

## ABSTRACT

*Global Positioning System (GPS) is used to track or provide the location of a point, especially work that is at risk of getting lost or trapped in a place that is difficult to reach. Wearable antennas are an alternative that is expected to be utilized in GPS applications. In this research, two types of antennas have been made, namely with rubber and polyester substrates at the L1 GPS frequency at 1.575 GHz. The patch and groundplane are designed using copper tape with a hexagonal patch shape. This research uses the Defected Ground Structure (DGS) method to get better results. The results obtained were that the polyester antenna with phantom had a return loss of -26.39 dB, VSWR 1.10, bandwidth 649 MHz, gain 2.31 dBi, and a Specific Absorption Rate (SAR) value of 1.13881 W/kg. Meanwhile, the rubber antenna with phantom has a return loss of -23.75 dB, VSWR 1.14, bandwidth 437 MHz, gain 3.0 dBi, and SAR value of 1.1324 W/kg. The realized on-body polyester antenna has a return loss of -28.3 dB, a VSWR of 1.08, and a bandwidth of 272 MHz. Meanwhile, the rubber on-body antenna has a return loss of 21.15 dB, a VSWR of 1.18, and a bandwidth of 374 MHz. Both antennas have results that meet the expected specifications. Based on the dimensions, the antenna with a rubber substrate is better to use, namely 90mm x 29mm, because it meets the requirements for wearable characteristics, namely it is smaller compared to the size of the polyester substrate antenna, namely 130mm x 41mm.*

**Keywords:** *Copper Tape, Global Positioning System (GPS), Defected Ground Structure (DGS), Patch Hexagonal, Polyester, Rubber, Wearable Antenna.*