

Electro-textile wearable antennas in wireless body area networks: materials, antenna design, manufacturing techniques, and human body consideration—a review

ABSTRACT

The latest progress in the emerging wireless technology has resulted in the development of wearable antennas made of various fabrics. This unique antenna is an integral part of the wireless body area network (WBAN). A wide range of applications are made by the wearable antennas in the fields of the Internet of Things, sport, defense, public safety, telemedicine, navigation, and tracking. The focus point of the current review is the recent progress of electro-textiles research with special attention on the materials properties, criteria, and manufacturing techniques. Existing as well as upcoming materials specifically and potentially used for electro-textile fabrication are discussed. Various manufacturing techniques are discussed to match the importance of material selection. The current work highlights the performance when the antennas tagging are applied in WBAN objects and illustrates how the human body affects the performance of the wearable antenna and vice versa. The findings of this review by introducing the best materials, techniques, and designs could be used in future to provide high-performance materials for body-centric applications.

Keyword: Wireless body area network; Embroidery; Electro-textile; Ultra-high frequency; Radio frequency identification tags; Body-centric; Wearable; Specific Absorption Rate; Fabrication techniques