Microstrip Patch Antenna Design and Simulation

This document summarizes the design and simulation of a microstrip patch antenna targeting the 2.4 GHz frequency band. The simulation was performed using ANSYS HFSS, and the antenna is optimized for wireless communication applications.

# Design Summary

Microstrip Patch Antenna Design Summary  
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Target Frequency: 2.4 GHz (ISM Band)  
Substrate: FR4 (εr = 4.4), Thickness = 1.6 mm  
Patch Dimensions: 38 mm x 29 mm (approx.)  
Feed Technique: Microstrip Line Feed  
Simulation Tool: ANSYS HFSS  
  
Key Results:  
- Return Loss (S11): ~-20 dB at 2.4 GHz  
- Bandwidth: ~100 MHz  
- Radiation Pattern: Directional, Gain ~6 dBi  
  
Application: Wireless communication (Wi-Fi, Bluetooth, IoT)

# Key Results

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- Bandwidth: ~100 MHz  
- Gain: ~6 dBi  
- Directional Radiation Pattern

# Visuals

Refer to the attached images for the Return Loss and Radiation Pattern.