

## 3-D Printed Step Shaped MIMO Patch Antenna Design for Wireless Applications

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**Abstract :** A three-dimensional step-shaped MIMO antenna with reduced mutual coupling between antenna components and the ability to operate at multiple bands is presented. The proposed antenna consists of two separate radiating components; each part is designed to provide a considerable degree of isolation between the radiators. The MIMO antenna measures  $36 \times 84$  mm<sup>2</sup>. Furthermore, a flexible PLA substrate that is 2 mm thick is designed for the MIMO antenna. The study's most significant finding is that low isolation (below 30dB) can be achieved throughout the whole operating range. This is operated at 6.3 GHz with an approximate radiation efficiency of 94% and a peak gain of 7.9 dB and can attain an Envelope Correlation Coefficient (ECC) of less than 0.0015. The proposed antenna is a good candidate for wireless application since the designed antenna achieves a notable improvement in isolation and radiation performance in the intended band of operation without the need for a decoupling mechanism.

**Keywords :** multi-input multi output, envelope correlation coefficient, 3-d printing, step shape, polylactic acid

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