

<<3G演进>>

图书基本信息

书名：<<3G演进>>

13位ISBN编号：9787115216793

10位ISBN编号：7115216797

出版时间：2010-1

出版时间：人民邮电出版社

作者：Erik Dahlman,Stefan Parkvall,Johan Skold

页数：608

版权说明：本站所提供下载的PDF图书仅提供预览和简介，请支持正版图书。

更多资源请访问：<http://www.tushu007.com>

## 前言

During the past years , there has been a quickly rising interest in radio access technologies for providing mobile as well as nomadic and fixed services for voice , video , and data. The difference in design , implementation , and use between telecom and data com technologies is also getting more blurred. One example is cellular technologies from the telecom world being used for broadband data and wireless LAN from the data com world being used for voice over IP. Today , the most widespread radio access technology for mobile communication is digital cellular , with the number of users passing 3 billion by 2007 , which is almost half of the worlds population. It has emerged from early deployments of an expensive voice service for a few car-borne users , to todays widespread use of third generation mobile-communication devices that provide a range of mobile services and often include camera , MP3 player , and PDA functions. With this widespread use and increasing interest in 3G , a continuing evolution ahead is foreseen. This book describes the evolution of 3G digital cellular into an advanced broadband mobile access. The focus of this book is on the evolution of the 3G mobile communication as developed in the 3GPP ( Third Generation Partnership Project ) standardization , looking at the radio access and access network evolution. This book is divided into five parts. Part I gives the background to 3G and its evolution , looking also at the different standards bodies and organizations involved in the process of defining 3G. It is followed by a discussion of the reasons and driving forces behind the 3G evolution. Part II gives a deeper insight into some of the technologies that are included , or are expected to be included as part of the 3G evolution. Because of its generic nature , Part II can be used as a background not only for the evolution steps taken in 3GPP as described in this book , but also for readers that want to understand the technology behind other systems , such as WiMAX and CDMA2000.

## <<3G演进>>

### 内容概要

《3G演进：HSPA与LTE(英文版.第2版)》是爱立信研究院研发人员的经验之谈，描述了3G数字蜂窝系统如何演进成为先进的宽带移动接入技术，重点介绍了3G移动通信标准化开发演进路线、无线接入技术和接入网络的演进。

书中内容分为5部分，清晰地勾勒出了3G演进技术取舍的诸多细节。

《3G演进：HSPA与LTE(英文版.第2版)》是移动通信行业技术人员的必备参考指南，也是高等院校通信专业师生不可多得的教学参考书。

## <<3G演进>>

### 作者简介

Erik Dahlman博士，世界知名移动通信技术专家，爱立信研究院资深研究员，毕业于瑞典皇家工学院。

早期从事WCDMA的3G移动通信技术的研发和标准制定工作，后来成为3GPP项目成员，目前主要负责WCDMA R5的标准化工作以及下一代手机系统的无线接入研究工作。

