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Contents

I. Introduction

Research related to antennas used for wireless systems has been progressing over the last few decades toward utilizing a singular radiator for several applications, primarily when consumers require fast operating devices [1]. Such antennas include UWB antennas, which have been researched in details for the aforementioned reasons [2] –[7]. These antennas have a numerous benefits, including ease of construction, high transmission rate, low power consumption and minimal cost [8]. Despite these advantages, UWB antennas have significant drawbacks, including as multipath fading and channel capacity, which have an impact on total system performance [9]. MIMO antenna designs with numerous radiation elements have certainly been utilized to address such issues without consuming transmitting power or additional bandwidth [10]. MIMO antennas are engaged on both the transmitter side and receiver sides of communication systems to enhance the quality of communication and channel capacity [11]. MIMO antenna systems take on mutual coupling due to the placement of several radiation elements in close vicinity, and one solution is to organize radiation elements at considerable length, which will enhance the size of the antenna. A large portion of current research is intended to address these two major difficulties. Various approaches have been explored to decrease mutual couplings in MIMO antennas, for example [12] –[19].

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