TSG-RAN Meeting #28 **RP-050334**

Quebec, Canada 1 – 3 June 2005

Title: MIMO for UTRA in Release 7

Source: Lucent Technologies, Texas Instrument, Mitsubishi, IPWireless, UTStarcom, CATT, Qualcomm

Agenda:

Document for: Discussion and Decision

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1 Introduction

It has been shown that the average downlink throughput will improve very significantly using MIMO in UTRA [1][2][6] while doubling the peak data rate that can be provided per user. The introduction of MIMO in Rel-7 will therefore enable UTRA to remain competitive with upcoming technologies and enable performance improvements to be provided quickly via relatively minor changes to existing air interfaces.

MIMO is an essential element of the EUTRA in the LTE work, and is very likely the UE's supporting EUTRA will support MIMO. This should not preclude the inclusion of MIMO in Rel-7 for UTRA. Indeed the introduction of MIMO in Rel-7 could facilitate the study of MIMO in the context of LTE.

2 Current Status of the MIMO WI

The system evaluation methodology has been agreed upon in RAN1, and the spatial channel model to be used has been specified in TR25.996 [3]. Several MIMO schemes for UTRA from various companies (including Lucent, Nortel, Mitsubishi, TI, Nokia, Samsung, Ericsson, LGE, IPWireless, CATT) have been proposed in RAN1 and were agreed to be included in TR25.876 [4]. Initial link level and systems level analysis of the proposed schemes have been presented. Thus it can be seen that the MIMO WI has generated substantial interest in RAN1, and numerous companies have participated actively on contributions and proposals on this work.

The next step on the MIMO WI is to evaluate the proposed schemes using the agreed system evaluation methodology. Judging from the amount of efforts put into the MIMO WI by numerous companies, we believe that there will be substantial support and contributions to continue the MIMO WI to further enhance UTRA.

3 Proposal (Restart MIMO WI at RAN#28)

It was agreed in RAN#26 to put the MIMO WI on hold until RAN#28, in order to give more meeting time to the Rel-6 WI on EDCH and MBMS, which are now considered to be completed. Considering the significant improvement that MIMO can offer in terms of peak rate, spectral efficiency, and coverage, we propose to restart the MIMO WI in the Rel-7 time frame.

As reported in the last MIMO SR [5], a significant portion of the RAN1 work has been completed [5]. RAN1 still needs to evaluate the MIMO proposals, study the impact to UE/UTRAN MIMO implementation and study the impact on physical layer operation. Work also needs to be started in RAN2-4. If it is agreed to restart the MIMO WI at RAN#28, we estimate the completion dates for the MIMO WI as:

Work in RAN 1,2,3 Target completion date: June 2006
Work in RAN 4 Target completion date: Dec. 2006

4 References

[1] R1-010879, Lucent, “Increasing MIMO throughput using per-antenna rate control”, RAN1#21, Turin, Italy, August 27-31, 2001.

[2] R1-040989, IPWireless, “Per-Antenna Rate Control for UTRA TDD: System Proposal and Link Level Results”, RAN1#38, Prague, Czech Republic, August 16-20, 2004.

[3] 3GPP TR 25.996 (V6.0.0): "Spatial channel model for Multiple Input Multiple Output (MIMO) simulations".

[4] 3GPP TR 25.876 (V1.7.0): "Multiple-Input Multiple Output in UTRA".

[5] RP-040269, Lucent, “MIMO in UTRA: Status Report”, RAN#25, Palm Springs, USA, September 7-9, 2004.

[6] R1-041007, CATT “Per-Stream Rate Control for LCR TDD_System Proposal and Initial Link Level Results”,