Project	**IEEE 802.16 Broadband Wireless Access Working Group** <http://ieee802.org/16>	
Title	Space Time Coding (STC) with Antenna Selection	
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Re:	[Cite the specific document number of the appropriate Call for Contributions, the ballot number, etc. Contributions that are not responsive to this section of the template, may be refused or assigned a low priority for review.]	
Abstract	Space time coding provides transmit diversity gain while antenna selection gives highest signal-to-interference-plus noise ratio (SINR) when the instantaneous channel status is available at the transmit side and channel varies slowly. We propose the architecture for joint transmit diversity based on space time coding (STC) and antenna selection based on the channel status information	
Purpose	[Description of what *specific* action is requested of the 802.16 Working Group or subgroup.]	
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Space Time Coding with Antenna Selection

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Suggested ToC Topic for IEEE 802.16m SDD: Support of Advanced Antenna Techniques

Title: Space Time Coding with Antenna Selection

Description: We propose the architecture for joint transmit diversity based on space time coding (STC) and antenna selection based on the channel status information. Space time coding scheme includes space-time block code (STBC), cyclic shift diversity, cyclic delay diversity (CDD), precoding, and etc. However, we mainly focus and describe STBC and CDD. It is known that antenna selection gives highest signal-to-interference-plus noise ratio (SINR) when the instantaneous channel status is available at the transmit side and channel varies slowly. Hence, it performs well in the case of low mobility like indoor application. However, the performance degradation manifests when the channel varies relatively faster than the time required to feedback the channel status to the transmitter. Transmit diversity on the space time coding and inherently assume no channel status information. Hence, they provide relatively robust operation in medium to high mobility case, e.g., cellular application. By combining transmit diversity with antenna selection in a unified manner, we provide architectures that gives antenna selection gain to stationary to low-speed users and diversity gain to medium to high-speed users. Transmit diversity combined with antenna selection is considered in [1] in the context of single carrier transmission. In this contribution, multiple band operation with basic unit of bandwidth N Hz is assumed. It may assume that the channel coherence bandwidth is N Hz. The total bandwidth is M x N Hz. The transmission is assumed to happen over one sub-band out of M sub-bands. The receiver may equip with more than one antenna element. Figure 1 and Figure 2 show the proposed architectures for STC with antenna selection and CDD with antenna selection, respectively.

[1] Dhananjay A. Gore and Arogyaswami J. Paulraj, “MIMO Antenna Subset Selection with Space-Time Coding”, IEEE Trans. On Signal processing, vol. 50, No.10, October 2002

Related Area(s) in SRD: Section 5.7: Support advanced antenna techniques, Section 7.1: User throughput, Section 7.2: Sector throughput and VoIP capacity, Section 7.4: Cell coverage

