

ABSTRACT

This study presents a novel mechanism and improves its antenna properties. This paper proposes a combination of design methods to improve the design model to minimize the interference and multipath fading according to 5G technology. The antenna is simple and easy to build, but it has more advantages than others.

This project research explores and focuses on the design of a circular patch antenna that integrates circular and cross-shaped gaps (slots) in the antenna patch to the ground plane to optimize MIMO Antenna applications for base stations operating in 3.5 GHz frequency bands. Modifications to the patch with give slits/gaps at each element can improve the performance of MIMO antennas.

The gain of the base station antenna for the frequency of 3.5 GHz with channel n78 is 2.41 to 2.48 dBi, with a return loss of -33.76 dB, with a bandwidth of 165 MHz. Next, the antenna has an envelope cross-correlation (ECC) value of 0.00000576, mutual coupling below -42.3 dB, and a diversity gain (DG) of 9.99999 dB. Then, the radiation pattern is obtained to be sectored or directional. The circular patch antennas are designed to improve the performance of 5G base stations, mainly used in indoor small cells, such as improving the received antenna signal and received power, obtaining the gain diversity, and addressing the increasing demands of modern wireless communication systems.

Keywords—MIMO, n78, indoor base station, circular patch