3GPP TSG RAN Meeting #17 ***RP-020587***
Biarritz, France, 3 – 6, September 2002

Title: **Agreed CRs (Rel-5) to TS 25.211 and TS 25.214 on "Inclusion of closed loop transmit diversity for HSDPA"**

Source: **TSG-RAN WG1**

Agenda item: **7.1.5**

No.	Spec	CR	Rev	R1 T-doc	Subject	Phase	Cat	Workitem	V_old	V_new
1	25.211	171	-	R1-02-1078	Inclusion of closed loop transmit diversity for HSDPA	Rel-5	F	HSDPA-Phys	5.1.0	5.2.0
2	25.214	288	-	R1-02-1078	Inclusion of closed loop transmit diversity for HSDPA	Rel-5	F	HSDPA-Phys	5.1.0	5.2.0

3GPP TSG RAN Meeting #17 ***R1-02-1078***
Biarritz, France, 3 – 6, September 2002

CR-Form-v7

CHANGE REQUEST

⌘ **25.211** **CR** **171** ⌘ **rev** **-** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐ ME ☒ Radio Access Network ☒ Core Network ☐

Title:	⌘	Inclusion of closed loop transmit diversity for HSDPA
Source:	⌘	TSG RAN WG1
Work item code:	⌘	HSDPA-Phys
Date:	⌘	15/08/2002
Category:	⌘	**F**
Release:	⌘	Rel-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
Rel-4 (Release 4)
Rel-5 (Release 5)
Rel-6 (Release 6)

Reason for change:	⌘	Currently, the use of closed loop transmit diversity for HS-PDCH and HS-SCCH is not defined.
Summary of change:	⌘	Table 11 is updated to include closed loop transmit diversity mode one for HS-PDSCH and HS-SCCH.
Consequences if not approved:	⌘	Closed loop transmit diversity cannot be used when a user is assigned a HS-DSCH. Note that this also limits the use of R99/R4 closed loop transmit diversity for the associated DPCH.

Clauses affected:	⌘	5.3.1

	Y	N			
Other specs affected: ⌘	X		Other core specifications	⌘	25.214
		X	Test specifications		
		X	O&M Specifications		

Other comments:	⌘	

5.3.1 Downlink transmit diversity

Table 11 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.
With respect to the usage of Tx diversity on different radio links within an active set, the following rules apply:

- Different Tx diversity modes (STTD and closed loop) shall not be used on the radio links within one active set.

- No Tx diversity on one or more radio links shall not prevent UTRAN to use Tx diversity on other radio links within the same active set.

- If STTD is activated on one or several radio links in the active set, the UE shall operate STTD either on only those radio links where STTD has been activated or on all radio links in the active set.

- If closed loop TX diversity is activated on one or several radio links in the active set, the UE shall operate closed loop TX diversity either on only those radio links where closed loop TX diversity has been activated or on all radio links in the active set.

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. The transmit diversity mode on the associated DPCH may not change during a PDSCH frame and within the slot prior to the PDSCH frame. This includes any change between no Tx diversity, open loop, closed loop mode 1 or closed loop mode 2. Also, the transmit diversity mode used for a HS-SCCH and or a HS-PDSCH subframe shall be the same as the transmit diversity mode used for the DPCH associated with this HS-SCCH and or HS-PDSCH subframe. The transmit diversity mode on the associated DPCH may not change during a HS-SCCH and or HS-PDSCH subframe and within the slot prior to the HS-SCCH subframe. This includes any change between no Tx diversity, open loop, closed loop mode 1 or closed loop mode 2.

Table 11: Application of Tx diversity modes on downlink physical channel types
"X" – can be applied, "–" – not applied, "FFS" – for further study

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
HS-PDSCH	–	X	FFS
HS-SCCH	–	X	FFS
AICH	–	X	–
CSICH	–	X	–
AP-AICH	-	X	-
CD/CA-ICH	-	X	-
DL-DPCCH for CPCH	-	X	X

Physical channel type	Open loop mode		Closed loop mode	
	TSTD	STTD	Mode 1	Mode 2
P-CCPCH	–	X	–	–
SCH	X	–	–	–
S-CCPCH	–	X	–	–
DPCH	–	X	X	X
PICH	–	X	–	–
PDSCH	–	X	X	X
HS-PDSCH	–	X	X	FFS
HS-SCCH	–	X	X	FFS
AICH	–	X	–	–
CSICH	–	X	–	–
AP-AICH	–	X	–	–
CD/CA-ICH	–	X	–	–
DL-DPCCH for CPCH	–	X	X	X