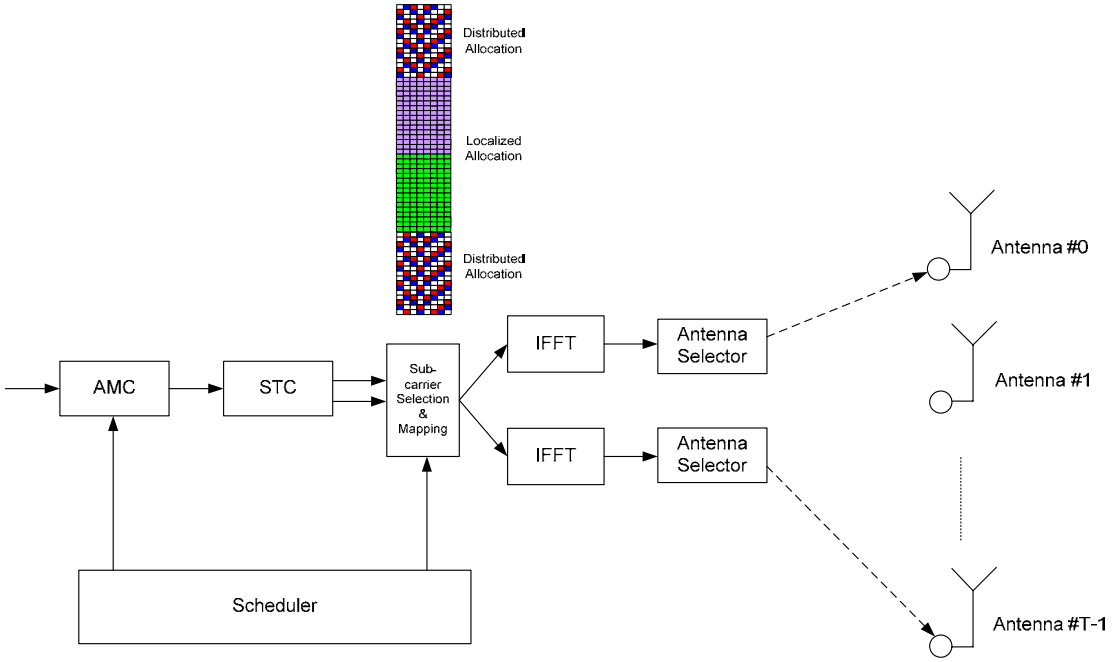

Figure 1: Architecture for Transmit Diversity Combined with Antenna Selection and OFDM for Transmission

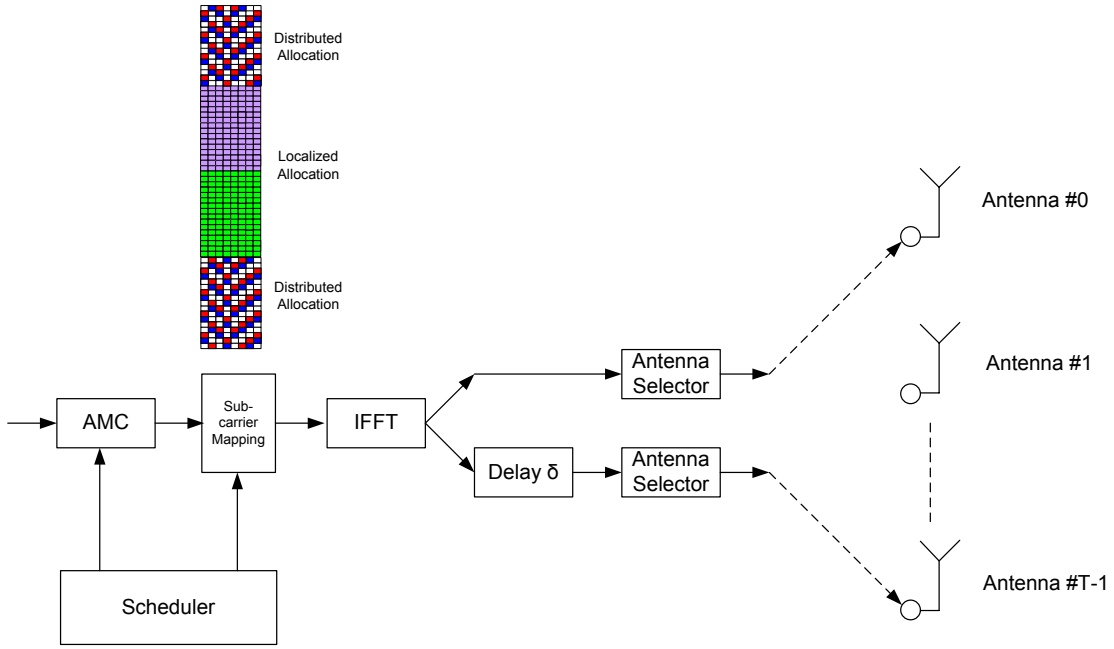

Figure 2: Architecture for Cyclic Delay Diversity Combined with Antenna Selection and OFDM for Transmission