Asynchronous Low Duty Cycle Media Access Control Protocol for Body Area Wireless Sensor Networks

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Abstract : Wireless body area networks (WBANs) technology has achieved lots of popularity over the last decade with a wide range of medical applications. This paper presents an asynchronous media access control (MAC) protocol based on B-MAC protocol by giving an application for medical issues. In WBAN applications, there are some serious problems such as energy, latency, link reliability (quality of wireless link) and throughput which are mainly due to size of sensor networks and human body specifications. To overcome these problems and improving link reliability, we concentrated on MAC layer that supports mobility models for medical applications. In the presented protocol, preamble frames are divided into some sub-frames considering the threshold level. Actually, the main reason for creating shorter preambles is the link reliability where due to some reasons such as water, the body signals are affected on some frequency bands and causes fading and shadowing on signals, therefore by increasing the link reliability, these effects are reduced. In case of mobility model, we use MoBAN model and modify that for some more areas. The presented asynchronous MAC protocol is modeled by OMNeT++ simulator. The results demonstrate increasing the link reliability comparing to B-MAC protocol where the packet reception ratio (PRR) is 92% also covers more mobility areas than MoBAN protocol.

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