他在无线通信领域拥有20多项专利，由于工作业绩突出，曾荣获IEEE运载工具技术学会授予的Jack Neubauer奖以及爱立信研究院授予的年度发明家奖。

## 书籍目录

Part	:	Introduction	1	Background of 3G evolution	31.1	History and background of 3G	31.1.1	Before 3G	31.1.2	Early 3G discussions	51.1.3	Research on 3G	61.1.4	3G standardization starts	71.2																																																																																																				
		Standardization	71.2.1	The standardization process	71.2.2	3GPP	91.2.3	IMT-2000 activities in ITU	111.3	Spectrum for 3G and systems beyond 3G	132	The motives behind the 3G evolution	152.1	Driving forces	152.1.1	Technology advancements	162.1.2	Services	172.1.3	Cost and performance	202.2	3G evolution : Two Radio Access Network approaches and an evolved core network	212.2.1	Radio Access Network evolution	212.2.2	An evolved core network : system architecture evolution	24																																																																																								
Part	:	Technologies for 3G Evolution	3	High data rates in mobile communication	293.1	High data rates : Fundamental constraints	293.1.1	High data rates in noise-limited scenarios	313.1.2	Higher data rates in interference-limited scenarios	333.2	Higher data rates within a limited bandwidth : Higher-order modulation	343.2.1	Higher-order modulation in combination with channel coding	353.2.2	Variations in instantaneous transmit power	363.3	Wider bandwidth including multi-carrier transmission	373.3.1	Multi-carrier transmission	404	OFDM transmission	434.1	Basic principles of OFDM	434.2	OFDM demodulation	464.3	OFDM implementation using IFFT/FFT processing	464.4	Cyclic-prefix insertion	484.5	Frequency-domain model of OFDM transmission	514.6	Channel estimation and reference symbols	524.7	Frequency diversity with OFDM : Importance of channel coding	534.8	Selection of basic OFDM parameters	554.8.1	OFDM subcarrier spacing	554.8.2	Number of subcarriers	574.8.3	Cyclic-prefix length	584.9	Variations in instantaneous transmission power	584.10	OFDM as a user-multiplexing and multiple-access scheme	594.11	Multi-cell broadcast/multicast transmission and OFDM	615	Wider-band ' single-carrier ' transmission	655.1	Equalization against radio-channel frequency selectivity	655.1.1	Time-domain linear equalization	665.1.2	Frequency-domain equalization	685.1.3	Other equalizer strategies	715.2	Uplink FDMA with flexible bandwidth assignment	715.3	DFT-spread OFDM	735.3.1	Basic principles	745.3.2	DFTS-OFDM receiver	765.3.3	User multiplexing with DFTS-OFDM	775.3.4	Distributed DFTS-OFDM	786	Multi-antenna techniques	816.1	Multi-antenna configurations	816.2	Benefits of multi-antenna techniques	826.3	Multiple receive antennas	836.4	Multiple transmit antennas	886.4.1	Transmit-antenna diversity	896.4.2	Transmitter-side beam-forming	936.5	Spatial multiplexing	966.5.1	Basic principles	976.5.2	Pre-coder-based spatial multiplexing	1006.5.3	Non-linear receiver processing	1027	Scheduling , link adaptation and hybrid ARQ	1057.1	Link adaptation : Power and rate control	1067.2	Channel-dependent scheduling	1077.2.1	Downlink scheduling	1087.2.2	Uplink scheduling	1127.2.3	Link adaptation and channel-dependent scheduling in the frequency domain	1157.2.4	Acquiring on channel-state information	1167.2.5	Traffic behavior and scheduling	1177.3	Advanced retransmission schemes	1187.4	Hybrid ARQ with soft combining	120
Part	:	HSPA8 WCDMA evolution : HSPA and MBMS	1278.1	WCDMA : Brief overview	1298.1.1	Overall architecture	1298.1.2	Physical layer	1328.1.3	Resource handling and packet-data session	1379	High-Speed Downlink Packet Access	1399.1	Overview	1399.1.1	Shared-channel transmission	1399.1.2	Channel-dependent scheduling	1409.1.3	Rate control and higher-order modulation	1429.1.4	Hybrid ARQ with soft combining	1429.1.5	Architecture	1439.2	Details of HSDPA	1449.2.1	HS-DSCH : Inclusion of features in WCDMA Release 5	1449.2.2	MAC-hs and physical-layer processing	1479.2.3	Scheduling	1499.2.4	Rate control	1509.2.5	Hybrid ARQ with soft combining	1549.2.6	Data flow	1579.2.7	Resource control for HS-DSCH	1599.2.8	Mobility	1609.2.9	UE categories	1629.3	Finer details of HSDPA	1629.3.1	Hybrid ARQ revisited : Physical-layer processing	1629.3.2	Interleaving and constellation rearrangement	1679.3.3	Hybrid ARQ revisited : Protocol operation	1689.3.4	In-sequence delivery	1709.3.5	MAC-hs header	1729.3.6	CQI and other means to assess the downlink quality	1749.3.7	Downlink control signaling : HS-SCCH	1779.3.8	Downlink control signaling : F-DPCH	1809.3.9	Uplink control signaling : HS-DPCCH	18010	Enhanced Uplink	18510.1	Overview	18510.1.1																																														

