

State of Libya

Ministry of Higher Education

Al-Asmarya Islamic University Faculty of Engineering

**PERFORMANCE ANALYSIS OF AN INSET-FED CIRCULAR MICROSTRIP
PATCH ANTENNA USING DIFFERENT SUBSTRATES FOR 2.4 GHZ WI-FI
APPLICATION**

This graduation project is submitted to Al-Asmarya Islamic University in partial fulfillment of the requirements of the award of a bachelor's degree in Electrical and Computer Engineering - Communication Engineering

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ABSTRACT

This project aims to design a circular microstrip patch antenna using three different substrate materials with varying dielectric constant. The three substrate materials are Flame Retardant 4 (FR-4) with a dielectric constant of 4.3, Roger RT- 5880 with a dielectric constant of 2.2 and Roger RT- 3210 with a dielectric constant of 10.8. The used feeding method was an inset-fed microstrip line feed at a resonant frequency of 2.4 GHz for Wi-Fi applications. The Computer Simulations Technology (CST) software was used to simulate the antennas. After running the simulation, the antenna parameters results (Return loss, Voltage Standing Wave Ratio, Bandwidth. Efficiency, Directivity, Gain, Half Power Beamwidth) for FR-4 and Roger RT-5880 and Roger RT- 3210 were compared. The antenna parameters results show that the FR-4 has a higher bandwidth as compared to a Roger RT-5880 and Roger RT- 3210; However, the efficiency, directivity, gain, and half-power beamwidth were enhanced with Roger RT- 3210 and Roger RT-5880. All the antennas were designed and simulated to get minimum return loss and minimum voltage standing wave ratio.