3GPP TSG RAN WG1#17 **TSGR1#17(00)-1271**

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Agenda item: AH26: Tx Diversity

Source: Samsung

Title: Transmit Diversity Operation for DSCH in SHO Region

Document for: Discussion and approval

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1. Introduction

Tx diversity for DSCH in SHO region has been addressed in RAN1#16 Pusan meeting[1], where the simulation for evaluating performance has also been required. This Tdoc evaluates the performance of the current scheme of TX diversity for DSCH in Release 99, and presents the performance improvement by a Tx diversity technique proposed in the last meeting. Common simulation environment and parameter configuration for more enhanced results is suggested.

Tx Diversity for DSCH in SHO

As addressed by Nokia, Qualcomm and Samsung, in SHO region, DSCH is transmitted from only one cell, while DPCH is transmitted from all active cells [1][2][3]. Accordingly, an enhanced power control method has been required, and a TR for this problem has been submitted [3].

In cases, Tx diversity for DSCH with the conventional technique in R99 can not show good performance just like the TPC for DSCH. That is because the weights may not be appropriate for DSCH transmitted from one BS, since the weights are optimized for DPCH transmitted from more than one cells.

A time-sharing method of feedback channel by DPCH and DSCH was presented as a solution [1], which can guarantee good performance in the case of low mobility (3km/h). The dedicated channel is required to use time-sharing for MRC channel estimation as well.

Fig. 1 and Fig. 2 show the theoretical raw BERs for the cases of 2 and 4 active BS's. In both figures, *the bottom-most line* shows the performance of Tx diversity for DPCH. The performance of the Tx diversity for DSCH with the proposed method is shown by *the middle line*, while *the top-most line* shows the performance with the conventional method.

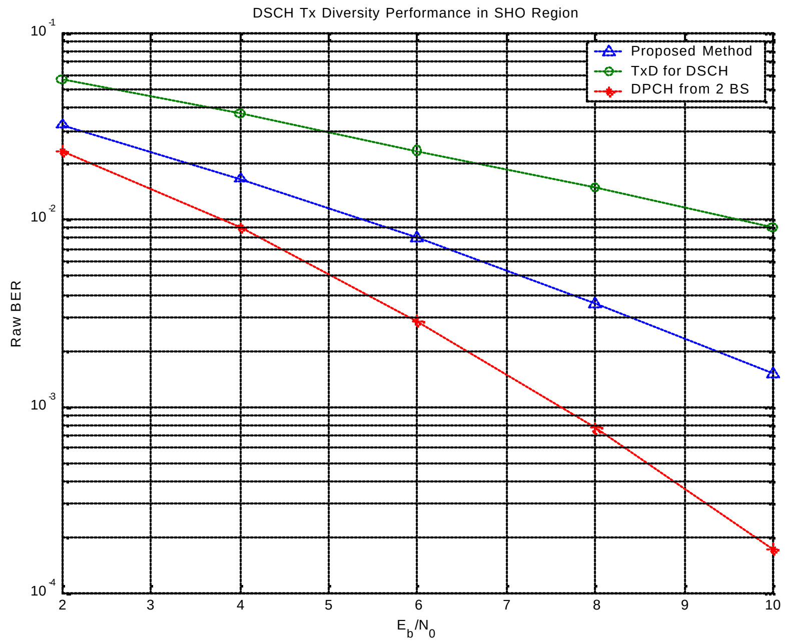

Fig. 1 Tx diversity for DSCH in SHO region under ideal environment – 2 active BS's

