

Abstract—The use of Radio Frequency Identification systems (RFID) is growing rapidly. Today, mostly “passive” RFID systems are used because no onboard energy source is needed on the transponders. However, “active” RFID technology, with onboard power sources in the transponders, gives a range of opportunities not possible with passive systems. To obtain energy efficiency in an Active RFID system the protocol to be used should be carefully designed with energy optimization in mind. This paper describes how energy consumption can be calculated, to be used in protocol definition, and how evaluation of protocol in this respect can be made. The performance of such a new protocol, in terms of energy efficiency, aggregated throughput, delay, and number of air collisions is evaluated and compared to an existing, commercially available protocol for Active RFID, as well as to the IEEE standard 802.15.4 (used e.g. in the Zigbee medium-access layer).

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