

1. Record Nr.	UNINA9910141411803321
Titolo	Radio protocols for LTE and LTE-advanced / / SeungJune Yi ... [et al.]
Pubbl/distr/stampa	Singapore : , : John Wiley & Sons Singapore, , 2012 [Piscataway, New Jersey] : , : IEEE Xplore, , [2012]
ISBN	1-283-59298-3 1-118-18854-3 9786613905437 1-118-18855-1
Edizione	[1st edition]
Descrizione fisica	1 online resource (339 p.)
Altri autori (Persone)	YiSeungJune
Disciplina	621.3845/6
Soggetti	Long-Term Evolution (Telecommunications) Mobile communication systems - Technological innovations Wireless communication systems - Technological innovations
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Foreword by Takehiro Nakamura xiii -- Preface xv -- About the Authors xvii -- 1 Introduction 1 -- 1.1 3GPP 1 -- 1.2 Evolutionary Path of 3GPP Systems 4 -- 1.2.1 GSM 4 -- 1.2.2 GPRS/EDGE 6 -- 1.2.3 UMTS 7 -- 1.2.4 HSPA 8 -- 1.2.5 LTE 9 -- 1.3 Market Trend 10 -- 1.4 Requirement of LTE 11 -- 1.5 Overview of LTE Architecture 14 -- 1.5.1 Network Architecture 14 -- 1.5.2 QoS Architecture 18 -- 1.5.3 Radio Protocol Architecture of LTE 21 -- 1.6 UE Capabilities 24 -- References 26 -- 2 Idle Mode Procedure 27 -- 2.1 Idle Mode Functions 27 -- 2.2 Services and Cell Categorization 29 -- 2.3 UE States and State Transitions 30 -- 2.4 PLMN Selection 31 -- 2.4.1 Triggering of PLMN Selection 32 -- 2.4.2 Search of Available PLMNs 32 -- 2.4.3 PLMN Selection 32 -- 2.5 Location Registration 34 -- 2.6 Cell Selection 34 -- 2.6.1 Cell Selection Criterion 35 -- 2.6.2 Cell Selection upon RRC Connection Release 36 -- 2.7 Cell Reselection 36 -- 2.7.1 Measurement Rules 37 -- 2.7.2 Reselection to a Neighboring Cell 39 -- 2.7.3 Mobility State Dependent Scaling 41 -- 2.8 Access Verification 43 -- 2.8.1 Cell Barring Status and Cell Reservation Status 43 -- 2.9 Paging Reception 44 -- References 45 -- 3 Radio Resource Control

(RRC) 47 -- 3.1 RRC Functions and Architecture 48 -- 3.2 System Information 50 -- 3.2.1 Scheduling of System Information 50 -- 3.2.2 System Information Update 54 -- 3.3 Paging 55 -- 3.4 Connection Establishment 56 -- 3.4.1 Step 1: Access Class Barring 57 -- 3.4.2 Step 2: Transmission of the RRCConnectionRequest Message 58 -- 3.4.3 Step 3: Receipt of the RRCConnectionSetup Message 59 -- 3.4.4 Step 4: Transmission of the RRCConnectionSetupComplete Message 59 -- 3.5 Security 60 -- 3.6 RRC Connection Reconfiguration 63 -- 3.6.1 SRB2 Establishment 63 -- 3.6.2 DRB Establishment 63 -- 3.6.3 Parallel Procedure with Security Activation 64 -- 3.7 UE Capability Transfer 65 -- 3.8 Intra-EUTRA Handover 65 -- 3.8.1 Handover Preparation 66 -- 3.8.2 Handover Execution 69 -- 3.8.3 Handover Completion 71. 