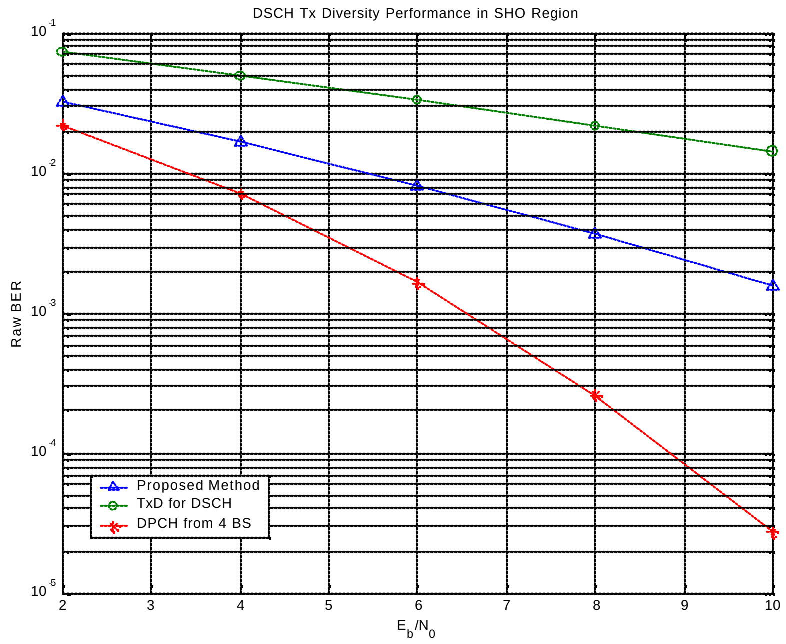

Fig. 2 Tx diversity for DSCH in SHO region under ideal environment – 4 active BS's

2. Simulation Results

In this section, link simulation result is presented with simulation scenario and parameters.

2.1 Simulation Scenario and Parameters

Scenario

The number of active BS's was assumed to be 2 in the link simulation. As addressed before, DSCH was transmitted from one BS, while DPCH was transmitted from both BS's simultaneously. The total transmission power of DPCH was assumed to be constant. Let E_c for DPCH be $E_{c,1}+E_{c,2}$, where $E_{c,1}$ and $E_{c,2}$ are the powers allocated to the BS_1 and BS_2, respectively. It was assumed that the downlink TPC is well performed in any cases.

Mode 1 was used in TxAA. The same weights for DPCH was used for DSCH in the conventional method, while in the proposed method, the feedback structure was modified for receiving the additional weights for DSCH. The dedicated pilot symbol was exploited in the channel estimation for MRC.

The interference by the DPCH transmitted from other BS was ignored in the DPCH simulation. The velocity of a UE was set to the low speed (3km/h), and only one path Rayleigh fading channel was assumed.

Parameters

The general parameters for Tx diversity are same as in [4]. Besides, additional parameters are shown in Table 1.

Table 1 Simulation Parameters

Parametes		Value
TxAA Mode		*Mode 1*
TxAA Weights	DPCH	*DPCH weight*
	DSCH	*DPCH weight*
	DSCH(Proposed Method)	*DSCH using time division feedback information*
MRC Channel Estimation		*WMSA using dedicated pilot symbols*
		Separated pilot symbols for proposed method
Mobile Speed		*3km/h*
Channel		*Single Path Rayleigh*
Down Link TPC		*Separated DPCH & DSCH TPC*
# of Total Active BS		*2*
# of Tx BS	DPCH	*2*
	DSCH	*1*
Distance from each BS to UE		*Same for all (Equal power distribution)*

