

ABSTRACT

Ultrawide-band technology, commonly known as UWB is a wireless technology that sends data over a wide frequency range for many applications. WBAN applications use wearable antennas because they have flexible materials and are suitable for telemedicine technology and have many advantages such as small size, lightweight, able to work at a wide enough frequency, easy fabrications, and affordable costs.

In this final project, the hexagonal patch ultrawide-band monopole planar wearable antenna was designed using Cordura Delinova 2000 textile material for the substrate and copper tape for the groundplane and patch. The Uniplanar Compact Electromagnetic Band Gap (UC-EBG) as a metamaterial was added to the design of the monopole planar antenna in this final project which aims to improve antenna parameters, increase efficiency, and reduce the effects of radiation on the body.

From the measurement results on the antenna with the UC-EBG structure at the bottom side of the patch, it produces a fractional bandwidth of 107% and able to work in the frequency range of 3-10 GHz on off-body conditions and 2-11 GHz on on-body conditions. In the SAR test at a distance of 45 mm, the results were 1.31 W/Kg at a frequency of 3,5 GHz and 1,267 W/Kg at a frequency of 5 GHz on hand objects. The results are a gain of 4.19 dBi and circular polarization at 3,5 GHz frequency. A gain of 6.01 dBi and an elliptical polarization are produced at 5 GHz frequency. The radiation pattern at both review frequencies is bidirectional.

Keywords : Monopole Planar, Wearable Antenna, Ultrawide-band, UC-EBG