



**UNIVERSITI TEKNOLOGI MARA**

**AN ULTRA-WIDEBAND (UWB) RECTANGULAR  
DIELECTRIC RESONATOR ANTENNA (DRA)**

**ABDULLAH FARID BIN MANSOR**

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## ABSTRACT

The design of an Ultra-Wideband (UWB) Rectangular Dielectric Resonator Antenna (DRA) is presented in this paper. There are three main objectives of this project. The first objective is to achieve the best performance of Ultra-Wideband (UWB) system. The second objective is to design the compact size of antenna with improvement of bandwidth and the last objective is performance analysis of antenna. The proposed antenna was analysed and designed using CST Microwave Studio software. The simulated results show the with 10-dB reference which it can operate at 3.1 GHz until 8.33 GHz. The ultra-wideband (UWB) communication system operate from 3.1 GHz until 10.6 GHz. The bandwidth of an Ultra-Wideband (UWB) Rectangular Dielectric Resonator Antenna (DRA) was 5.233 which cover 70% of ultra-wideband (UWB) applications. An Ultra-Wideband (UWB) Rectangular Dielectric Resonator Antenna (DRA) was build up with the compact size of antenna which 40 x 40 mm. Furthermore, the antenna has been analysed and discussed. The performance analysis of the return loss, the radiation pattern, the input impedance and the gain were presented.

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# CHAPTER 1

## INTRODUCTION

### 1.1 BACKGROUND OF STUDY

Nowadays, the wireless communication is rapidly growing. The wireless technology has been discussed in international open discussion within the researchers to improve the performance of wireless communication. Dielectric resonator antenna (DRA) is an efficient radiator that responsible to get best communication performance. Dielectric resonator starts growing at 1970 which helping to reduce of active and passive microwave components such as filter and oscillators [1, 2]. Nowadays, DRAs was famous among engineers to create the new technology where it very influent and helping in the important sectors of a country such as defences, army, radar and worldwide communication.

DRAs can be designed with various shapes such as hemispherical, cylindrical, rectangular, and triangular due to flexibility. The impact of the form affects the application coverage requirements in the wireless communications industry. The ability performance of DRAs designed for wide impedance bandwidth, low profiles, circular polarization, compactness, and high gain are illustrated.