3.9 Measurement Control 72 -- 3.9.1 Measurement Configuration 73 -- 3.9.2 Measurement Report Triggering 74 -- 3.9.3 Measurement Reporting 75 -- 3.10 RRC Connection Re-establishment 75 -- 3.11 Inter-RAT Mobility 78 -- 3.11.1 Inter-RAT Mobility from/ to 3GPP Access Systems 78 -- 3.11.2 Inter-RAT Mobility from/ to CDMA2000 Systems 82 -- 3.12 RRC Connection Release 84 -- Reference 85 -- 4 Packet Data Convergence Protocol (PDCP) 87 -- 4.1 PDCP Functions and Architecture 87 -- 4.2 Header Compression 89 -- 4.3 Security 91 -- 4.3.1 Integrity Protection 91 -- 4.3.2 Ciphering 92 -- 4.4 Data Transfer 93 -- 4.5 SDU Discard 94 -- 4.6 Handover 95 -- 4.6.1 SRB Behavior at Handover 95 -- 4.6.2 UM DRB Behavior at Handover 95 -- 4.6.3 AM DRB Behavior at Handover 97 -- 4.7 PDCP PDU Formats 99 -- 4.7.1 PDCP Data PDU Formats 99 -- 4.7.2 PDCP Control PDU Formats 100 -- Reference 100 -- 5 Radio Link Control (RLC) 101 -- 5.1 RLC Functions and Architecture 101 -- 5.1.1 Transparent Mode (TM) RLC 101 -- 5.1.2 Unacknowledged Mode (UM) RLC 102 -- 5.1.3 Acknowledged Mode (AM) RLC 103 -- 5.2 Framing 105 -- 5.3 Reordering 106 -- 5.4 ARQ Operation 108 -- 5.4.1 Polling 108 -- 5.4.2 Status Reporting 109 -- 5.4.3 Retransmission 110 -- 5.4.4 Re-segmentation 111 -- 5.5 Window Operation 112 -- 5.5.1 UM RLC Window Operation 112 -- 5.5.2 AM RLC Window Operation 113 -- 5.6 SDU Discard 113 -- 5.7 RLC Re-establishment 114 -- 5.8 RLC PDU Formats 114 -- 5.8.1 TMD PDU Format 114 -- 5.8.2 UMD PDU Format 115 -- 5.8.3 AMD PDU Format 115 -- 5.8.4 AMD PDU Segment Format 116 -- 5.8.5 STATUS PDU Format 117 -- Reference 117 -- 6 Medium Access Control (MAC) 119 -- 6.1 MAC Functions and Services 119 -- 6.2 MAC Architecture 120 -- 6.3 MAC Channels and Mapping 121 -- 6.3.1 Transport Channels 121 -- 6.3.2 Logical Channels 122 -- 6.3.3 Channel Mapping 123 -- 6.4 Scheduling 123 -- 6.4.1 Dynamic Scheduling 124 -- 6.4.2 Semi-Persistent Scheduling (SPS) 124 -- 6.5 Scheduling Information Delivery 127 -- 6.5.1 Buffer Status Reporting (BSR) 127. 6.5.2 Scheduling Request (SR) 129 -- 6.5.3 Power Headroom Report (PHR) 130 -- 6.6 Logical Channel Prioritization (LCP) 130 -- 6.7 Discontinuous Reception (DRX) 134 -- 6.8 Hybrid-ARQ (HARQ) 138 -- 6.8.1 HARQ in the Uplink 140 -- 6.8.2 HARQ in the Downlink 140 -- 6.8.3 TTI Bundling 140 -- 6.8.4 Measurement Gap 142 -- 6.9 Random Access (RA) Procedure 143 -- 6.10 Time Alignment 145 -- 6.11 MAC PDU Formats 146 -- 6.11.1 MAC Control Elements (CEs) 148 -- 6.11.2 MAC PDU for Random Access Response 149 -- Reference 149 -- 7 Overview of LTE and LTE-Advanced New Features 151 -- 7.1 Voice over LTE (VoLTE) 151 -- 7.2 Home eNB (HeNB) 152 -- 7.3 Public Warning System (PWS) 153 -- 7.4 Multimedia Broadcast/Multicast Service (MBMS) 153 -- 7.5 Carrier Aggregation (CA) 154 -- 7.6 Relay 155 -- 7.7 Minimization of Drive Test (MDT) 156 -- 7.8 Enhanced Inter-Cell Interference Coordination (eICIC) 156 -- 7.9 Machine Type

Communication (MTC) 157 -- 8 Voice over LTE (VoLTE) 159 -- 8.1	
Voice Solutions for LTE 159 -- 8.1.1 Ultimate Voice Solution 159 --	
8.1.2 Interim Voice Solutions 160 -- 8.2 IMS VoIP 162 -- 8.2.1 IMS	
Profile 162 -- 8.2.2 Single Radio Voice Call Continuity (SRVCC) 164 --	
