

UNIVERSITI TEKNOLOGI MARA

**RECTANGULAR MICROSTRIP PATCH ANTENNA
(RMPA) WITH DEFECTED GROUND STRUCTURE
(DGS) FOR BANDWIDTH ENHANCEMENT**

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ABSTRACT

Embedded system communication has become popular nowadays. This recent development has led to the growth in antenna field study to provide compact, wider band and good radiation performances. In this thesis, a rectangular microstrip patch antenna with Defected Ground Structure (DGS) is proposed for wireless application to enhance the antenna bandwidth. The low cost FR4 substrate with effective permittivity ϵ_r of 4.3 has been used. Five types of DGS: (a) circular shaped DGS, (b) circular-ring DGS, (c) square shaped DGS, (d) square-bracket DGS and (e) rectangular shaped DGS have been simulated and analyzed using the Computer Simulation Technology (CST) Microwave Studio software in order to determine the best shape of DGS that give effect to bandwidth enhancement. Further parametric studies were carried out for rectangular shaped DGS and circular-ring DGS which gave larger bandwidth compared to other simulated DGS shapes. The simulation results were compared to RMPA without DGS. From the simulations that have been carried out, it is proved that Rectangular and Circular-ring shaped DGS could be used for bandwidth enhancement. The antennas with Rectangular DGS and Circular-ring DGS could improve approximately 64% and 35% of bandwidth respectively. The used of Rectangular DGS could reduce approximately 25% of antenna size.

Keywords- Defected Ground Structure (DGS), Microstrip Patch Antenna, Bandwidth, Computer Simulation Technology (CST) software

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