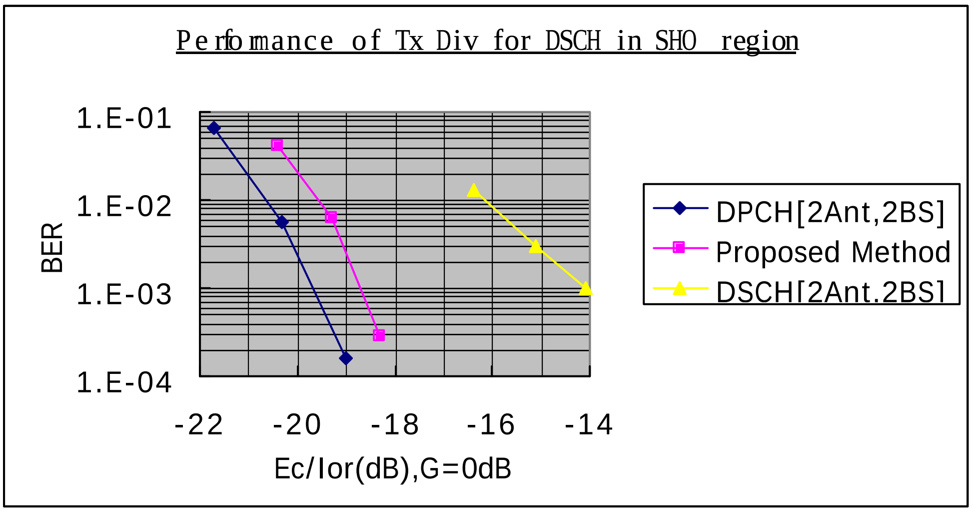

Fig. 3 Tx diversity for DSCH in SHO region under link environment – BER

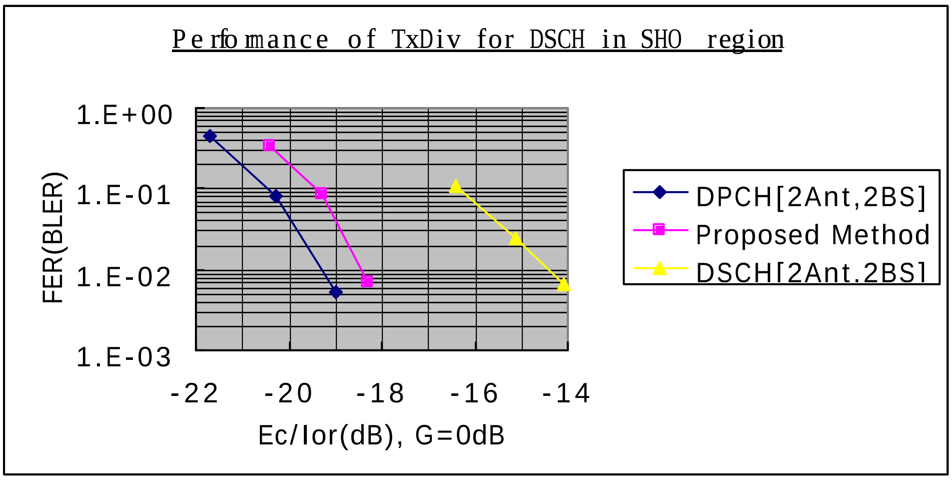

Fig. 4 Tx diversity for DSCH in SHO region under link environment – FER(BLER)

3. Simulation results

The BER and FER(BLER) of Tx diversity for DSCH in SHO region under link environment are shown in Fig. 3 and Fig. 4. The results show that *the proposed Tx diversity method* has 4.5dB and 4dB gains under BER=10^{-3} and 10^{-2} environment, respectively, compared to *the conventional method*.

4. Discussion and conclusions

In this proposal, the performance evaluation by the simulation of Tx diversity for DSCH in SHO was presented. The time-sharing feedback scheme shows 4dB and 4.5dB gains, respectively, in the case of low speed chanel when BER is equal to 10^{-2} and 10^{-3} compared to the conventional method.

The simulation scenarios and parameters in more diverse cases should be considered. The performance comparison with other techniques which have not been addressed in this proposal is also needed as future work.

5. References

[1] Samsung, DSCH Tx Diversity Operation in SHO Region, 3GPP TSG-RAN WG1#16 R1-00-1270

[2] Nokia, Draft TR for the DSCH power control improvement in Soft Handover, 3GPP TSG-RAN WG1#15 R1-00-1026

[3] Qualcomm, Power control in DCH/DSCH mode, 3GPP TSG-RAN WG1#11 R1-00-0327

[4] Nokia, "Recommended simulation parameters for Tx diversity simulations", 3GPP TSG-RAN WG1 R1-00-0867

Contact points

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