



# Understanding UMTS Radio Network Modelling, Planning and Automated Optimisation: Theory and Practice

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## Understanding UMTS Radio Network Modelling, Planning and Automated Optimisation: Theory and Practice From Wiley

This book sets out to provide the theoretical foundations that will enable radio network planners to plan model and optimize radio networks using state-of-the-art findings from around the globe. It adopts a logical approach, beginning with the background to the present status of UMTS radio network technology, before devoting equal coverage to planning, modelling and optimization issues. All key planning areas are covered, including the technical and legal implications of network infrastructure sharing, hierarchical cell structure (HCS) deployment, ultra-high-site deployment and the benefits and limitations of using computer-aided design (CAD) software. Theoretical models for UMTS technology are explained as generic system models, stand-alone services and mixed services. Business modelling theory and methods are put forward, taking in propagation calculations, link-level, UMTS static and UMTS dynamic simulations. The challenges and goals of the automated optimization process are explored in depth using cutting-edge cost function and optimization algorithms. This theory-based resource containing prolific illustrative case studies explains the reasons for UMTS radio networks performance issues and how to use this foundational knowledge to model, plan and optimize present and future systems.

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## **Editorial Review**

### **Review**

"...this book really fills a gap in the existing literature ...it really helps one understand the WCDMA network..." (*IEEE Communications magazine*, August 2007)

### **From the Back Cover**

*Understanding UMTS Radio Network Modelling, Planning and Automated Optimisation: Theory and Practice* sets out to provide the theoretical foundations that will enable radio network planners to plan, model and radio networks using state-of-the-art findings from around the globe. Adopting a logical approach, it begins with the background to the present status of UMTS radio network technology, before devoting equal coverage to planning, modelling and optimisation issues. A broad-based supply of information is given, gleaned from cutting-edge research by worldwide experts in academia and industry. All key planning areas are covered, including the technical and legal implications of network infrastructure sharing, hierarchical cell structure (HCS) deployment, ultra-high-site deployment and the benefits and limitations of using computer-aided design (CAD) software. In addition, theoretical models for UMTS technology are explained as generic system models, stand-alone services and mixed services. Business modelling theory and methods are also put forward, taking in propagation calculations, link-level, UMTS static and UMTS dynamic simulations.

- Offers a solid theoretical background in the areas of modelling automatic and manual optimisation, which differs from the more practical guides available.
- Covers all the key technologies: UMTS (Universal Mobile Telecommunications Service) FDD (Frequency Division Duplex) with UHS (Ultra-High-Site) and UTRAN LMDS/WiMAX backhaul systems.
- Avoids explanations on a case-by-case basis, providing instead general mathematical tools that can be applied to understand, analyze and optimize complex system performance.
- The challenges and goals of the automated optimization process are explored in depth using cutting-edge cost function and optimization algorithms.

Highly relevant to radio network operators (planning and optimization staff, system marketing, technical managers) and telecommunications equipment providers, this book will also appeal to postgraduate and research students in the field of telecommunications and radio networking.

### **About the Author**

**Maciej J. Nawrocki** currently works for the Centre for Telecommunications Research at King's College London. His areas of interest include WCDMA based cellular networks, CDMA network planning methods, optimization methods for 3G systems radio planning and, latterly, efficient modeling algorithms for UMTS radio network organization.

**Mischa Dohler** has a PhD from Kings College London where he has also held a lecturing post. His areas of interest include propagation, coding, transceiver design and link level simulations.

**Hamid Aghvami** is presently Director of the Centre for Telecommunications Research at King's College London. He is considered a world expert in the field of personal and mobile radio communications and is a fellow of the Royal Academy of Engineering, a fellow member of the IEE and senior member of the IEEE.

## **Users Review**

### **From reader reviews:**

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