Abstract

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Effect of node position on BER performance and data throughput of on-body medical body area networks (MBANs)

Medical Body Area Network (MBAN), recently released by the Federal Communications Commission (FCC), is a narrowband body area network (NB-BAN) specialized for medical applications. Its allocated band of frequency is from 2360–2400 MHz. This paper studies the effect of transmitter and receiver node positions on the bit-error-rate (BER) performance and maximum allowable data throughput of the on-body scenario of the 2360–2390 MHz band assuming standing body activity. In This case we consider two receiver node positions namely, the right hip and chest with various transmitter node positions. Numerical results show that the achieved bit to noise energy ratio ranges from 11–12 dB for the right hip receiver node (first scenario), and from 10.3–17.1 dB for the chest receiver node (second scenario) depending on the position of transmitter node. The achieved data throughputs are 171.949–216.47 Mbps for the first scenario, and 53.137–254.33 Mbps for the second scenario, also depending on the transmitter node position. Both scenarios show that the achieved bit to noise energy ratio varies for only 7 dBs among the different node positions, which is a relatively small range compared to other BAN bands like the ultra-wideband (UWB). The latter has a variation on ?20 dBs for the bit to noise energy ratio depending on the transmitter and receiver node positions.