3GPP TSG RAN Meeting #17
Biarritz, France, 3 – 6, September 2002

R1-02-1078

CR-Form-v7

CHANGE REQUEST

⌘ **25.214** **CR** **288** ⌘ **rev** **-** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐ ME ☒ Radio Access Network ☒ Core Network ☐

Title:	⌘	Inclusion of closed loop transmit diversity for HSDPA
Source:	⌘	TSG RAN WG1
Work item code:	⌘	HSDPA-Phys
Date:	⌘	15/08/2002
Category:	⌘	**F**
Release:	⌘	Rel-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
Rel-4 (Release 4)
Rel-5 (Release 5)
Rel-6 (Release 6)

Reason for change:	⌘	Currently, the use of closed loop transmit diversity for HS-PDCH and HS-SCCH is not defined.
Summary of change:	⌘	The timing of the weight update is specified for HS-PDSCH and HS-SCCH.
Consequences if not approved:	⌘	Closed loop transmit diversity cannot be used when a user is assigned an HS-DSCH. Note that this also limits the use of R99/R4 closed loop transmit diversity for the associated DPCH.

Clauses affected:	⌘	8.1			
		Y	**N**		
Other specs affected:	⌘	**X**		Other core specifications	⌘ 25.211
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

8.1 Determination of feedback information

The UE uses the CPICH to separately estimate the channels seen from each antenna.

Once every slot, the UE computes the phase adjustment, ϕ, and for mode 2 the amplitude adjustment that should be applied at the UTRAN access point to maximise the UE received power. During soft handover, the UE computes the phase adjustment and for mode 2 the amplitude adjustment to maximise the total UE received power from the cells in the active set. In the case that a PDSCH, HS-PDSCH, or HS-SCCH is associated with a DPCH for which closed-loop transmit diversity is applied, the antenna weights applied to the PDSCH, HS-PDSCH, and HS-SCCH, respectively, are the same as the antenna weights applied to the associated DPCH. In case a PDSCH, HS-PDSCH, or HS-SCCH is associated with a DPCH during soft handover, the UE may emphasize the radio link carrying PDSCH, HS-PDSCH, or HS-SCCH, respectively, when calculating the antenna weights. An example of how the computations can be accomplished is given in Annex A.2.

The UE feeds back to the UTRAN access point the information on which phase/power settings to use. Feedback Signalling Message (FSM) bits are transmitted in the portion of FBI field of uplink DPCCH slot(s) assigned to closed loop mode transmit diversity, the FBI D field (see [1]). Each message is of length $N_W = N_{po}+N_{ph}$ bits and its format is shown in the figure 4. The transmission order of bits is from MSB to LSB, i.e. MSB is transmitted first. FSM_{po} and FSM_{ph} subfields are used to transmit the power and phase settings, respectively.

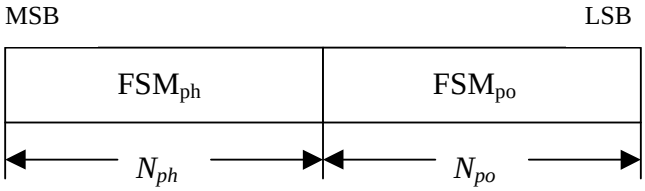

Figure 4: Format of feedback signalling message. FSM_{po} transmits the power setting and FSM_{ph} the phase setting

The adjustments are made by the UTRAN Access Point at the beginning of the downlink DPCCH pilot field. The downlink slot in which the adjustment is done is signalled to L1 of UE by higher layers. Two possibilities exist:

1) When feedback command is transmitted in uplink slot *i*, which is transmitted approximately 1024 chips in offset from the received downlink slot *j*, the adjustment is done at the beginning of the pilot field of the downlink slot (*j*+1) mod 15.

2) When feedback command is transmitted in uplink slot *i*, which is transmitted approximately 1024 chips in offset from the received downlink slot *j*, the adjustment is done at the beginning of the pilot field of the downlink slot (*j*+2) mod 15.

Thus, adjustment timing at UTRAN Access Point is either according to 1) or 2) as controlled by the higher layers.

The timing of the weight adjustment of the PDSCH is such that the PDSCH weight adjustment is done at the PDSCH slot border, N chips after the adjustment of the associated DPCH, where $0 \leq N < 2560$.

The timing of the weight adjustment of the HS-PDSCH and the HS-SCCH is such that the HS-PDSCH and HS-SCCH weight adjustment is done at the HS-PDSCH and HS-SCCH slot border, respectively, M chips after the adjustment of the associated DPCH, where $0 \leq M < 2560$.