ABSTRACT

Due to the tremendous development of modern communication systems, users have been demanding for more and faster information transmission rates. Therefore, it is very important to have a much larger channel capacity for the next modern wireless communication system, namely 5G communication. The antenna is said to be UWB if the antenna has a bandwidth of 3 GHz. UWB (Ultra Wide-Band) itself has a definition that is technology for short-range radio communication, which may overlap with some of the frequency bands allocated for radio communication services. Devices using UWB technology typically have intentional radiation from the antenna with a bandwidth of -10 dB at least 500 MHz.

In this final project, the design and realization of an Ultra Wide-Band Microstrip antenna for 5G communication is carried out at a frequency of 2.3 GHz – 3.5 GHz. The antenna used this time is a Microstrip antenna with a patch shape, where the material for the substrate is FR4-Epoxy with a thickness of 1.6 mm and a value of εr 4.3. The patch material uses copper with a thickness of 0.035 mm, which is made using the DGS (Defected Ground Structure) method which aims to increase or widen the Bandwidth value. This Microstrip antenna was simulated using the CST Studio Suite 2019 software, taking into account the antenna parameter values.

The design of this UWB Microstrip antenna produces antenna parameter values such as Return Loss at a working frequency of 2.3 GHz with values of -11.965 dB and -21.292 dB, and a frequency of 3.5 GHz with values of -12,278 dB and -27.082 dB, for simulation results with VSWR measurement results at the working frequency at 2.3 GHz is 1.674 and 1.193, and the 3.5 GHz frequency is 1.643 and 1.092. The resulting bandwidth when measuring and simulating is 1.79 GHz or 60.9% and 6.234 GHz or 169.6%, for the Gain value from the simulation is 4.709 dBi. The radiation pattern from the simulation is omnidirectional and the polarization is linear. From the simulation results and the measurement results, this antenna can be applied at a frequency of 2.3 GHz – 3.5 GHz.

Keywords: ***Microstrip Antenna, Defected Ground Structure, Ultra Wide-Band, 5G.***