

**Evolved Universal Terrestrial Radio Access (E-UTRA) and
Evolved Universal Terrestrial Radio Access (E-UTRAN);
Overall description;
Stage 2
(3GPP TS 36.300 version 8.4.0 Release 8)**



Reference

RTS/TSGR-0236300v840

Keywords

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

Individual copies of the present document can be downloaded from:

<http://www.etsi.org>

The present document may be made available in more than one electronic version or in print. In any case of existing or perceived difference in contents between such versions, the reference version is the Portable Document Format (PDF). In case of dispute, the reference shall be the printing on ETSI printers of the PDF version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at

<http://portal.etsi.org/tb/status/status.asp>

If you find errors in the present document, please send your comment to one of the following services:

http://portal.etsi.org/chaicor/ETSI_support.asp

Copyright Notification

No part may be reproduced except as authorized by written permission.
The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2008.
All rights reserved.

DECT™, PLUGTESTS™, UMTS™, TIPHON™, the TIPHON logo and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members.

3GPP™ is a Trade Mark of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<http://webapp.etsi.org/IPR/home.asp>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

This Technical Specification (TS) has been produced by ETSI 3rd Generation Partnership Project (3GPP).

The present document may refer to technical specifications or reports using their 3GPP identities, UMTS identities or GSM identities. These should be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between GSM, UMTS, 3GPP and ETSI identities can be found under <http://webapp.etsi.org/key/queryform.asp>.

Contents

Intellectual Property Rights	2
Foreword.....	2
Foreword.....	9
1 Scope	10
2 References	10
3 Definitions, symbols and abbreviations	11
3.1 Definitions	11
3.2 Abbreviations	11
4 Overall architecture	13
4.1 Functional Split	14
4.2 Interfaces	16
4.2.1 S1 Interface	16
4.2.2 X2 Interface	16
4.3 Radio Protocol architecture	16
4.3.1 User plane	16
4.3.2 Control plane	17
4.4 Synchronization.....	18
4.5 IP fragmentation.....	18
5 Physical Layer for E-UTRA.....	18
5.1 Downlink Transmission Scheme.....	20
5.1.1 Basic transmission scheme based on OFDM	20
5.1.2 Physical-layer processing	20
5.1.3 Physical downlink control channel	20
5.1.4 Downlink Reference signal.....	21
5.1.5 Downlink multi-antenna transmission	21
5.1.6 MBSFN transmission.....	21
5.1.7 Physical layer procedure.....	21
5.1.7.1 Link adaptation	21
5.1.7.2 Power Control	22
5.1.7.3 Cell search.....	22
5.1.8 Physical layer measurements definition.....	22
5.2 Uplink Transmission Scheme.....	22
5.2.1 Basic transmission scheme	22
5.2.2 Physical-layer processing	23
5.2.3 Physical uplink control channel.....	23
5.2.4 Uplink Reference signal.....	24
5.2.5 Random access preamble.....	24
5.2.6 Uplink multi-antenna transmission	24
5.2.7 Physical channel procedure.....	24
5.2.7.1 Link adaptation	24
5.2.7.2 Uplink Power control	24
5.2.7.3 Uplink timing control.....	24
5.3 Transport Channels.....	25
5.3.1 Mapping between transport channels and physical channels.....	26
5.4 E-UTRA physical layer model	26
5.4.1 Void	26
5.4.2 Void	26
6 Layer 2.....	26
6.1 MAC Sublayer.....	28
6.1.1 Services and Functions	28
6.1.2 Logical Channels	28
6.1.2.1 Control Channels	29

6.1.2.2	Traffic Channels.....	29
6.1.3	Mapping between logical channels and transport channels	29
6.1.3.1	Mapping in Uplink	29
6.1.3.2	Mapping in Downlink	30
6.2	RLC Sublayer.....	31
6.2.1	Services and Functions	31
6.2.2	PDU Structure.....	31
6.3	PDCP Sublayer.....	32
6.3.1	Services and Functions	32
6.3.2	PDU Structure.....	32
6.4	Data flows through Layer 2.....	33
7	RRC.....	33
7.1	Services and Functions	33
7.2	RRC protocol states & state transitions	33
7.3	Transport of NAS messages	34
7.4	System Information	34
7.5	RRC Procedures	35
8	E-UTRAN identities.....	35
8.1	E-UTRAN related UE identities.....	35
8.2	Network entity related Identities	36
9	ARQ and HARQ	36
9.1	HARQ principles.....	37
9.2	ARQ principles.....	37
9.3	HARQ/ARQ interactions	37
10	Mobility.....	37
10.1	Intra E-UTRAN.....	38
10.1.1	Mobility Management in ECM-IDLE	38
10.1.1.1	Cell selection.....	38
10.1.1.2	Cell reselection.....	38
10.1.1.3	Handling in eNB	39
10.1.1.4	Handling above eNB	39
10.1.1.5	Mobility Management Entity (MME).....	39
10.1.2	Mobility Management in ECM-CONNECTED.....	39
10.1.2.1	Handover.....	40
10.1.2.1.1	C-plane handling	40
10.1.2.1.2	U-plane handling	43
10.1.2.2	Path Switch	44
10.1.2.3	Data forwarding	44
10.1.2.3.1	For RLC-AM bearers	44
10.1.2.3.2	For RLC-UM bearers	45
10.1.2.4	Handling in eNB	45
10.1.2.5	Handling above eNB	45
10.1.2.6	Mobility Management Entity (MME).....	45
10.1.2.7	Timing Advance.....	45
10.1.3	Measurements	46
10.1.3.1	Intra-frequency neighbour (cell) measurements.....	47
10.1.3.2	Inter-frequency neighbour (cell) measurements.....	47
10.1.4	Paging and C-plane establishment	47
10.1.5	Random Access Procedure	48
10.1.5.1	Contention based random access procedure.....	48
10.1.5.2	Non-contention based random access procedure	50
10.1.5.3	Interaction model between L1 and L2/3 for Random Access Procedure	50
10.1.6	Radio Link Failure	51
10.1.7	Radio Access Network Sharing	52
10.1.8	Handling of Roaming and Area Restrictions for UEs in ECM-CONNECTED.....	52
10.2	Inter RAT	53
10.2.1	Cell reselection	53
10.2.2	Handover	53
10.2.2a	Inter-RAT cell change order to GERAN with NACC	54

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.