Agenda Item: 7

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3GPP TSG RAN WG2 TR R25.924 on "Opportunity Driven Multiple Access" is provided for information.

3G TR 25.924 V0.1.0(1999-05)

Technical Report

**3rd Generation Partnership Project (3GPP);
Technical Specification Group (TSG) RAN;
Working Group 2 (WG2);**

**Opportunity Driven Multiple Access (ODMA)
(3G TS 25.924 version 0.1.0)**

Reference

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Keywords

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Contents

Foreword

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 this TS, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version 3.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 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;

Introduction

This clause is optional. If it exists, it is always the third unnumbered clause.

No text block identified.

1   Scope

This clause shall start on a new page. No text block identified. Should start:

The present document …

TBD

2   References

This text block applies to ALL deliverables. The sub-division below applies optionally to TSs.

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.

- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1] 3GPP Homepage: www.3GPP.org
[2] ~~S2.01~~25.301, Radio Interface Protocol Architecture
[3] ~~S2.02~~25.302, Layer 1; General requirements
[4] ~~S2.03~~25.303, UE States and Procedures in Connected Mode
[5] ~~S2.04~~25.304, Description of procedures in idle Mode
[6] ~~S2.22~~25.322, Description of RLC protocol
[7] ~~S2.31~~25.321, Description of RRC protocol
[8] ~~S2.40~~25.340, Description of principles for error handling and message description
[9] ETSI UMTS 25.XX: "Vocabulary for the UTRAN"

3   Definitions, symbols and abbreviations

Delete from the above heading those words which are not applicable.

See [9] for a definition of fundamental concepts and vocabulary.

3.1   Definitions

Clause numbering depends on applicability.

For the purposes of the present document, the [following] terms and definitions [given in ... and the following] apply.

OCCCH	ODMA Common Control Channel
ODCCH	ODMA Dedicated Control Channel
ODCH	ODMA Dedicated Channel
ODMA	Opportunity Driven Multiple Access
ORACH	ODMA Random Access Channel
ODTCH	ODMA Dedicated Traffic Channel
TDD	Time Division Duplex
UE	User Equipment
UE_R	User Equipment with ODMA relay operation enabled
UL	Uplink

UMTS	Universal Mobile Telecommunications System
URA	UTRAN Registration Area
UTRA	UMTS Terrestrial Radio Access
UTRAN	UMTS Terrestrial Radio Access Network

Definition format

<defined term>: <definition>.

example: text used to clarify abstract rules by applying them literally.

3.2 Symbols

Clause numbering depends on applicability.

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

Symbol format

<symbol> <Explanation>

3.3 Abbreviations

Clause numbering depends on applicability.

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

Abbreviation format

<ACRONYM> <Explanation>

4. Opportunity Driven Multiple Access (ODMA)

ODMA is a communications relaying protocol, which may be used to increase the efficiency of UMTS. One way in which this is achieved is by increasing the range of high data rate services. The concept of ODMA was introduced at ETSI SMG2 in 1996, after which a number of contributions have been presented.

4.1 ODMA Infrastructure Configurations

FFS

4.2 ODMA Probing and Route Acquisition

FFS

4.3 ODMA Efficiency and Power Requirements

FFS

4.4   ODMA Physical Layer Burst Mapping

FFS

4.5   ODMA Idle Mode Procedures

FFS

4.6   ODMA Connected Mode Procedures

FFS

5 Annex

Frequently Asked Questions

Question 1

In highly connected networks, delay per hop decreases. Is it not likely in such cases the mean distance covered by each hop is shortened so that the reduced delay per hop is offset by an increase in the number of hops per path. The total end to end delay may actually increase. Have we examined this?

Answer 1

As the density of stations increases, the path loss between stations typically reduces as a 40 log D relationship. Therefore the data rate that can be used between stations increases at the same rate. The delay of a multi-hop network reduces as the density goes up, even if there are more relays. For example if the relay distance is halved, the number of hops is doubled, the path loss per hop is reduced by 12 dB and the data rate can be increased by ten times or so (at the same power level), and therefore overall delay is reduced by five. This is a non-intuitive conclusion and holds, providing the data rate can be continually increased. In addition, the amount of joules of energy required to move the data over the relays is reduced in total by five times. Overall there is an improvement in performance through using more relay hops.

At some point the maximum data rate is reached, due to bandwidth allocation or complexity problems, at which point the number of hops needs to be curtailed based upon the maximum delay.

Question 2

ODMA should not focus entirely on urban deployments. The large increase in the number of basestations that we suggest UMTS needs compared with GSM actually only applies to the rural (i.e. noise-limited) case - hence "universal" UMTS remains uneconomic. Surely if ODMA sticks to the non-fading wideband relaying the required ranges can be achieved - albeit at 100mW mean power ?

Answer 2

Wide area coverage in the rural environment, particularly if this is used as an extension of the high data rate services within a rural cell, is an important application of ODMA. Particularly in rural environments where there are sparse population densities strung out along roads or in clusters, the use of seeds and subscriber relay to fixed subscribers or via fixed subscribers will provide significant advantages.

Question 3

What are the average sleeping patterns on 720 ms multi-frame?

Answer 3

FFS

Question 4

How many times and during how many slots and frames does the UE listen to the RACH, ORACH?

Answer 4

FFS

Question 5

What is the duty cycle of probing on the RACH, ORACH?

Answer 5

FFS

Question 6

Over how many slots are receive and transmit associated with relaying functionality?

Answer 6

FFS

History

<table>
<tr><td colspan="3" align="center">**Document history**</td></tr>
<tr><td>April 1999</td><td>0.0.1</td><td>Report was created with initial heading included from document R2-99287</td></tr>
<tr><td>May 1999</td><td>0.0.2</td><td>References 3GPP document numbers within the report were updated.</td></tr>
<tr><td>June 1999</td><td>0.1.0</td><td>Version 0.0.2 approved by WG2 over email.</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td colspan="3">Rapporteur for 3GPP TSG RAN WG2 25.924 is:</td></tr>
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<tr><td colspan="3" align="center">This document is written in Microsoft Word Version 97 SR-1.</td></tr>
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