Project	**IEEE 802.16 Broadband Wireless Access Working Group** <http://ieee802.org/16>	
Title	Complementary Coding Combining for OFDM	
Date Submitted	**2007-11-07**	
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Re:	IEEE 802.16m-07/040 Call for Contributions on Project 802.16m SDD	
Abstract	Complementary Code Combining Soft Handoff is a well-known scheme for achieving both coding gain and diversity gain in CDMA network. We propose several complementary coding combining schemes for OFDM, which can help bring more diversity gains into the next generation system.	
Purpose	For discussion and approval by TGM	
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Suggested ToC Topic for IEEE 802.16m SDD: Enhancements on Cell-edge Performance

Title: Complementary Code Combining Soft Handoff for OFDM

Description: Complementary Code Combining Soft Handoff has been adopted in cdma2000 standard for CDMA network. It is a well-known scheme for achieving both coding gain and diversity gain. One application example of it can be shown in Fig. 1 For mobile systems based on OFDM , some challenges exists for directly applying it. Mostly it is because of high channel estimation requirement of OFDM.

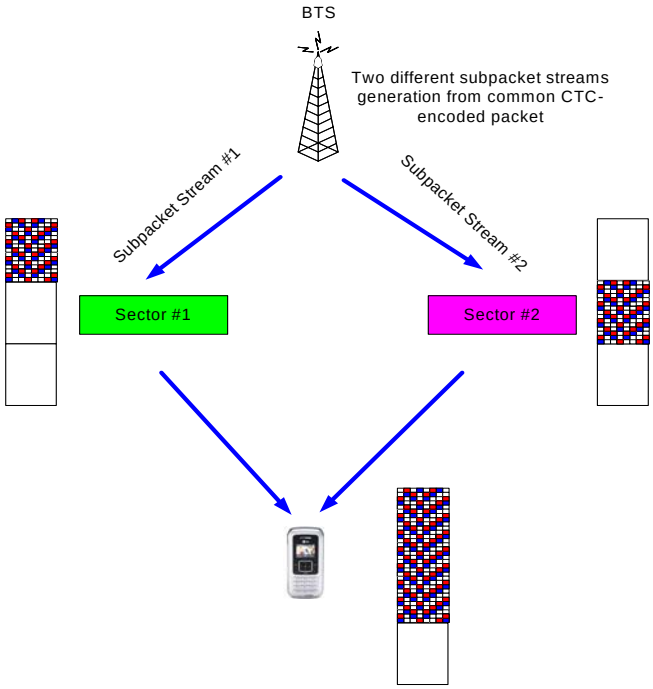

Figure 1 Code combining soft handoff or diversity

The tradeoff of the proposed schemes can be shown in the following table.

Proposed Approach	Pilot/Traffic Chan. within the cell	Pilot Channels between cells	Traffic Channels between cells	Performance		
				Spectral Efficiency	Chan. Esti. Complexity	Demod. Complexity
I	TDM/FDM/ OFDM	TDM/FDM/ OFDM	TDM/FDM/ OFDM	Low	Low	Low
II	**SIP**	TDM/FDM/ OFDM	TDM/FDM/ OFDM	Middle	High	Middle
III	TDM/FDM/ OFDM	TDM/FDM/ OFDM	overlapped	High	Low	High
IV	TDM/FDM/ OFDM	**CMP**	overlapped	Highest	Middle	High

Related Area(s) in SRD: Section 7.1.1: Relative performance (cell-edge user throughput), Section 7.1.2: Absolute performance (cell-edge user throughput), and Section 7.4: Cell coverage