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Technical Report

3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Requirements for Evolved UTRA and UTRAN (Release 7)

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Contents

Foreword

This Technical Report has been produced by the 3rd Generation Partnership Project (3GPP).

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Version x.y.z

where:

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  - 1 presented to TSG for information;
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- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

1 Scope

This document is related to the technical report for the study item "Evolved UTRA and UTRAN" [1]. The objective of the study item is to develop a framework for the evolution of the 3GPP radio-access technology towards a high-data-rate, low-latency and packet-optimized radio access technology.

This document provides guidance and collects requirements which an evolved UTRA and UTRAN system should meet.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TD RP-040461: "Proposed Study Item on Evolved UTRA and UTRAN".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply.

<defined term>: <definition>.

3.2 Symbols

For the purposes of the present document, the following symbols apply:

<symbol> <Explanation>

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

4 Introduction

At the 3GPP TSG RAN #26 meeting, the SI description on "Evolved UTRA and UTRAN" was approved [1].

The justification of the study item was, that with enhancements such as HSDPA and Enhanced Uplink, the 3GPP radio-access technology will be highly competitive for several years. However, to ensure competitiveness in an even longer time frame, i.e. for the next 10 years and beyond, a long-term evolution of the 3GPP radio-access technology needs to be considered.

Important parts of such a long-term evolution includes reduced latency, higher user data rates, improved system capacity and coverage, and reduced cost for the operator. In order to achieve this, an evolution of the radio interface as well as the radio network architecture should be considered.

Considering a desire for even higher data rates and also taking into account future additional 3G spectrum allocations the long-term 3GPP evolution should include an evolution towards support for wider transmission bandwidth than 5 MHz. At the same time, support for transmission bandwidths of 5MHz and less than 5MHz should be investigated in order to allow for more flexibility in whichever frequency bands the system may be deployed.

5 Objectives

The objective of Evolved UTRA and UTRAN is to develop a framework for the evolution of the 3GPP radio-access technology towards a high-data-rate, low-latency and packet-optimized radio-access technology. Thus the study should focus on supporting services provided from the PS-domain. In order to achieve this, studies should be carried out in at least the following areas:

- Related to the radio-interface physical layer (downlink and uplink):
  - e.g. means to support flexible transmission bandwidth up to 20 MHz, introduction of new transmission schemes and advanced multi-antenna technologies
- Related to the radio interface layer 2 and 3:
  - e.g. signalling optimization
- Related to the UTRAN architecture:
  - identify the most optimum UTRAN network architecture and functional split between RAN network nodes, not precluding considerations on the functional split between UTRAN and CN
- RF-related issues

Note the following text in italic is provided for guidance and can be removed once sections 5 to 11 are completed. Based on [1] the initial targets for the evolution of the radio-interface and radio-access network architecture are as follows.

General Requirements
- *Support of further enhanced IMS and core network*
- *Further enhanced MBMS*
- *Reduced CAPEX and OPEX including backhaul*

Radio Interface Physical Layer Requirements
- *Significantly increased peak data rate e.g. 100 Mbps (downlink) and 50 Mbps (uplink)*
- *Significantly improved spectrum efficiency (e.g. 2-4 x Rel6)*
- *Increase "cell edge bit rate" whilst maintaining same site locations as deployed today*
- *System should be optimized for low mobile speed but also support high mobile speed*

Physical Layer 2/3 Requirements
- *Efficient support of the various types of services, especially from the PS domain (e.g. Voice over IP, Presence)*
- *Possibility for a Radio-access network latency (user-plane UE – RNC (or corresponding node above Node B) - UE) below 10 ms*
- *Significantly reduced C-plane latency (e.g. including the possibility to exchange user-plane data starting from camped-state with a transition time of less than 100 ms (excluding downlink paging delay))*

UTRAN Architectural Requirements

RF and Radio Resources Management Requirements
- *Operation in paired and unpaired spectrum should not be precluded*
- *Scaleable bandwidth*
  - *5, 10, 20 and possibly 15 MHz*
  - *[1.25,] 2.5 MHz: to allow flexibility in narrow spectral allocations where the system may be deployed*

- *Possibility for simplified co-existence between operators in adjacent bands as well as cross-border co-existence*
- *Support for inter-working with existing 3G systems and non-3GPP specified systems*

System and Terminal Complexity Requirements
- *Reasonable system and terminal complexity, cost, and power consumption.*
- *Cost effective migration from Rel-6 UTRA radio interface and architecture*
- *Backwards compatibility is highly desirable, but the trade off versus performance and/or capability enhancements should be carefully considered*

6 General Requirements

Editor's Note: This section identifies general requirements related to topics such CAPEX and OPEX, support for different service types, and backhaul.

7 Radio Interface Physical Layer Requirements

Editor's Note: This section identifies requirements related to physical layer aspects including topics such as peak data rates (uplink and downlink), achievable bit rates over the system area (including the cell edge), deployment considerations and spectrum efficiency

8 Radio Interface Layer 2 / 3 Requirements

Editor's Note: This section identifies requirements applicable to layers 2 and 3, including radio resource control aspects, and U-plane and C-plane latency requirements.

9 UTRAN Architectural Requirements

Editor's Note: This section contains requirements relating to UTRAN architectural aspects.

10 RF and Radio Resource Management Requirements

Editor's Note: This section contains requirements related to radio frequency performance, inter-RAT support, radio resource management and system coexistence.

11 System and Terminal Complexity Requirements

Editor's Note: This section contains requirements related to the complexity of the system and terminal, cost and current consumption.

12 Change History

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New