Scheduling 18610.1.2 Hybrid ARQ with soft combining 18810.1.3 Architecture 18910.2 Details of  
 Enhanced Uplink 19010.2.1 MAC-e and physical layer processing 19310.2.2 Scheduling 19510.2.3  
 E-TFC selection 20210.2.4 Hybrid ARQ with soft combining 20310.2.5 Physical channel allocation  
 20810.2.6 Power control 21010.2.7 Data flow 21110.2.8 Resource control for E-DCH 21210.2.9  
 Mobility 21310.2.10 UE categories 21310.3 Finer details of Enhanced Uplink 21410.3.1 Scheduling -  
 the small print 21410.3.2 Further details on hybrid ARQ operation 22310.3.3 Control signaling 23011  
 MBMS : Multimedia Broadcast Multicast Services 23911.1 Overview 24211.1.1 Macro-diversity  
 24311.1.2 Application-level coding 24511.2 Details of MBMS 24611.2.1 MTCH 24711.2.2  
 MCCH and MICH 24711.2.3 MSCH 24912 HSPA Evolution 25112.1 MIMO 25112.1.1  
 HSDPA-MIMO data transmission 25212.1.2 Rate control for HSDPA-MIMO 25612.1.3 Hybrid-ARQ  
 with soft combining for HSDPA-MIMO 25612.1.4 Control signaling for HSDPA-MIMO 25712.1.5 UE  
 capabilities 25912.2 Higher-order modulation. 25912.3 Continuous packet connectivity 26012.3.1  
 DTX – reducing uplink overhead 26112.3.2 DRX – reducing UE power consumption 26412.3.3  
 HS-SCCH-less operation : downlink overhead reduction 26512.3.4 Control signaling 26712.4  
 Enhanced CELL\_FACH operation 26712.5 Layer 2 protocol enhancements 26912.6 Advanced receivers  
 27012.6.1 Advanced UE receivers specified in 3GPP 27112.6.2 Receiver diversity ( type 1 ) 27112.6.3  
 Chip-level equalizers and similar receivers ( type 2 ) 27212.6.4 Combination with antenna diversity ( type  
 3 ) 27312.6.5 Combination with antenna diversity and interference cancellation ( type 3i ) 27412.7  
 MBSFN operation 27512.8 Conclusion 275Part : LTE and SAE13 LTE and SAE : Introduction  
 and design targets 27913.1 LTE design targets 28013.1.1 Capabilities 28113.1.2 System performance  
 28213.1.3 Deployment-related aspects 28313.1.4 Architecture and migration 28513.1.5 Radio resource  
 management 28613.1.6 Complexity 28613.1.7 General aspects 28613.2 SAE design targets 28714  
 LTE radio access : An overview 28914.1 LTE transmission schemes : Downlink OFDM and uplink  
 DFTS-OFDM/SC-FDMA 28914.2 Channel-dependent scheduling and rate adaptation 29114.2.1  
 Downlink scheduling 29214.2.2 Uplink scheduling 29214.2.3 Inter-cell interference coordination  
 29314.3 Hybrid ARQ with soft combining 29414.4 Multiple antenna support 29414.5 Multicast and  
 broadcast support 29514.6 Spectrum flexibility 29614.6.1 Flexibility in duplex arrangement 29614.6.2  
 Flexibility in frequency-band-of-operation 29714.6.3 Bandwidth flexibility 29715 LTE radio interface  
 architecture 29915.1 Radio link control 30115.2 Medium access control 30215.2.1 Logical channels  
 and transport channels 30315.2.2 Scheduling 30515.2.3 Hybrid ARQ with soft combining 30815.3  
 Physical layer 31115.4 Terminal states 31415.5 Data flow 31516 Downlink transmission scheme  
 31716.1 Overall time-domain structure and duplex alternatives 31716.2 The downlink physical resource  
 31916.3 Downlink reference signals 32416.3.1 Cell-specific downlink reference signals 32516.3.2  
 UE-specific reference signals 32816.4 Downlink L1/L2 control signaling 33016.4.1 Physical Control  
 Format Indicator Channel 33216.4.2 Physical Hybrid-ARQ Indicator Channel 33416.4.3 Physical  
 Downlink Control Channel 33816.4.4 Downlink scheduling assignment 34016.4.5 Uplink scheduling  
 grants 34816.4.6 Power-control commands 35216.4.7 PDCCH processing 35216.4.8 Blind decoding  
 of PDCCHs 35716.5 Downlink transport-channel processing 36116.5.1 CRC insertion per transport block  
 36116.5.2 Code-block segmentation and per-code-block CRC insertion 36216.5.3 Turbo coding  
 36316.5.4 Rate-matching and physical-layer hybrid-ARQ functionality 36516.5.5 Bit-level scrambling  
 36616.5.6 Data modulation 36616.5.7 Antenna mapping 36716.5.8 Resource-block mapping  
 36716.6 Multi-antenna transmission 37116.6.1 Transmit diversity 37216.6.2 Spatial multiplexing  
 37316.6.3 General beam-forming 37716.7 MBSFN transmission and MCH 37817 Uplink transmission  
 scheme 38317.1 The uplink physical resource 38317.2 Uplink reference signals 38517.2.1 Uplink  
 demodulation reference signals 38517.2.2 Uplink sounding reference signals 39317.3 Uplink L1/L2 control  
 signaling 39617.3.1 Uplink L1/L2 control signaling on PUCCH 39817.3.2 Uplink L1/L2 control signaling  
 on PUSCH 41117.4 Uplink transport-channel processing 41317.5 PUSCH frequency hopping 41517.5.1

