ABSTRACT

Wireless passive RFID networks is still in its infancy due to lack of tag-to-tag communication and a routing protocol in contrast with routing protocols for battery powered mobile wireless ad hoc and sensor networks. In this paper, a cross-layer approach for passive RFID tag-to-tag communication and a multi-hop routing protocol are introduced. In the data-link layer, a new medium access control (MAC) protocol that is suitable for passive tag-to-tag communication is developed. In the network layer, the optimal link cost multipath routing (OLCMR) protocol for passive RFID networks by using modulation depth as the link cost is introduced. Analytical proofs demonstrate that the proposed protocol results in an optimal route between any source-destination pair in terms of end-to-end (E2E) cost. Simulation results indicate that proposed protocol consumes less energy when compared to OLSR for battery powered nodes. In addition, when compared to the single path routing, the proposed multipath protocol increases the delivery ratio significantly.