

# U-Slot Microstrip Patch Array Antenna for UHF RFID Reader



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**Abstract** This paper aims to design and analyze a microstrip patch array antenna for the application of Radio Frequency Identification (RFID). Array antennas are widely used in the RFID applications as it offers high gain and directivity to allow long distance read range. The microstrip patch is arranged in  $2 \times 2$  array and is printed on FR-4 materials. In compliance with the Malaysian RFID regulated range of frequency of 919 to 923 MHz, the antenna is designed to meet its specifications. The operating frequency of the microstrip patch antenna array is 921 MHz. The FR-4 substrate with a dielectric constant of 4.7 and height of 0.16 cm. Theoretical studies and calculations on this topic have been done in order to design the microstrip patch antenna array with the correct dimensions. By using the CST Microwave Studio 2014 as the primary software to model and simulate the results, there are a few parameters that are going to be analyze which includes reflection coefficient, Voltage Standing Ratio (VSWR), gain, directivity, radiation pattern and bandwidth.

**Keywords** Microstrip array antenna · U-Slot · Radio frequency identification · Ultra high frequency · Return loss

## 1 Introduction

In current history, radio frequency identification (RFID) development has revolutionized from an obscured piece of technology to prominent applications for instance agriculture goods, electronic devices, manifold volumes of industrial products for position recording, distribution reports and location facilitation [1].

To instantly recognize and trace tags adhered onto items, RFID capitalizes electromagnetic radiation and these tags are incorporated with electronically stored data

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Z. Md. Zain et al. (eds.), *Proceedings of the 6th International Conference on Electrical, Control and Computer Engineering*, Lecture Notes in Electrical Engineering 842,  
[https://doi.org/10.1007/978-981-16-8690-0\\_81](https://doi.org/10.1007/978-981-16-8690-0_81)

927