ABSTRACT

The 5G technology is a telecommunications innovation that offers incredibly high-speed data transfer. It is expected to outperform its predecessors significantly. In utilizing 5G services, efficient devices are crucial, and solutions like Multiple Input Multiple Output (MIMO) systems play a key role. MIMO is an antenna system with numerous transmitting and receiving elements, enabling simultaneous transmission and reception. A 26 GHz frequency microstrip antenna is modified using a double U-slot, and the Defected Ground Structure (DGS) method is employed to reduce antenna coupling effects and enhance bandwidth. This antenna features a directional radiation pattern that focuses in a specific direction, thereby increasing efficiency. Prior to optimization, the return loss was at around -14.15 dB, VSWR was approximately 1.49 dB, and bandwidth was 0.65 GHz. After optimization, the return loss improved to between -27.06 and -28.09 dB, signifying performance enhancement. Despite a slight increase in VSWR to 1.08 to 1.09 dB, it remains within acceptable limits. The bandwidth increased to 1.06 to 1.13 GHz. These results indicate that optimization successfully boosted antenna performance, resulting in higher data transfer efficiency. This technology has the potential to revolutionize the telecommunications landscape with faster and more reliable services through advanced 5G networks.

***Keywords**: 5G, Microstrip Antenna, Defected Ground Structure, double U-Slot, frequency 26 Ghz, MIMO, Multiple Input Multiple Output*