Hopping based on cell-specific hopping/mirroring patterns 41617.5.2 Hopping based on explicit hopping information 41818 LTE access procedures 42118.1 Acquisition and cell search 42118.1.1 Overview of LTE cell search 42118.1.2 PSS structure 42418.1.3 SSS structure 42418.2 System information 42518.2.1 MIB and BCH transmission 42618.2.2 System-Information Blocks 42918.3 Random access 43218.3.1 Step 1 : Random-access preamble transmission 43418.3.2 Step 2 : Random-access response 44118.3.3 Step 3 : Terminal identification 44218.3.4 Step 4 : Contention resolution 44318.4 Paging 44419 LTE transmission procedures 44719.1 RLC and hybrid-ARQ protocol operation 44719.1.1 Hybrid-ARQ with soft combining 44819.1.2 Radio-link control 45919.2 Scheduling and rate adaptation 46519.2.1 Downlink scheduling 46719.2.2 Uplink scheduling 47019.2.3 Semi-persistent scheduling 47619.2.4 Scheduling for half-duplex FDD 47819.2.5 Channel-status reporting 47919.3 Uplink power control 48219.3.1 Power control for PUCCH 48219.3.2 Power control for PUSCH 48519.3.3 Power control for SRS 48819.4 Discontinuous reception ( DRX ) 48819.5 Uplink timing alignment 49019.6 UE categories 49520 Flexible bandwidth in LTE 49720.1 Spectrum for LTE 49720.1.1 Frequency bands for LTE 49820.1.2 New frequency bands 50120.2 Flexible spectrum use 50220.3 Flexible channel bandwidth operation 50320.4 Requirements to support flexible bandwidth 50520.4.1 RF requirements for LTE 50520.4.2 Regional requirements 50620.4.3 BS transmitter requirements 50720.4.4 BS receiver requirements 51120.4.5 Terminal transmitter requirements 51420.4.6 Terminal receiver requirements 51521 System Architecture Evolution 51721.1 Functional split between radio access network and core network 51821.1.1 Functional split between WCDMA/HSPA radio access network and core network 51821.1.2 Functional split between LTE RAN and core network 51921.2 HSPA/WCDMA and LTE radio access network 52021.2.1 WCDMA/HSPA radio access network 52121.2.2 LTE radio access network 52621.3 Core network architecture 52821.3.1 GSM core network used for WCDMA/HSPA 52921.3.2 The ' SAE ' core network : The Evolved Packet Core 53321.3.3 WCDMA/HSPA connected to Evolved Packet Core 53621.3.4 Non-3GPP access connected to Evolved Packet Core 53722 LTE-Advanced 53922.1 IMT-2000 development 53922.2 LTE-Advanced – The 3GPP candidate for IMT-Advanced 54022.2.1 Fundamental requirements for LTE-Advanced 54122.2.2 Extended requirements beyond ITU requirements 54222.3 Technical components of LTE-Advanced 54222.3.1 Wider bandwidth and carrier aggregation 54322.3.2 Extended multi-antenna solutions 54422.3.3 Advanced repeaters and relaying functionality 54522.4 Conclusion 546Part : Performance and Concluding Remarks23 Performance of 3G evolution 54923.1 Performance assessment 54923.1.1 End-user perspective of performance 55023.1.2 Operator perspective 55223.2 Performance in terms of peak data rates 55223.3 Performance evaluation of 3G evolution 55323.3.1 Models and assumptions 55323.3.2 Performance numbers for LTE with 5 MHz FDD carriers 55523.4 Evaluation of LTE in 3GPP 55723.4.1 LTE performance requirements 55723.4.2 LTE performance evaluation 55923.4.3 Performance of LTE with 20 MHz FDD carrier 56023.5 Conclusion 56024 Other wireless communications systems 56324.1 UTRA TDD 56324.2 TD-SCDMA ( low chip rate UTRA TDD ) 56524.3 CDMA2000 56624.3.1 CDMA2000 1x 56724.3.2 1x EV-DO Rev 0 56724.3.3 1x EV-DO Rev A 56824.3.4 1x EV-DO Rev B 56924.3.5 UMB ( 1x EV-DO Rev C ) 57124.4 GSM/EDGE 57324.4.1 Objectives for the GSM/EDGE evolution 57324.4.2 Dual-antenna terminals 57524.4.3 Multi-carrier EDGE 57524.4.4 Reduced TTI and fast feedback 57624.4.5 Improved modulation and coding 57724.4.6 Higher symbol rates 57724.5 WiMAX ( IEEE 802.16 ) 57824.5.1 Spectrum , bandwidth options and duplexing arrangement 58024.5.2 Scalable OFDMA 58124.5.3 TDD frame structure 58124.5.4 Modulation , coding and Hybrid ARQ 58124.5.5 Quality-of-service handling 58224.5.6 Mobility 58324.5.7 Multi-antenna technologies 58424.5.8 Fractional frequency reuse 58424.5.9 Advanced Air Interface ( IEEE 802.16m ) 58524.6 Mobile Broadband Wireless Access ( IEEE 802.20 ) 58624.7 Summary 58825 Future evolution 58925.1 IMT-Advanced 59025.2 The research community 59125.3 Standardization bodies 59125.4 Concluding remarks 592References 593Index 603





