3GPP TSG RAN WG1 ***TSGR1#15(00)1091***
Berlin, Germany,
22nd – 25th August, 2000

Agenda Item: **4**

Source: **Vodafone Group, Ericsson, Nokia**

Title: **Support of closed loop transmit diversity modes**

Document for: **Approval**

Introduction

The support of the TSTD and STTD downlink open loop transmit diversity modes is indicated as mandatory at UE and optional in UTRAN in TS 25.211. However nothing is specified either in subclause 5.3.1.2 of TS 25.211 or section 7 of TS 25.214 regarding the support of the closed loop transmit diversity modes.

Summary of proposed corrections

In section 5.3.1.2, we propose to mention also that the support of both closed loop transmit diversity modes shall be mandatory at UE and optional in UTRAN as a matter of consistency.

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Document R1-00-1091
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

25.211	CR	070r1	Current Version:	3.3.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	RAN #9	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from:* ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

Proposed change affects: *(at least one should be marked with an X)* (U)SIM [ ] ME [X] UTRAN / Radio [X] Core Network [ ]

Source: Vodafone Group, Ericsson, Nokia **Date:** 2000-08-15

Subject: Support of closed loop transmit diversity modes

Work item:

Category: *(only one category shall be marked with an X)*

F	Correction	[X]	**Release:**	Phase 2	[ ]
A	Corresponds to a correction in an earlier release	[ ]		Release 96	[ ]
B	Addition of feature	[ ]		Release 97	[ ]
C	Functional modification of feature	[ ]		Release 98	[ ]
D	Editorial modification	[ ]		Release 99	[X]
				Release 00	[ ]

Reason for change: The support of closed loop transmit diversity modes at both UTRAN and UE is not specified neither in TS 25.211 and TS 25.214 in the relevant sections.

Clauses affected: 5.3.1.2

Other specs affected:

Other 3G core specifications	[ ]	→ List of CRs:
Other GSM core specifications	[ ]	→ List of CRs:
MS test specifications	[ ]	→ List of CRs:
BSS test specifications	[ ]	→ List of CRs:
O&M specifications	[ ]	→ List of CRs:

Other comments: Consequence if not accepted This inconsistency in the specifications may lead to misinterpretation of the requirement and, therefore, variation in implementation.

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5.3.1 Downlink transmit diversity

Table 10 summarizes the possible application of open and closed loop transmit diversity modes on different downlink physical channel types. Simultaneous use of STTD and closed loop modes on the same physical channel is not allowed. In addition, if Tx diversity is applied on any of the downlink physical channels it shall also be applied on P-CCPCH and SCH. Regarding CPICH transmission in case of transmit diversity, see subclause 5.3.3.1.
Furthermore, the transmit diversity mode used for a PDSCH frame shall be the same as the transmit diversity mode used for the DPCH associated with this PDSCH frame. During the duration of the PDSCH frame, and within the slot prior to the PDSCH frame, the transmit diversity mode (open loop or closed loop) on the associated DPCH may not change. However, changing from closed loop mode 1 to mode 2 or vice versa, is allowed.

Table 10: Application of Tx diversity modes on downlink physical channel types "X" – can be applied, "–" – not applied

Physical channel type	Open loop mode		Closed loop Mode
	TSTD	STTD	
P-CCPCH	–	X	–
SCH	X	–	–
S-CCPCH	–	X	–
DPCH	–	X	X
PICH	–	X	–
PDSCH	–	X	X
AICH	–	X	–
CSICH	–	X	–

5.3.1.1 Open loop transmit diversity

5.3.1.1.1 Space time block coding based transmit antenna diversity (STTD)

The open loop downlink transmit diversity employs a space time block coding based transmit diversity (STTD). The STTD encoding is optional in UTRAN. STTD support is mandatory at the UE. STTD encoding is applied on blocks of 4 consecutive channel bits. A block diagram of a generic STTD encoder for channel bits b_0, b_1, b_2, b_3 is shown in the figure 8 below. Channel coding, rate matching and interleaving is done as in the non-diversity mode. The bit b_i is real valued {0} for DTX bits and {1, -1} for all other channel bits.

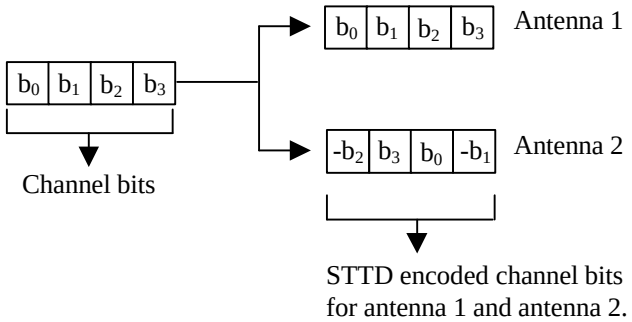

Figure 8: Generic block diagram of the STTD encoder

5.3.1.1.2 Time Switched Transmit Diversity for SCH (TSTD)

Transmit diversity, in the form of Time Switched Transmit Diversity (TSTD), can be applied to the SCH. TSTD for the SCH is optional in UTRAN, while TSTD support is mandatory in the UE. TSTD for the SCH is described in subclause 5.3.3.4.1.

5.3.1.2 Closed loop transmit diversity

Closed loop transmit diversity is described in [5]. ~~The support of both closed loop transmit diversity modes is optional in UTRAN and mandatory at the UE~~ Both closed loop transmit diversity modes shall be supported at the UE and may be supported in the UTRAN.