Constant Envelop-WOFDM for Energy Efficient High Data Rate WMSNs

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Wireless sensor networks (WSNs) are finding their place in many real life applications because low power and small-size sensor nodes can be inexpensively and easily deployed for different applications. Wireless multimedia sensor networks (WMSNs) consist of wireless nodes capable of producing multimedia data streams that will enable a new generation of WSN applications. The transmission of multimedia content involves high volume data communication that may require significant bandwidth and energy resources. Hence, supporting high data rate while maintaining energy efficiency is a key challenge of WMSNs. Multi-Input Multi-Output (MIMO) techniques can be used to increase the data rate for a given bit error rate (BER) and transmission power. Due to the small form factor, energy and processing constraints of WSN nodes, sometimes it is not feasible to equip the nodes with multiple antennas. Virtual MIMO as opposed to True MIMO system architecture is considered more feasible for WSN applications.

In this paper, the performance of constant envelop wavelet based OFDM (CE-WOFDM) is investigated with virtual MIMO system architecture. Due to better BER performance and low peak to average power ratio (PAPR) of CE-WOFDM as compared to WOFDM, WSN becomes more energy efficient.

Keywords: WMSNs; WOFDM; MIMO; PAPR