## 章节摘录

The size and weight of the mobile terminals have been reduced dramatically during the past 20 years. The standby and talk times have also been extended dramatically and the end users do not need to re-charge their devices every day. Simple black-and-white ( or brown-and-gray ) numerical screens have evolved into color screens capable of showing digital photos at good quality. Mega- pixel-capable digital cameras have been added making the device more attractive to use. Thus, the mobile device has become a multi-purpose device, not only a mobile phone for voice communications. In parallel to the technical development of the mobile devices, the mobile- communication technologies are developed to meet the demands of the new services enabled, and also to enable them wireless. The development of the digital signal processors enables more advanced receivers capable of processing mega- bits of data in a short time, and the introduction of the optical fibers enables high-speed network connections to the base stations. In sum, this enables a fast access to information on the Internet as well as a short roundtrip time for normal communications. Thus, new and fancier services are enabled by the technical development of the devices, and new and more efficient mobile-communication systems are enabled by a similar technical development.

2.1.2 Services Delivering services to the end users is the fundamental goal of any mobile- communication system. Knowing them, understanding them, managing them, and charging them properly is the key for success. It is also the most difficult task being faced by the engineers developing the mobile-communication system of the future. It is very difficult to predict what service ( s ) will be popular in a 5- to 10-year perspective. In fact, the engineers have to design a system that can adapt to any service that might become popular and used in the future. Unfortunately, there are also technical limitations that need to be understood, and also the technical innovations that in the future enable new services.

2.1.2.1 Internet and IP technology The success of the Internet and the IP-based services delivered over the Internet is more and more going wireless. This means that the mobile-communication systems are delivering more and more IP-based services, from the best effort- Internet data to voice-over-IP, for example in the shape of push-to-talk ( PoC ) . Furthermore, in the wireless environment it is more natural to use, for example, location-based services and tracking services than in the fixed environment.

## <<3G演进>>

### 媒体关注与评论

“如果你打算学习HSPA与LTE，本书无疑是最佳参考指南，因为作者不但是通信技术高手，而且知道怎么让你也成为技术高手。

”——Joel Schopp, IBM工程师 “这是迄今为止最系统的甚至可以说最优秀的移动通信技术演进资料！

我这么评价它毫不夸张，因为它详尽介绍了4G之路该如何走。

”——Amazon.com

## &lt;&lt;3G演进&gt;&gt;

## 编辑推荐

飞速发展的移动通信技术如何演进不但给各大运营商、设备厂商带来了挑战，也成为横亘在网络工程人员面前的巨大课题，如何应用新技术以保证自己在竞争中立于不败之地，是通信工程师们必须认真思考的问题。

《3G演进：HSPA与LTE(英文版.第2版)》是爱立信研究院工程师们的经验结晶，探讨诸多3GPP标准细节，清晰地勾勒出了如何在各种移动通信演进技术之间进行取舍，准确体现了作者在把握技术演进方向上的前瞻意识。

与许多只是阐述标准的同类书不同，《3G演进：HSPA与LTE(英文版.第2版)》内容均来自一线实战，很多资料都是首次公开。

全书内容分为五个部分，重在介绍3.5G和4G移动通信标准化开发的路线，关注无线接入技术和接入网络的演进，主要知识点包括：3.5G和4G系统及其发展背景；3.5G和4G涉及的具体技术，如高速数据传输、OFDM传输、多天线技术等；HSPA；LTE和SAE；系统性能评估。

《3G演进：HSPA与LTE(英文版.第2版)》将使你更深入地理解3.5G和4G技术，自信应对未来通信技术挑战。

版权说明

本站所提供下载的PDF图书仅提供预览和简介，请支持正版图书。

更多资源请访问:<http://www.tushu007.com>