

## ABSTRACT

Defected ground structure (DGS) is the concept of utilizing a new shape on a layer that is placed under the radiating patch. The goal is to disturb the distribution of the current flow so that the resonance frequency will change. When the frequency of the antenna has changes, iteration and normalization by changing the dimensions of the antenna where conducted the initial resonance frequency can be obtained. DGS method proves that we can get the dimensions of the antenna which much smaller than a conventional antenna with the same resonance frequency.

The shape of the DGS which designed is three rings DGS on the groundplane antenna and gap will be introduced on the each ring. This antenna will be used for 4G technology, WiMAX operating at 3.65 GHz. The antenna is designed with Epoxy FR4 material and feeding method using microstrip line. Three ring with gap was chosen because in this condition, antenna parameters is still within the specification. The addition of the gap reduce the resonance frequency of the antenna from 3.65 GHz to 2.35 GHz. And, after normalization process of the antenna size, miniaturization has been obtained up to 64% compared the conventional dimension. This result then developed further as a 2x2 MIMO antenna.

The antenna has simulated using Ansoft HFSS simulator. After fabrication, the 2x2 MIMO antenna has measured and inherits VSWR value of about is 1,382 which bandwidth reaching 111 MHz, and the peak of the frequency at 3.65 GHz. The DGS methods also able to reduce the effects of mutual coupling on the MIMO antenna, proven by the retrieved values of -47.61 dB.

Keywords: Antennas, MIMO, Defected Ground Structure, Multi Rings, Miniaturization