ABSTRACT

Fifth generation (5G) is a technology that was just launched in Indonesia in 2021. Currently, it is still a trial period and is still limited. To support 5G technology, many components are needed to support its implementation, one of which is antennas, because spectrum is needed in several frequency ranges. to provide high data rates and handovers. This final project designs a metamaterial antenna to meet the specifications of 5G technology. In this final project, the antenna used is a metamaterial antenna based on Artificial Magnetic Conductor (AMC) which has high gain, wide bandwidth, directional radiation pattern. The metamaterial concept is used to reduce the dimensions of the metamaterial antenna but still with good specifications. In this final project the author also uses the DGS (Defected Ground Structure) technique which is applied to this research, namely by cutting the groundplane part of the metamaterial antenna. This final project uses 3D electromagnetic software and realizes a metamaterial antenna for 5G technology. The metamaterial antenna for 5G technology is made of FR4 epoxy material with a dielectric constant of 4.3 and a thickness of 1.6 mm. The metamaterial antenna is designed to work in the 3.45 GHz to 3.55 GHz frequency range with a working frequency of 3.5 GHz. The results of the realization of the antenna will show that the metamaterial antenna has a bandwidth of >100 MHz. The radiation pattern on the antenna is unidirectional gain of >3 dB. It can be concluded that the design and realization of 5G metamaterial antenna based on Artificial Magnetic Conductor (AMC) in the Final Project has met the expected specifications.

Keywords: 5G technology, metamaterial antenna, square patch, AMC, DGS, FR- 4