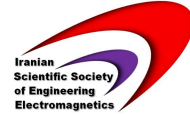


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Dual Band and Dual Polarized Substrate Integrated Waveguide Slot Antenna

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Abstract— A new dual band and dual polarized slot antenna is designed at x band, using longitudinal and transverse slots on the broad wall of the substrate integrated waveguide. The two resonances are completely apart resulting in a low cross polarization level at both sets. The antenna has a minimum radiation efficiency of 80% in both bands.

KEYWORDS: Dual band, Dual polarized, Slot antenna, Substrate integrated waveguide.

I. INTRODUCTION

Dual polarized antennas have attracted much attention due to the capability of receiving and transmitting signals with two different polarizations. Many investigations using a microstrip antenna have been done up to now to get this desirable feature of the antenna. In [1] a new dual hybrid-feed structure is used to generate dual orthogonal linear polarizations. A single feed dual polarized antenna is studied in [2] which stimulate two orthogonal modes of radiating patch by adding a stub to the end of the feed line.

On the other hand waveguide slot antennas are good candidates for the microwave application due to their high gain, high efficiency and low cross polarization level. However these antennas are bulky, heavy and costly to produce. Substrate integrated waveguides can be used to implement the slot array antennas with the good advantages of low cost, low

profile and easy integration with planar circuits. Experimental equations for designing SIW is stated at [3] which is used to design SIW in this paper.

Even so there is less effort which is done to get dual polarization using these kind of antennas. The first investigation was published in 1996 in which shunt slots in broad wall of the waveguide and inclined edge wall slots are used for vertical and horizontal polarization respectively [4]. Inclined edge wall slots produce cross polarization and limited the antenna performance. In [5] non-inclined edge wall slots are excited by two shaped irises and eliminate the drawback with inclined slots. In [6] both longitudinal and transverse slots are etched in broad wall of two different waveguides, so it doesn't require any extra formation to excite the slots. In [7] two closed radiating slots in broad wall of the waveguide are used to produce the two right hand and left hand circular polarization.

Most of these structures use two waveguides to create dual polarization, which cause the structure to be costly and bulky. In this paper we present dual band, dual polarized antenna which is based on substrate integrated waveguide and doesn't have problems of waveguide structures.