

ABSTRACT

5G is a new generation that offers large data transfer capacity. This revolutionary technology can offer all the necessary connectivity in telecommunication networks and can enable a flexible and easily automated 5G architecture that can be implemented in industry 4.0. In making this 5G network, antennas are needed as an important system in building a 5G network. Microstrip antenna is the choice because of its advantages, it has a low-profile structure, light weight, has small physical characteristics, and is thin. This research designs a microstrip antenna with a rectangular patch shape at a frequency of 3.5 GHz with the addition of superstrate and substrate integrated waveguide (SIW) methods which aim to widen bandwidth and reduce noise. The addition of this method is said to be able to widen the bandwidth by using the microstrip line feeding technique. This study uses a comparison on a conventional antenna with an antenna that has been added SIW and superstrate, then the fabrication and testing process will be carried out to obtain the desired specification results.

A microstrip antenna is designed in the form of a rectangular patch which is given vias from the patch to the groundplane and for the superstrate, the FR -4 material is given with a dielectric constant of 4.3 and a substrate thickness of 1.6 mm. From the results of the study, a comparison of the simulation results with the measurement results was carried out. The simulation results show that the VSWR value is 1.78 and the gain is -3.15 dBi, with a return loss of -11.05 dB. Meanwhile, the VSWR measurement results obtained are 3.24 with a gain of -2.53 dBi and a return loss of -5.13 dB. The resulting radiation pattern is unidirectional, and the resulting polarization is linear.

Keywords: 5G, Antenna, superstrate, Substrate Integrated Waveguide (SIW)