Energy Efficiency of Non-Collaborative and Collaborative Hybrid-ARQ Protocols

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In this paper, the energy efficiency of Hybrid-ARQ protocols in single-user links, with the possible inclusion of a relay station, is considered. The total energy consumption accounts for both the transmission power and the energy consumed by the transmitting and receiving electronic circuitry of all involved terminals (source, destination and, possibly, the relay). The minimum energy required for successful communication, based on the optimal transmission time of each packet, is determined for Hybrid-ARQ Type I, Chase Combining and Incremental Redundancy protocols.