

# Design and Fabrication of a Multiple Input/Multiple Output Aperture Coupled Multilayer Microstrip Patch Antenna for X-band Applications

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## Abstract

In this paper, a new multilayer MIMO antenna is designed and fabricated. This antenna composed of two low-cost FR4 substrates and three conductor layers. Lower substrate contains the microstrip lines and ground plane which connected to the ports. In this design, the input signal radiates from feed lines at which a  $\lambda/4$  microstrip is attached as impedance matching elements. Also, four rectangle-shaped slots are etched on the ground plane and placed vertically above the feed lines. The signals are guided from feed lines via slots to the quarter circle-shaped patches in the upper substrate as the aperture coupled feed technique. The proposed antenna exhibits three impedance bandwidths at 7.12-7.54 GHz, 8.27-8.72 GHz and 10.33-10.96 GHz. The presented antenna is in the shape of an octagonal whose length of longer side and shorter side are 26mm and 10 mm respectively. The radiation pattern and gain of the antenna are in acceptable range and the proposed antenna is suitable for X-band applications.

**Keywords:** Microstrip antenna, Aperture-Coupled, Muli Input Multi Output, X-band.

## Highlights

- A multiple input/multiple output (MIMO) antenna is presented for X-band and operating in three different bands.
- Proper radiation pattern with maximum gain of about 4 is achieved for directional applications in X-band.
- Compared to previous works, it exhibits better isolation and gain with reduced size.

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