected from 61 submissions The main topics deal with future access networks Internet of Things and smart city smart environment applications communications and computing infrastructures security aspects in communication and data processing signal processing and multimedia **Soft Computing in Data Science** Michael W. Berry, Azlinah Mohamed, Bee Wah Yap, 2015-09-02 This book constitutes the refereed proceedings of the International Conference on Soft Computing in Data Science SCDS 2015 held in Putrajaya Malaysia in September 2015 The 25 revised full papers presented were carefully reviewed and selected from 69 submissions. The papers are organized in topical sections on data mining fuzzy computing evolutionary computing and optimization pattern recognition human machine interface hybrid methods Wireless Networking Jack L. Burbank, Julia Andrusenko, Jared S. Everett, William T. M. Kasch, 2013-05-17 This book focuses on providing a detailed and practical explanation of key existing and emerging wireless networking

technologies and trends while minimizing the amount of theoretical background information The book also goes beyond simply presenting what the technology is but also examines why the technology is the way it is the history of its development standardization and deployment The book also describes how each technology is used what problems it was designed to solve what problems it was not designed to solve how it relates to other technologies in the marketplace and internetworking challenges faced withing the context of the Internet as well as providing deployment trends and standardization trends Finally this book decomposes evolving wireless technologies to identify key technical and usage trends in order to discuss the likely characteristics of future wireless networks LTE, WiMAX and WLAN Network Design, Optimization and **Performance Analysis** Leonhard Korowajczuk, 2011-08-22 A technological overview of LTE and WiMAX LTE WiMAX and WLAN Network Design Optimization and Performance Analysis provides a practical guide to LTE and WiMAX technologies introducing various tools and concepts used within In addition topics such as traffic modelling of IP centric networks RF propagation fading mobility and indoor coverage are explored new techniques which increase throughput such as MIMO and AAS technology are highlighted and simulation network design and performance analysis are also examined Finally in the latter part of the book Korowajczuk gives a step by step guide to network design providing readers with the capability to build reliable and robust data networks By focusing on LTE and WiMAX this book extends current network planning approaches to next generation wireless systems based on OFDMA providing an essential resource for engineers and operators of fixed and wireless broadband data access networks With information presented in a sequential format LTE WiMAX and WLAN Network Design Optimization and Performance Analysis aids a progressive development of knowledge complementing latter graduate and postgraduate courses while also providing a valuable resource to network designers equipment vendors reference material operators consultants and regulators Key Features One of the first books to comprehensively explain and evaluate LTE Provides an unique explanation of the basic concepts involved in wireless broadband technologies and their applications in LTE WiMAX and WLAN before progressing to the network design Demonstrates the application of network planning for LTE and WiMAX with theoretical and practical approaches Includes all aspects of system design and optimization such as dynamic traffic simulations multi layered traffic analysis statistical interference analysis and performance estimations

The book delves into Design Deployment And Performance Of 4g Lte Networks A Practical Approach. Design Deployment And Performance Of 4g Lte Networks A Practical Approach is a crucial topic that needs to be grasped by everyone, from students and scholars to the general public. This book will furnish comprehensive and in-depth insights into Design Deployment And Performance Of 4g Lte Networks A Practical Approach, encompassing both the fundamentals and more intricate discussions.

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