Abstract

In this paper, we exploit the benefits of the diversity gains that arise from a cluster of opportunistic relays (ORs) and from the independently fading subcarriers of multiple users. Our goal is to improve the energy efficiency of the decode-and-forward-based OR-assisted single-carrier frequency-division multiple-access (SC-FDMA) uplink, where the direct transmission (DT) link is unavailable. We propose two joint dynamic resource allocation (JDRA) schemes by assuming that the pilot-aided channel-quality information (CQI) of all the users may be exchanged. Furthermore, we take the following two main aspects into account: 1) "first-hop quality awareness" (FHQA) for JDRA-aided OR and 2) "buffering delay awareness" in the context of interleaver-aided channel-coded systems. In addition, frequency-domain turbo equalizers are employed in both the relay and BS's receivers. Our results demonstrate that, compared to the DT benchmark, the proposed FHQA JDRA schemes can achieve an energy reduction gain of 91% for a single-antenna base station (BS) receiver and up to 7.4% for a multiantenna BS when considering the energy consumption due to CQI exchange among relays.


Index Terms

Computer Science
Communications
Keywords
Orthogonal frequency division multiplexing (OFDM)  peak-to-average power ratio (PAPR)
partial transmit sequence selected mapping.