8.3 Circuit-Switched Fallback (CSFB) 167 -- 8.3.1 CSFB to UTRAN or	
GERAN 168 -- 8.3.2 CSFB to CDMA2000 1xRTT 173 -- 8.4 Service	
Domain Selection 178 -- 8.4.1 UE Decision between IMS VoIP and CSFB	
180 -- 8.5 Comparison between IMS VoIP and CSFB 181 -- 8.6 RAN	
Optimization for VoIP 181 -- 8.6.1 Robust Header Compression (ROHC)	
182 -- 8.6.2 TTI Bundling 182 -- 8.6.3 Semi-Persistent Scheduling for	
HARQ 183 -- References 183 -- 9 Home eNB (HeNB) 185 -- 9.1	
Architectural Framework 186 -- 9.1.1 Access Mode 186 -- 9.1.2 Use	
Cases 187 -- 9.1.3 High-level Requirements 188 -- 9.1.4 Network	
Architecture 189 -- 9.2 CSG Provisioning 189 -- 9.2.1 CSG	
Subscription Data 190 -- 9.2.2 CSG Member Status 190 -- 9.3 System	
Information Related to CSG 190 -- 9.3.1 CSG Identification Information	
191 -- 9.3.2 CSG Cell Deployment Information 192.	
9.4 Identification of CSG 193 -- 9.4.1 Autonomous CSG Search 193 --	
9.4.2 Manual CSG Selection 193 -- 9.5 Mobility with CSG Cells 194 --	
9.5.1 Mobility in RRC_IDLE 194 -- 9.5.2 Mobility in RRC_CONNECTED	
196 -- 9.6 Support for Hybrid Cells 200 -- 9.6.1 Motivation 200 --	
9.6.2 Features 201 -- References 203 -- 10 Public Warning System	
(PWS) 205 -- 10.1 Warning System Architecture 206 -- 10.2 Warning	
Messages 207 -- 10.3 Delivery of Warning Messages on a Network 209	
-- 10.3.1 Warning Message Delivery Procedure 209 -- 10.3.2 Warning	
Message Cancel Procedure 211 -- 10.4 Delivery of Warning Messages	
over the Radio Interface 212 -- 10.4.1 PWS Notifications in System	
Information 213 -- 10.4.2 Indication of PWS Notifications in Paging 214	
-- 10.4.3 Segmentation of Warning Messages 214 -- References 215	
-- 11 Multimedia Broadcast/Multicast Service (MBMS) 217 -- 11.1	
MBMS Services 217 -- 11.2 Architecture and Functions for MBMS 218	
-- 11.3 MBSFN Transmissions 221 -- 11.4 Radio Protocols for MBMS	
222 -- 11.4.1 Layers 1 and 2 for MBMS 222 -- 11.4.2 Layer 3 for MBMS	
224 -- 11.5 MBMS Procedures 226 -- 11.5.1 MBMS Session Start 226	
-- 11.5.2 MCCH Information Acquisition and MRB Configuration 228 --	
11.5.3 MBMS Session Update 229 -- 11.5.4 MBMS Session Stop 230 --	
11.5.5 MRB Release 231 -- 11.6 MBMS Enhancements in Releases 10	
and 11 232 -- 11.6.1 MBMS Counting 232 -- 11.6.2 MBMS Service	
Continuity 234 -- References 235 -- 12 Carrier Aggregation (CA) 237	
-- 12.1 Spectrum and Deployment Scenarios 240 -- 12.1.1 Spectrum	
Scenarios 240 -- 12.1.2 Deployment Scenarios 241 -- 12.2 Cell	
Management 243 -- 12.2.1 PCell and SCell 243 -- 12.2.2 Signaling of	
Configuration Information 244 -- 12.2.3 Linkages and References 244	
-- 12.2.4 Cross-Carrier Scheduling 245 -- 12.2.5 Extended	
Measurements 247 -- 12.2.6 SCell Management 250 -- 12.2.7 Mobility	
with Carrier Aggregation 250 -- 12.3 Extended MAC Functions 251 --	
12.3.1 SCell Activation and Deactivation 251 -- 12.3.2 Power	
Headroom Reporting (PHR) 253.	
