Energy optimization of radio transmission using wake-up radios
Invited paper

It is well known that, in radio communications, the number of connected devices will be multiplied by eight compared to the classical approach. The first group is represented by multiband filters, a subcarrier-based architecture and an adaptive wake-up radio, and the second group is proposed by the authors of this paper. The proposed architecture is based on the idea of taking the decision at the baseband level. The active parts are implemented using ultra low power circuits, especially the efficiency of the power amplifier, the most energy inefficient part. Another emerging technique is to harvest different forms of ambient energy in order to identify which radio front end is taken at the active state. The proposed architecture is quasi-passive and consumes energy only to activate the main radio front end. The decision to activate the main radio front end is taken after receiving a wake-up signal. Depending on the RF level, the main node is waked up, an identifier is sent, and the main radio front end is activated. The proposed wake-up radio is quasi-passive and consumes energy only to activate the main radio front end. In order to increase the wake-up radio sensitivity, a heterodyne receiver is used instead of a classical OFDM signal. A 52 μW Wake-Up Receiver with 72 dBm Sensitivity Using an Uncertain-IF Architecture, A new wake-up radio architecture for wireless sensor networks, and Radio-Triggered Wake-Up for Wireless Sensor Networks. A 52 μW Wake-Up Receiver with 72 dBm Sensitivity Using an Uncertain-IF Architecture, Nano-Power Wireless Wake-Up Receiver With Serial Peripheral Interface, and A new wake-up radio architecture for wireless sensor networks.