A 6.0GHz small printed monopole antenna for wireless implantable body area network applications

Abstract

Wireless implantable body area network (WiBAN) is useful for monitoring vital human parameters in medical diagnosis such as breast cancer, heart attack and high blood pressure. The main objective of this paper is to design a small printed monopole antenna for WiBAN applications at 6.0 GHz. The small implantable antenna was tested in a lossy environment by being submerged into canola oil that mimics the dielectric properties of human breast fat tissue. The antenna performances were measured by using vector network analyzer (VNA) in order to evaluate the return loss and operating bandwidth of the antenna. The other parameters such as efficiency, radiation pattern and gain are evaluated by simulation of CST Studio 2012 software. When compared, there is good agreement between the simulation and measurement results. The simulated antenna gain and efficiency are 5.8dBi and 97%, respectively, when submerged into canola oil. The antenna radiation pattern is directional, and it has 6 lobes implying its coverage in more directions which is of good benefit due to body movement. The antenna's polarization was tested by placing a wideband antenna at several degrees around the proposed antenna. The value of S21 was also analyzed to investigate the path gain of the selected links.

Keywords

Printed monopole antennas; Wireless implantable body area network (WiBAN)