TSG-RAN Working Group 1 meeting #7
Hanover, Germany
30 Aug. – 3 Sept.

TSGR1#7(99)c07

Source: Motorola

Text proposal for Tx Diversity for DCH

Text Proposal for 25.221

5.5 Beamforming and Transmit Diversity

When Downlink beamforming or Tx Diversity is used on a downlink DPCH, at least the user to which beamforming/Tx Diversity is applied shall get an individual midamble shift according to chapter 5.2.3.

Text proposal for 25.224

6.11 ~~Forward Link~~ Transmit Diversity for DPCH

~~Transmit diversity in the forward link provides means to achieve similar performance gains as the mobile station receiver diversity without the complexity of a second mobile station receiver. Furthermore, transmit diversity improves the SIR and increases the system capacity. Depending on the mobile station's distance to the base station, its speed, and the asymmetry ratio, selective transmit diversity (STD) can be employed.~~
Selective Transmit Diversity (STD) and Transmit Adaptive Antennas (TxAA) can be employed as transmit diversity schemes for dedicated physical channels.

~~With STD, the received signal power of reverse link is measured for each of the antennas at the BTS over every single reverse link interval (1 slot). The antenna with the highest signal level is used to transmit the forward link information for that link during the next interval over which the carrier is used for the forward link (1 or more slots). The basis for the gains from this type of diversity is the availability of information on the channel due to the use of the same frequency for reverse link and forward link. STD is applied only to dedicated physical channels. STD can be applied if the distance between the different transmit antennas is small enough so that the delay profile from each antenna is almost the same.~~

6.11.1 DPCH transmission scheme

The transmitter structure to support transmit diversity for DPCH transmission is shown in Figure 1. Channel coding, interleaving and spreading are done as in non-diversity mode. The spread complex valued signal is fed to both TX antenna branches, and weighted with antenna specific weight factors w_1 and w_2. The weight factors are complex valued signals (i.e., $w_i = a_i + jb_i$), in general.
The weight factors are determined by the Node B.

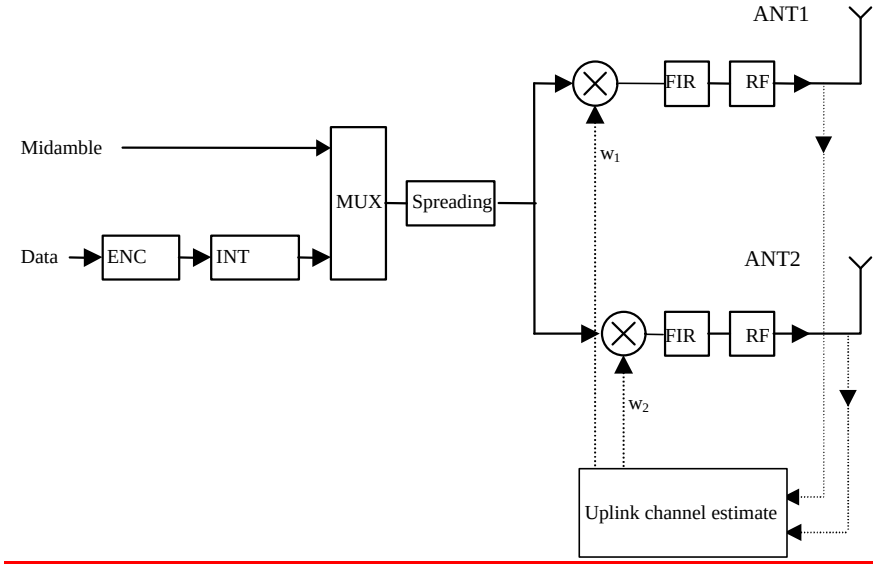

Figure 1. Downlink transmitter structure to support Transmit Diversity for DPCH transmission (UTRAN Access Point)

6.11.2 Determination of weight information

6.11.2.1 STD weights

The weight vector will take only two values depending on the signal strength received by each antenna in the uplink slot. For each user, the weight corresponding to the antenna receiving the highest power will be set to 1.

	W_1	W_2
Antenna 1 receiving highest power	1	0
Antenna 2 receiving highest power	0	1

Table 1: STD weights

6.11.2.2 TxAA weights

In a generic sense, the weight vector to be applied at the transmitter is the *w* that maximises:

$$P=w^{H}H^{H}Hw \qquad (1)$$

where

$H=[h_1\ h_2 \ldots]$

and where the column vector h_i represents the estimated uplink channel impulse response for the i'th transmission antenna, of length equal to the length of the channel impulse response.

<Editors Note: Other TX diversity schemes such as schemes for common channels ~~and TXAA~~ are ffs>