

Title: OFDM for UTRAN enhancement – further proceeding
Source: Alcatel
Agenda Item: 8.12.3
Document for: Discussion

1. Introduction

OFDM for HSDPA downlink traffic has been a Study Item in RAN WG 1. In RAN WG 1 #37 the final version 1.2.0. of the SI report has been approved [1]. The study was explicitly restricted to so called “textbook” OFDM, which means a basic OFDM system without any advanced features like, e.g., pulse shaping for higher spectral efficiency, frequency scheduling, and interference avoidance measures at the cell borders.

2. Proposal

The SI report concludes that OFDM is feasible as an additional air interface for HSDPA traffic. It also states that the restricted “textbook” OFDM system already offers a performance gain compared to WCDMA with a Rake receiver and is at least comparable to that of the WCDMA air interface with advanced receivers.

Several contributions show that an OFDM air interface has the potential for higher spectral efficiency [3] and for throughput enhancements [4], [5]. Further contributions point out that an OFDM air interface has the potential of substantially wider HSDPA coverage as WCDMA (see e.g., [2] or [1] sect. 6.6.1).

The performance in a multi-cell environment has only been assessed with simplified interference assumptions and user traffic multiplexing that distributes the inter cell interference to all users. Pilot patterns interference also remains for further study.

We consider OFDM as an essential step for the further evolution of packet traffic support in UMTS due to its potential performance and flexibility. Therefore, we propose to put the OFDM study currently on hold until the more urgent issues of Enhanced Uplink and MBMS are finalised, and the realistic performance of HSDPA-WCDMA with advanced receivers, as studied in RAN WG 4, can be better assessed. Thus, the OFDM study could be taken up again in about 9 – 12 month from now.

References

- [1] 3GPP TSG-RAN-1, “TR 25.892: Feasibility Study for OFDM for UTRAN Enhancement”, Version 1.2.0, May 2004.
- [2] R1-040572, “OFDM with interference control for improved HSDPA coverage”, Alcatel, May 2004.

- [3] R1-030520, “ Link-Level and System-Level Performance Evaluation Results for WCDMA (G-Rake receiver) in UTRAN ”, Nortel Networks, May 2003.
- [4] R1-031221, “User Traffic Multiplexing Based on Frequency Scheduling”, Samsung and Nortel Networks, November 2003.
- [5] R1-031265, “Adaptive subcarrier allocation and modulation scheme selection in OFDM System”, Alcatel, November 2003.