ABSTRACT

Ultra wideband (UWB) impulse radio (IR) system has currently being considered for several applications due to its attractive features that include low-power carrierless and ample multipath diversity. However, accurate timing offset (propagation delay) acquisition and channel estimation are critical for reliable operation. In this paper, we show the feasibility of using small training data set to jointly estimate timing and channel information in a multipath environment and in the presence of multi-user interference (MUI). Moreover, we exploit the training data set to design two types of constrained minimum output energy (C-MOE) mobile station (MS) receivers that effectively suppress MUI and extract the desired signal. Simulation results demonstrate that both the proposed timing-channel estimator and C-MOE based detectors are robust to MUI and near-far problems.

Keywords: Ultra wideband (UWB), Time-hopping (TH), Multi-user interference (MUI), Minimum output energy (C-MOE)