12.3.3 Logical Channel Prioritization (LCP) 256 -- 12.3.4 Buffer Status	
Report (BSR) 257 -- 12.3.5 Discontinuous Reception (DRX) 258 --	
12.3.6 Semi-Persistent Scheduling (SPS) 258 -- References 259 -- 13	
Relay 261 -- 13.1 Deployment Scenarios 261 -- 13.2 Network	
Architecture for the Relay Node 262 -- 13.3 Types of Relay Node 264	
-- 13.3.1 Layer Performing Relaying 264 -- 13.3.2 Frequency	
Separation of Uu and Un Links 266 -- 13.4 Relay Node-Specific	
Operation 267 -- 13.4.1 Bearer Mapping 267 -- 13.4.2 Integrity	
Protection for a UnDRB 268 -- 13.4.3 RN Subframe Configuration 270	
-- 13.4.4 Update of System Information 271 -- 13.4.5 RN	

Reconfiguration Procedure 271 -- 13.5 Relay Node Start-Up Procedure 272 -- 13.6 Simplified Operation of Release 10 Relay Node 274 --
References 275 -- 14 Minimization of Driving Test (MDT) 277 -- 14.1
Architectural Framework 278 -- 14.1.1 Use Cases 279 -- 14.1.2
Initiation of the MDT Task with UE Selection 280 -- 14.1.3 Collection of
MDT Measurement Results 281 -- 14.2 Logged MDT 281 -- 14.2.1
Configuration Phase 283 -- 14.2.2 Logging Phase 284 -- 14.2.3
Reporting Phase 286 -- 14.3 Immediate MDT 289 -- 14.3.1
Configuration Phase 290 -- 14.3.2 Measurement and Evaluation Phase
291 -- 14.3.3 Reporting Phase 291 -- 14.3.4 MDT Context Transfer
291 -- References 292 -- 15 Enhanced Inter-Cell Interference
Coordination (eICIC) 293 -- 15.1 Heterogeneous Network Deployment
293 -- 15.1.1 Interference in Heterogeneous Networks 295 -- 15.1.2
Limitation of Frequency Domain ICIC 296 -- 15.2 CA-based ICIC 298
-- 15.3 Time Domain ICIC 299 -- 15.3.1 Restricted Measurements 300
-- 15.3.2 Macro / Pico Cell Scenario 301 -- 15.3.3 Macro / Femto Cell
Scenario 303 -- 15.3.4 Network Configuration 303 -- References 304
-- 16 Machine Type Communication (MTC) 305 -- 16.1 Overload
Control for MTC 305 -- 16.1.1 Overload Control in Release 8 306 --
16.1.2 Core Network Overload Control in Release 10 307 -- 16.1.3
RAN Overload Control in Release 11 310 -- 16.2 MTC Features in 3GPP
311.
References 312 -- Index 313.

Sommario/riassunto

Provides a unique focus on radio protocols for LTE and LTE-Advanced (LTE-A) Giving readers a valuable understanding of LTE radio protocols, this book covers LTE (Long-Term Evolution) Layer 2/3 radio protocols as well as new features including LTE-Advanced. It is divided into two sections to differentiate between the two technologies' characteristics. The authors systematically explain the design principles and functions of LTE radio protocols during the development of mobile handsets. The book also provides essential knowledge on the interaction between mobile networks a
