

Abstract

Interference-blind demodulation techniques fail often and lead to performance degradation in systems with routine frame collisions. Performing joint detection on two interfering frames, which would allow for the decoding of both despite the collision, could yield performance improvements in wireless communication systems. This would lead to fewer retransmissions, conserving system power, and allow for the replacement of current MAC-layer collision management mechanisms such as the 802.11 RTS/CTS, which introduce performance degradation due to overhead.

This paper proposes a system capable of resolving a frame collision with a time-domain QAM modulation scheme in a quasi-static flat-fading channel with Additive White Gaussian Noise (AWGN). The system detects the presence of the interferer in the frame currently being decoded, and performs frequency, phase and gain synchronization on the interferer while continuing to decode the primary frame. Once both frames are synchronized, a joint detection algorithm is used to complete decoding of both frames. Performance of the system is analyzed, and potential avenues for improvement in future work are explored.