ABSTRACT

This research discusses the design and realization of a Folded-Arms Square Open Loop Resonator microstrip filter for 5.8 GHz applications, aiming to improve performance in terms of return loss, insertion loss, and bandwidth. The study includes simulation and fabrication of the filter using FR4 substrate, as well as measurements using a Vector Network Analyzer (VNA).

Simulation results indicate that the Folded-Arms Square Open Loop Resonator with two resonators achieves the best performance, with a return loss of -31.83 dB, insertion loss of -2.5 dB, and bandwidth of 322 MHz. However, after fabrication, performance deviations occurred, where the operating frequency shifted to 5.84 GHz, return loss decreased to -21.03 dB, insertion loss increased to -11.46 dB, and bandwidth narrowed to 106 MHz. These deviations are suspected to be caused by fabrication tolerances, FR4 substrate losses, connector quality, and imperfections in soldering techniques. To enhance realization accuracy, optimization in the fabrication process and the selection of low-loss materials is necessary.

Keywords: *Band Pass Filter*, *Folded-arms Square open loop resonator*, *Return Loss*, *Insertion Loss*, *Bandwidth*, FR4, C-band