Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**	
Title	**Enhancement of fast cell search and reduced complexity for cell search**	
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Re:	IEEE 802.16e D2 Draft	
Abstract	This contribution proposes propose enhancements of fast cell search to reduce complexity for cell search	
Purpose	To incorporate the changes here proposed into the 802.16e D2 draft.	
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Fast cell search and reduced complexity for cell search

1 Background

To extend current IEEE802.16d into mobility application, one of the issues is the fast cell search and it's associated the computing complexity for the MSS.

2 3-stage Fast Cell Search

The current cell search in the OFDMA network is based on the preamble; however, due to the mobility operation in the multi-cell environment, the MSS will perform the cell search constantly. Current preamble based cell search has the following drawbacks: the preamble sequence space is large and therefore requires a high computation complexity for the preamble search, the multiple BS large spacing (or asynchronous BS) will also cause to search large amount of hypothesis to search.

To speed up the cell search, we propose the hierarchical search procedure. The cell search structure is based on the primary synchronous channel (PSCH) and secondary synchronous channel (SSCH) and scrambling sequence. The PSCH is embedded into the preamble as a common sequence to all BS to enable the MSS search the timing, and the entire cell specific scrambling code is further partitioned into N small groups. The SSCH is embedded into fixed pilot channel to enable the search the pointer of the scrambling code space and framing. The last step is to search the sub-group of scrambling space to find the cell id.

3 Advantages

The proposed three-stage hierarchical search procedure allows simplifying MSS cell search computational complexity by more than the order of magnitude. This benefit is significant in terms of MSS battery life improvement.