TSG-RAN Working Group 1 meeting#16 ***TSGR1(00)1247***

Pusan, Korea, Oct 10~13,2000

Agenda Item: AH21
Source: CWTS
To: TSG RAN WG1
Title: Downlink Transmit Diversity
Document for: Discussion and Approval

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1 Summary

This paper describes the different transmit diversity schemes for different downlink physical channel types in 1.28Mcps TDD

2 Proposal

It's proposed to discuss and include the following text proposal into the clause 5.5 Downlink Transmit Diversity.

---------- Changes to working CR of 25.224 begin ----------

5.5 Downlink Transmit Diversity for 1.28Mcps TDD

5.5.1 Transmit Diversity for DPCH and FPACH

The transmitter structure to support transmit diversity for DPCH transmission is shown in figure X1. 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 w1 and w2. The weight factors are complex valued signals (i.e., wi = ai + jbi), in general. These weight factors are calculated on a per slot and per user basis.

The weight factors are determined by the UTRAN.

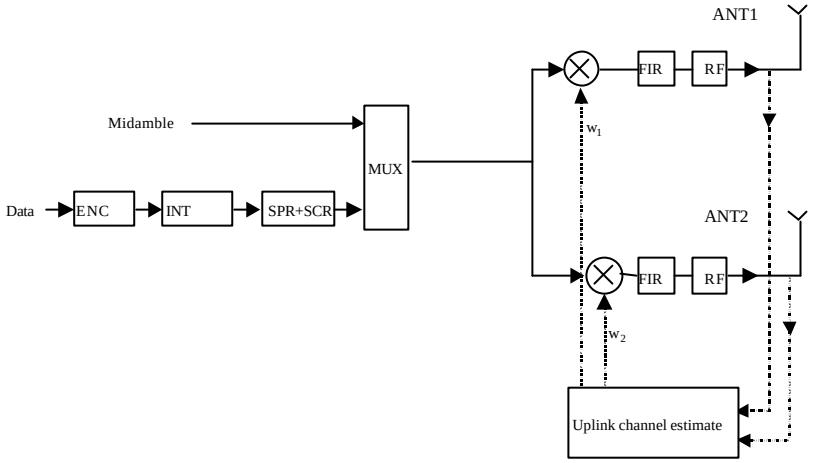

Figure X1: Downlink transmitter structure to support Transmit Diversity for DPCH transmission (UTRAN Access Point) in 1.28Mcps TDD

5.5.2 Transmit Diversity for DwPCH

Time Switched Transmit Diversity (TSTD) can be employed as transmit diversity scheme for the down link pilot channel in 1.28Mcps TDD.

5.5.2.1 DwPCH Transmission Scheme

The transmitter structure to support transmit diversity for DwPCH transmission is shown in figure X2. DwPCH is transmitted from antenna 1 and antenna 2 alternatively.

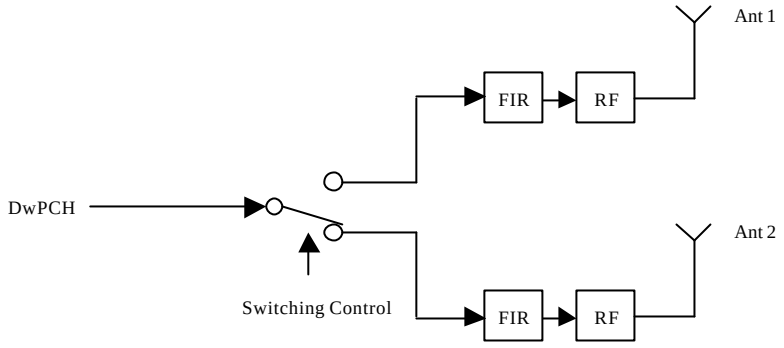

Figure X2: Downlink transmitter structure to support Transmit Diversity for DwPCH transmission (UTRAN Access Point) in 1.28Mcps TDd

5.5.3 Transmit Diversity for ~~FPACH~~ P-CCPCH

Block Space Time Transmit Diversity (Block STTD) may be employed as transmit diversity scheme for the Primary Common Control Physical Channels (P-CCPCH).

5.5.3.1 P-CCPCH Transmission Scheme

The open loop downlink transmit diversity employs a Block Space Time Transmit Diversity scheme (Block STTD).
A block diagram of the Block STTD transmitter is shown in figure X3. Before Block STTD encoding, channel coding, rate matching, interleaving and bit-to-symbol mapping are performed as in the non-diversity mode.
Block STTD encoding is separately performed for each of the two data fields present in a burst (each data field contains N data symbols). For each data field at the encoder input, 2 data fields are generated at its output, corresponding to each of the diversity antennas. The Block STTD encoding operation is illustrated in figure X4, where the superscript * stands for complex conjugate. If N is an odd number, the first symbol of the block shall not be STTD encoded and the same symbol will be transmitted with equal power from both antennas.
After Block STTD encoding both branches are separately spread and scrambled as in the non-diversity mode.
The use of Block STTD encoding will be indicated by higher layers.

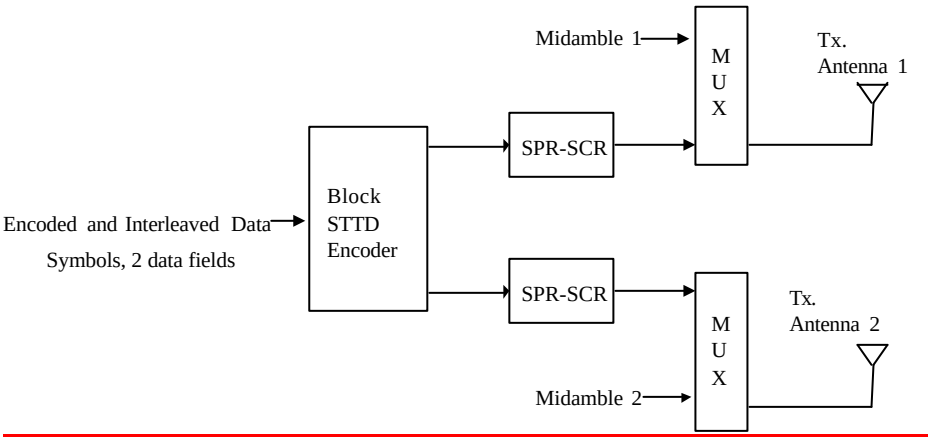

Figure X3: Block Diagram of the transmitter (STTD) in 1.28Mcps TDD

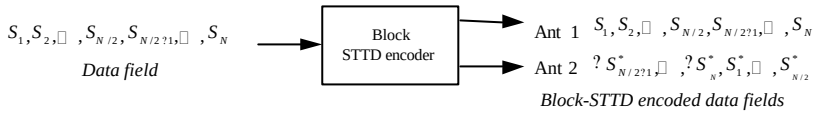

Figure X4: Block Diagram of Block STTD encoder in 1.28Mcps TDD. The symbols S_i are QPSK. N is the length of the block to be encoded

---------- Changes to working CR of 25.224 end ----------