

# Novel Uplink Initial Ranging Method for IEEE 802.16e OFDMA Systems

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## Abstract

Ranging is one of the most important processes in the uplink of the IEEE 802.16e OFDMA system. A ranging process includes the initial ranging, periodic ranging, handover ranging, and the contention bandwidth request. Initial ranging provides network entry, uplink synchronization, and system coordination. In the initial state of the transmission process, multiple users randomly transmit selected ranging code sets and BS identifies a specific user using the ranging code identification and uplink synchronization using the transmission delay estimation. In this paper, we discuss the details of the initial ranging and propose an algorithm to carry out a successful ranging process. The performance results and the comparison of computational complexity with the traditional method are also presented. It is noted the proposed algorithm can offer a better trade-off between computational complexity and performance.

Keyword : Worldwide Interoperability for Microwave Access (WiMAX), initial ranging, ranging code, TTD.