

Abstract

Miniaturization on GPS antenna aims to support the integration of the system into a small device. Miniaturization of antennas has previously been widely done in various studies with a various of techniques and methods. Starting from the use of Defected Ground Structure (DGS) techniques, Slot Loading Technique until use of substrates with high permittivity. in this research miniaturization was done by combining slot loading technique method and multi layers substrate. The selection of slot loading technique method is based on the high success of reduction of antenna dimensions and the improvement of performance from the provision of slots on the antenna. In previous journals the success of slot loading technique in miniaturizing antennas reached up to 80% reduction. The application of the Multi layers substrate method is intended to overcome the size of the rear lobe of the antenna when miniturization is performed. The method is intended to increase the efficiency of the antenna so that the gain of the antenna can increase and remove the backlobe from the antenna. After 7x antenna simulation process, the final result obtained from the antenna with Slot Loading Technique and Multi Layers Substrate managed to shrink the dimensions of the antenna up to 38% and eliminate the backlobe of the antenna which is the main problem when miniaturization. Each addition of substrate layer and slot addition will increase the gain value so the backlobe on the antenna will decrease. The miniaturization antenna with the addition of 2 slots on the patch and 3 layers of substrate has VSWR 1.8, bandwidth around 77.6 MHz and a gain of 2.02 dBi and elliptical polarization. This antenna also has an omnidireksional radiation pattern according to the needs of the GPS antenna receiver.

Keywords: Global Positioning System, Microstrip, Miniaturization, Slot Loading Technique, Multi Layers Substrate