

Evolution of Wearable Technology for Wireless Body Area Networks

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Wearable and flexible electronics technology is recognized as one of the hottest trends in today's world. The emerging applications for wearable electronics have experienced enormous growth over the last decade. The number of wearable devices available in the electronics market including activity trackers, smart watches, glasses, helmets, and smart clothing seems to grow exponentially. In general, wearable and flexible technologies aim at interweaving technology into everyday activities to maximize the quality of life. Antennas, being one of the critical components in modern wireless devices, thus need to be specifically designed to function while being worn and bent. A review of existing wearable system is performed, with a specific attention to be paid to the antenna element. Initially a basic patch antenna with copper as patch and ground plane, while commercial FR4 (relative permittivity of 4.3) material as substrate was presented. Secondly the patch antenna with textile material (relative permittivity of 2.2) as substrate, while copper as patch and ground plane called Textile patch antenna was studied. Third, a pure Textile patch antenna was reviewed. And finally a wideband Button antenna for wearable applications was reviewed and simulated using the software tool CST. The antenna parameters such as Gain, impedance bandwidth, efficiency and radiation characteristics were observed and compare them for all the mentioned antennas. Also the performance is analyzed when the patch antenna bent and crumpled when worn on the body. By simulation, the traditional basic patch antenna with inset feed which is working at 2.45GHz shows a gain of 7-8dBi and impedance bandwidth of about 1-5%.Where as for the textile antenna, the impedance bandwidth is slightly variable from traditional patch antenna. This kind of Textile patch antennas are useful for monitoring health, in spacesuits, fire fighters garments, mobile phones and many other applications.