Status Report for WI to TSG

Work Item Name: MIMO processing for HSDPA

SOURCE: Rapporteur TSG: RAN WG: 1

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Ref. to WI sheet: RAN_Work_Items.doc

Progress Report since the last TSG (for all involved WGs):

RAN WG1 #34 in Seoul:

- The work on the requirements section of the TR was completed with main requirements came from the operators.
- Few candidate proposals were presented with some simulation results, some of them are system level results. The proposals presented were
    - o Lucent candidate (PARC)
    - o Samsung candidate (PU2RC)
    - o Nortel candidate (MPD)

RAN WG1 #35 in Lisbon:

- The updated MIMO TR [1] from the previous meeting was approved. In addition, a proposal to incorporate the TDD part in the MIMO TR was proposed.

- A few companies proposed text proposals for MIMO candidates into the TR. The proposed MIMO candidates so far are from Lucent (PARC), Nortel (MPD), Mitsubishi (DSTTD-SGRC) and Samsung (PU2RC). Some discussions have started on system simulation assumptions in order to start the system evaluation for the proposed candidates.

Summary of the existing candidates:

- The Lucent proposal (per-antenna rate control, or PARC) transmits independent streams on each antenna which are modulated with a common set of spreading codes. The data rates on each of the streams can be adjusted to account for each antenna's channel characteristics.

- The Nortel proposal (multipaths diversity, or MPD) also uses spatial multiplexing with rate control on each stream. However, the difference is that each stream is transmitted from two antennas with the spreading codes differentiated by a delay of one chip interval. A semi-definite programming algorithm based on a simplified maximum likelihood search is proposed as a 'near-optimal' receiver strategy.

- The Mitsubishi proposal (double space-time transmit diversity with sub-group rate control (DSTTD-SGRC)) combines space time transmit diversity techniques with robust sub-group level rate control.

- The Samsung proposal (per-user unitary rate control, or PU2RC) uses spatial multiplexing to transmit simultaneously to multiple users. Hence multiple streams are transmitted to multiple users, unlike the other MIMO proposals where multiple streams are transmitted to a single user. The transmissions are beamformed (weighted) using a unitary matrix based on the singular-value decompositions of the MIMO channels.

RAN WG2:
The WI has not been treated yet.
RAN WG3:
The WI has not been treated yet.
RAN WG4:
The WI was not treated.

List of completed elements:

- Requirements
- Link level channel model
- System level channel model

List of open issues:

- System level simulation methodology f
- Evaluation of MIMO proposals
- Impact on UE and UTRAN implementation.
- Impact on physical layer operation.
- Conclusion

Estimates of the level of completion (when possible):

40%

WI completion date review resulting from the discussion at the working group:

09/2004 (TSG-RAN#25)

References to WG's internal documentation and/or TRs:

[1] R1-031398, MIMO Rapporteur, MIMO TR 25.876 v1.2.0