

# Radio Network Planning and Optimisation for UMTS

SECOND EDITION



EDITED BY

JAANA LAIHO · ACHIM WACKER · TOMAŠ NOVOSAD

# Radio Network Planning And Optimization Engineer

**M Lipman**



## **Radio Network Planning And Optimization Engineer:**

*UMTS Radio Network Planning, Optimization and QoS Management* Jukka Lempiäinen, Matti Manninen, 2007-05-08 In cellular networks a new generation of CDMA or WCDMA based networks will start operations in most countries in the near future The standardized WCDMA technology generates new challenges in radio network planning optimization and QoS management because of the dynamic nature of its radio interface and various new services and different network operating modes Moreover new and modified radio planning phases as well as new field measurements and emphasized QoS management are needed when UMTS networks are designed and optimized Hence a practical UMTS planning process must be defined in detail from dimensioning to optimization tasks This book follows the UMTS planning process It is organized in three parts Part I UMTS configuration planning Part II UMTS topology planning and Part III UMTS network functionality The first chapter in Part I introduces the UMTS and UTRAN systems and radio network planning strategy and defines a planning process for UMTS In Chapter 2 the UMTS planning process is covered and a detailed description of the UMTS power budget is given with planning threshold examples provided

*Fundamentals of Cellular Network Planning and Optimisation* Ajay R. Mishra, 2004-05-21 By 2008 some 2 billion people will be using mobile phones and devices in many cases to access advanced data services Against this backdrop the need for efficient and effective network design will be critical to the success of increasingly complex mobile networks Simon Beresford Wylie SVP Nokia Networks With the complexity of the cellular networks increasing day by day a deeper understanding of the design and performance of end to end cellular networks is required Moreover all the types of networks from 2G 2.5G 3G seem to co exist *Fundamentals of Cellular Network Planning and Optimisation* covers end to end network planning and optimisation aspects from second generation GSM to third generation WCDMA networks including GPRS and EDGE networks All the sub systems of the network i e radio network transmission network and core network have been covered with focus on both practical and theoretical issues By bringing all these concepts under one cover this book becomes essential reading for the network design engineers working either with cellular service vendors or operators experts scientists working on end to end issues and undergraduate post graduate students Key Highlights Distinctly divided into four parts 2G GSM 2.5G GPRS EDGE 3G WCDMA and introduction to 4G OFDM ALL IP WLAN Overview respectively Each part focuses on the radio transmission and core networks Concentrates on cellular network planning process and explains the underlying principles behind the planning and optimizing of the cellular networks The text will serve as a handbook for anyone engaged in the study design deployment and business of cellular networks

*Femtocells* Jie Zhang, Guillaume de la Roche, 2011-09-26 This book provides an in depth guide to femtocell technologies In this book the authors provide a comprehensive and organized explanation of the femtocell concepts architecture air interface technologies and challenging issues arising from the deployment of femtocells such as interference mobility management and self organization The book details a system level simulation based methodology addressing the key

concerns of femtocell deployment such as interference between femto and macrocells and the performance of both femto and macrocell layers In addition key research topics in interference modeling and mitigation mobility management and Self Organizing Network SON are highlighted The authors also introduce HNB HeNB standardization in 3GPP Furthermore access methods closed open and hybrid applications timing synchronization health issues business models and security are discussed The authors also provide a comparison between femtocells and other indoor coverage techniques such as picocells repeaters distributed antenna systems and radio over fiber Lastly both CDMA and OFDMA based femtocells are covered Key Features Provides a comprehensive reference on femtocells and related topics Offers the latest research results on femtocells based on simulation and measurements Gives an overview of indoor coverage techniques such as picocells repeaters distributed antenna systems radio over fiber and femtocells Includes chapters on femtocell access network architecture air interface technologies GSM UMTS HSPA WiMAX and LTE femtocell simulation interference analysis and mitigation in femto macrocell networks mobility management in femto macrocell networks femtocell self organization and other key challenges such as timing synchronization and security faced by femtocell deployment Points to over 240 references from 3GPP The Femto Forum journals and conference proceedings This book will be an invaluable guide for RF engineers from operators R D engineers from femtocells hardware manufacturers employees from regulatory bodies radio network planners academics and researchers from universities and research organizations Students undertaking wireless communications courses will also find this book insightful

**6G Frontiers** Chamitha De Alwis, Quoc-Viet Pham, Madhusanka Liyanage, 2022-12-20 6G Frontiers Enables readers to understand the exciting new technologies architectural directions technical aspects and applications of 6G plus legal and standardization approaches 6G Frontiers offers intelligent insight into the ongoing research trends use cases and key developmental technologies powering the upcoming 6G framework The authors cover a myriad of important topics that intersect with 6G such as hyper intelligent networking security privacy and trust harmonized mobile networks legal views and standards initiatives The work also explores the more extreme and controversial predictions surrounding 6G such as hyper connected smart cities space tourism and deep sea tourism Sample thought provoking topics covered in the comprehensive work include Evolution of mobile networks from 0G to 6G including the driving trends requirements and key enabling technologies of each generation Logistics of 6G networks which are expected to offer peak data rates over 1 Tbps imperceptible end to end delays beneath 0.1 ms and network availability and reliability rates beyond 99.99999% New technology requirements for 6G such as Further enhanced Mobile Broadband FeMBB ultra massive Machine Type Communication mMTC Mobile BroadBand and Low Latency MBLL and massive Low Latency Machine Type communication mLLMT Potential architectural directions of 6G including zero touch network and service management intent based networking edge AI intelligent network softwarization and radio access networks A complete and modern resource for understanding the potential development logistics and implications of 6G networks 6G Frontiers is a must read reference for

researchers academics and technology architects who wish to understand the cutting edge progress that is being made towards better and faster wireless mobile technology

