

Source: Motorola and Nokia

Title: **Proposal for Rel-5 study item on MIMO techniques for HSDPA**

Introduction

In RAN#7 a study item on High Speed Downlink Packet Access was approved for consideration. The aim of the study was to look at the feasibility and potential of various techniques such as Adaptive Modulation and Coding and Hybrid ARQ for increasing throughput and peak data rates with decrease in delay.

Status

Multiple Input Multiple Output (MIMO) technique with emphasis on open loop V-BLAST method was proposed for HS-DSCH by Lucent [1] to increase the peak rate and average throughput of HSDPA.

MIMO represents a promising approach but there are a wide variety of applicable MIMO techniques which should be investigated along with MIMO examples in the TR during the standardisation process. It may also be noted that, the performance advantage of MIMO schemes is heavily dependent on the underlying channel model. The channel model should be agreed upon in RAN1 and will be used to verify different techniques. In view of the above, RAN1 recommended that MIMO should be a part of further HSDPA work.

Proposal

In the light of the above mentioned studies and conclusions on MIMO, it is proposed that a new study item on MIMO applications be approved for Rel-5.

Study Item: MIMO Methods

This study item will address various MIMO methods e.g. to increase the average throughput performance and peak data rate of the HS-DSCH.

The following tasks need to be addressed to evaluate MIMO.

- MIMO with channel state information available at the transmitter.
- MIMO with channel state information not available at the transmitter. An example of this class of scheme was studied in the WG1 TR.

- Other MIMO schemes such as Punctured schemes [2] have been discussed in WG#1 where the user data throughput is increased using punctured Turbo codes. The transmitter utilizes a STTD and the receiver uses a simple multiple antenna Rake.
- MIMO channel model
- UE complexity aspect

We think MIMO techniques are exciting and potentially valuable and studies should continue in investigating various MIMO techniques in order to come up with the best possible solution with regard to performance and UE complexity.

References

- [1] Lucent, "Enhancement for HSDPA using Multiple Antennas," TSGR1#15(00)1096.
- [2] Nokia, "Double data rate for FDD downlink through channel code puncturing in MIMO channels," Tdoc#R1-01-0258