

ABSTRACT

Fifth Generation (5G) is a technology that is currently developing rapidly, 5G become more important because of its ability to provide data speeds and bandwidth better than its predecessor (2G, 3G, 4G). In addition, 5G also supports the 4.0 industrial revolution, in Indonesia itself 3.5 GHz is set as one of the 5G operating frequencies. To provide relatively large data rates and bandwidth, communication devices with good performance are needed, in this case antennas. In this final project the author makes a microstrip antenna with a metamaterial structure, this metamaterial structure can reduce the dimensions of the antenna and increase the bandwidth of the antenna.

In this final project the author uses 3D electromagnetic software and realizes an antenna for 5G communication. This microstrip antenna with a metamaterial structure uses FR-4 as a substrate material with a thickness of 1.57 mm and a permittivity of 4.3.

The realized antenna works at an operating frequency of 3.508 GHz, has gain of 1.78 dBi, VSWR of 1.097, bandwidth of 335.4 MHz, and return loss of -26.662 dB, and with total dimension of 26,281 x 26,281 mm^2 . This antenna also has an omnidirectional radiation pattern so it can be utilized optimally for mobile communication.

Keywords: *Microstrip antenna, Metamaterials, 3D electromagnetic software, Fifth Generation (5G)*