*5G Second Phase Explained* Jyrki T. J. Penttinen, 2021-07-06

**5G SECOND PHASE EXPLAINED** A one stop reference that offers an accessible guide to an understanding of the enhanced core technologies of 5G

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Written for technical personnel of network operators network element and user device manufacturers

*5G Second Phase Explained* offers a guide to an understanding of network deployment and device designing of 5G technologies

**MIMO System Technology for Wireless Communications** George Tsoulos, 2018-10-03

For broadband communications it was frequency division multiplexing

For optical communications it was wavelength division multiplexing

Then for all types of networks it was code division

Breakthroughs in transmission speed were made possible by these developments heralding next generation networks of increasing capability in each case

The basic idea is the same more channels equals higher throughput

For wireless communications it is space time coding using multiple input multiple output MIMO technology

Providing a complete treatment of MIMO under a single cover

*MIMO System Technology for Wireless Communications* assembles coverage on all aspects of MIMO technology along with up to date information on key related issues

Contributors from leading academic and industrial institutions around the world share their expertise and lend the book a global perspective

They lead you gradually from basic to more advanced concepts from propagation modeling and performance analysis to space time codes various systems implementation options and limitations practical system development considerations field trials and network planning issues

Linking theoretical analysis to practical issues the book does not limit itself to any specific standardization or research industrial initiatives

MIMO is the catalyst for the next revolution in wireless systems and *MIMO System Technology for Wireless Communications* lays a thorough and complete foundation on which to build the next and future generations of wireless networks

[NEC Research & Development](#) ,2001

*UMTS Network Planning, Optimization, and Inter-Operation with GSM* Moe Rahnema, 2008-04-15

*UMTS Network Planning Optimization and Inter Operation with GSM* is an accessible

one stop reference to help engineers effectively reduce the time and costs involved in UMTS deployment and optimization Rahnema includes detailed coverage from both a theoretical and practical perspective on the planning and optimization aspects of UMTS and a number of other new techniques to help operators get the most out of their networks Provides an end to end perspective from network design to optimization Incorporates the hands on experiences of numerous researchers Single authorship allows for strong coherency and accessibility Details the complete iteration cycle of radio link budgeting for coverage planning and dimensioning Rahnema demonstrates detailed formulation of radio capacity and coverage in UMTS and discusses the tradeoffs involved He presents complete link budgeting and iterative simulations for capacity and coverage planning along with practical guidelines UMTS Network Planning contains seventeen cohesive and well organized chapters which cover numerous topics including Radio channel structures radio channel models parameters model tuning Techniques for capacity and coverage enhancements Complete treatment of power control handoffs and radio resource practical management processes and parameters Detailed coverage of TCP protocol enhancement for operation over wireless links particularly UMTS Application of GSM measurements to plan and re engineer for UMTS radio sites Guidelines for site co location with GSM the QOS classes parameters and inter workings in UMTS AMR voice codecs and tradeoffs core and access network design architectural evolution and protocols Comprehensive discussion and presentation of practical techniques for radio performance analysis trending and troubleshooting Perfect for professionals in the field and researchers specializing in network enhancement Engineers working on other air interfaces and next generation technologies will find many of the techniques introduced helpful in designing and deploying future wireless networks as well Students and professionals new to the wireless field will also find this book to be a good foundation in network planning performance analysis and optimization

**Business India** ,1996-05 [Radio Network Planning and Optimisation for UMTS](#) Jaana Laiho,Achim Wacker,Tomáš Novosad,2006-05-01 Radio Network Planning and Optimisation for UMTS Second Edition is a comprehensive and fully updated introduction to WCDMA radio access technology used in UMTS featuring new content on key developments Written by leading experts at Nokia the first edition quickly established itself as a best selling and highly respected book on how to dimension plan and optimise UMTS networks This valuable text examines current and future radio network management issues and their impact on network performance as well as the relevant capacity and coverage enhancement methods In addition to coverage of WCDMA radio access technology used in UMTS and the planning and optimisation of such a system the service control and management concept in WCDMA and GPRS networks are also introduced This is an excellent source of information for those considering future cellular networks where Quality of Service QoS is of paramount importance Key features of the Second Edition include High Speed Downlink Packet Access HSDPA physical layer dimensioning and radio resource management Quality of Service QoS mechanisms in network for service differentiation Multiple Input Multiple Output MIMO technology Practical network optimisation examples Service

optimisation for UMTS and GPRS EDGE capacity optimisation The hot topic of service control and management in WCDMA and GPRS networks that has evolved since the first edition Companion website includes Figures Static radio network simulator implemented in MATLAB This text will have instant appeal to wireless operators and network and terminal manufacturers It will also be essential reading for undergraduate and postgraduate students frequency regulation bodies and all those interested in radio network planning and optimisation particularly RF network systems engineering professionals

**Journal of Communications and Networks** ,2009      *Cellular Radio Systems* D. M. Balston,1993 Understand the status of all the major cellular radio systems worldwide explore the change from analog to digital and evaluate the differences between the new digital systems This comprehensive source brings together the technical and commercial issues associated with all the major analog and emerging digital systems      **Graduating Engineer** ,1996      Dissertation Abstracts International ,2005      Graduating Engineer & Computer Careers ,1997      BIA's Radio Yearbook ,2005      **Jeune Afrique** ,2007      **Electronic & Radio Engineer** ,1958      **Telecommunications** ,1980      *Proceedings* ,2002

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