3GPP TR 25.zyx V0.0.1 Draft2(2006-0x)

Technical Report

**3rd Generation Partnership Project;
Technical Specification Group Radio Access Network;
Improved support of gaming over HSDPA/EDCH
(Release 7)**

3GPP

Postal address

3GPP support office address
650 Route des Lucioles - Sophia Antipolis
Valbonne - FRANCE
Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Internet
http://www.3gpp.org

3GPP

Contents

Foreword

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

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

x   the first digit:

1   presented to TSG for information;

2   presented to TSG for approval;

3   or greater indicates TSG approved document under change control.

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 physical layer aspect of the study item "Evolved UTRA and UTRAN" [1]. The purpose of this TR is to help TSG RAN WG1 to define and describe the potential physical layer evolution under consideration and compare the benefits of each evolution techniques, along with the complexity evaluation of each technique.

This activity involves the Radio Access work area of the 3GPP studies and has impacts both on the Mobile Equipment and Access Network of the 3GPP systems.

This document is intended to gather all information in order to compare the solutions and gains vs. complexity, and draw a conclusion on way forward.

This document is a 'living' document, i.e. it is permanently updated and presented to TSG-RAN meetings.

The purpose of this TR is to help 3GPP TSG RAN WG2 define, describe and improve the support for gaming using HSDPA/HSUPA (HS-DSCH/E-DCH), focusing on minimizing delay and the service interruption time in case of handover. The latency of radio, core network, and terminals should be included in this TR with evaluations of the various complexity issues affecting both real time gaming (such as RT Shooting and RT auto racing) and less than real time gaming (such as chess and other less demanding gaming). Inclusion of 2 way RT gaming plus 2 way synchronized voice should also be included in this TR. All evaluations shall include complexity analysis and any end-user complexities and relevant issues.

The activity involved in this TR involves both Radio Access and has impacts that include Radio Access Network and Mobile Equipment.

This TR is intended to work in conjunction with other WI's that are currently employed in reducing the latency of the radio network.

The conclusion of this work item shall be CR's that will be presented to RAN WG2 and other WG's

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 R2-061495: "LS on Real Time Gaming Requirements"

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.

At the 3GPP TSG RAN #30 (December 2006) as RP-050871 WI on Gaming was approved

HSDPA and HSUPA are very important features for operators to carry efficient multimedia services in conjunction with IMS. Gaming is an increasingly important application that requires better performance to satisfy the user expectation. There is a need to enhance the support for gaming, e.g. to focus on minimizing of delay and the service interruption time in case of handover.

The suggestion has been made to evaluate how gaming can be supported with current technology and what exactly are the shortcomings compared to the requirements. Many issues may not be understood in detail. Based on this concept, the WI should identify areas that contain potential for improvement and if technology enhancements are needed, they should be described in detail, benefits and performance should be evaluated and the impacts on the specifications and working groups should be made clear. One way forward would be to have a look at performance (or lack there-of) on a per feature basis.

5 Background Mobile Gaming

5.1 Gaming applications

5.1.1 Real Time First Person Shooter

5.1.2 Other Real Time Games

5.1.3 Non-Real Time Games

5.2 Traffic Characteristics

6 Requirements

(Editor's note: we refer the related requirement in TR25.xxx)

Required round trip time (RTT) based on the communications model (Peer to Peer & Client-Server)

Required RTT based on a hybrid model in which part of the game is implemented with the Client-Server model and the remaining part with the Peer-to-Peer model.

Required End to End Delay

Transferred peak and average data rates and probable required band width in each case.

SA1 has produced a CR to TS 22.105 which provides more accurate values for End-user Performance Expectations on realtime gaming.

Table 1 of TS 22.105 thus will contain the following values for gaming:

Medium	Application	Degree of symmetry	Data rate	End-to-end One-way Delay	Delay Variation within a call	Information loss
Data	realtime games	Two-way	< 60 kb/s	< 75 msec preferred	N.A	< 3% FER preferred, < 5% FER limit

It should be noted, that these values are considered the most demanding ones with respect to delay requirements (e.g. supporting First Person Shooter games). Other types of games may require higher or lower data rates and more or less information loss but can tolerate longer end-to-end delay.

We also believe, that from End-user point of view no distinction of the communications model (Peer to Peer & Client-Server) needs to be made.

7. Overview of gaming over HSDPA/EDCH

7.1 QoS

7.2 Scheduling

7.3 Handover

7.4 ....

8. Overview of Technology Enhancement

9. Details of Technology Enhancements

9.1 Feature x

9.1.1. Description

9.1.2. Evaluation and Benefits

9.1.3. Impact on other WGs

9.2 Feature y

9.2.1. Description

9.2.2. Evaluation and Benefits

9.2.3. Impact on other WGs

10. Conclusion and recommendation

ANNEX A: Change History

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