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Dual Frequency Microstrip Patch Antenna For Different Applications

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Abstract

Dual frequency mioctrostrip antennas will provide alternative to large bandwidth antennas. In which applications a large bandwidth is needed for operating at two transmitting and receiving bands. When these two operating frequencies far apart(away), a dual frequency microstrip patch antenna structure can be considered to avoid the use of separate antennas. For this, a critical overview of possible solutions can be found out and future properties are outlined.

Introduction

Microstrip patch antennas are popular for their well-known attractive features, are widely used because of their many advantages, such as low profile, light weight with monolithic microwave integrated circuits. Their important advantage is that intrinsic limitation in bandwidth. Which is due to resonating nature of the patch structure. Modern communication systems such as those for satellite links (GPS, Vehicular etc) as well as emerging applications, such as wireless local area networks. In particular often these antennas require compactness and low cast, thus rendering planar technology usefulness and some times it may be unavoidable. Further their light ness, microstrip patch antennas are well suited for systems to be mounted on airborne platforms, like synthetic aperture radar and scatter meters**.** From these applications, a technique is given for research on innovative solution to overcome the bandwidth limitations of microstrip patch antennas[1]. In some applications the increased bandwidth is needed for operating the two separate sub bands, this is alternative method of broadening the total bandwidth is represented by dual frequency microstrip patch antennas. Indeed optimal antenna for a specific applications it is one that ensures the matching of the bandwidth of the transmitted or received signal. Dual frequency microstrip antenna exhibits a dual resonating behaviour in a single radiating structure. In terms of space and cost, little attenuation has been considered. This is probably due to the relative complexity of the feeding is network what we are applying for particularly for array applications

It is need to operate, at dual frequency can arise in vehicular satellite communication systems, where low cost antennas like patterns. When the system operated at two frequencies too far, dual frequency microstrip antenna may avoid the use of two different antennas.

Two or Dual frequency techniques for microstrip patch antennas

In Principle, dual frequency planar antennas will operate with similar features, in terms of both radiation and impedance matching at two separate frequencies. For getting these

features using planar technologies, particularly when the structural and technological simplicity such type of microstrip patch antennas can be preserved.

The simplest way to operate at dual frequencies is to use first resonance of the two orthogonal dimensions of the rectangular microstrip antenna patch TM100 and TM010 modes. In this paper, the frequency ratio is approximately equal to the ratio between two orthogonal sides of the patch. The limitation of this approach is that the two different frequencies excite two orthogonal polarisations. This is very useful in low-cost short range applications where polarisation requirement is not met. The above approach characterizes a first classification that dual frequency patch antennas. It is extended to any kind of patch shape that offers two cross polarized resonant modes. Most of the dual frequency microstrip antennas found in two ways. Multi patch dual frequency antennas and reactively loaded dual frequency patch antennas.

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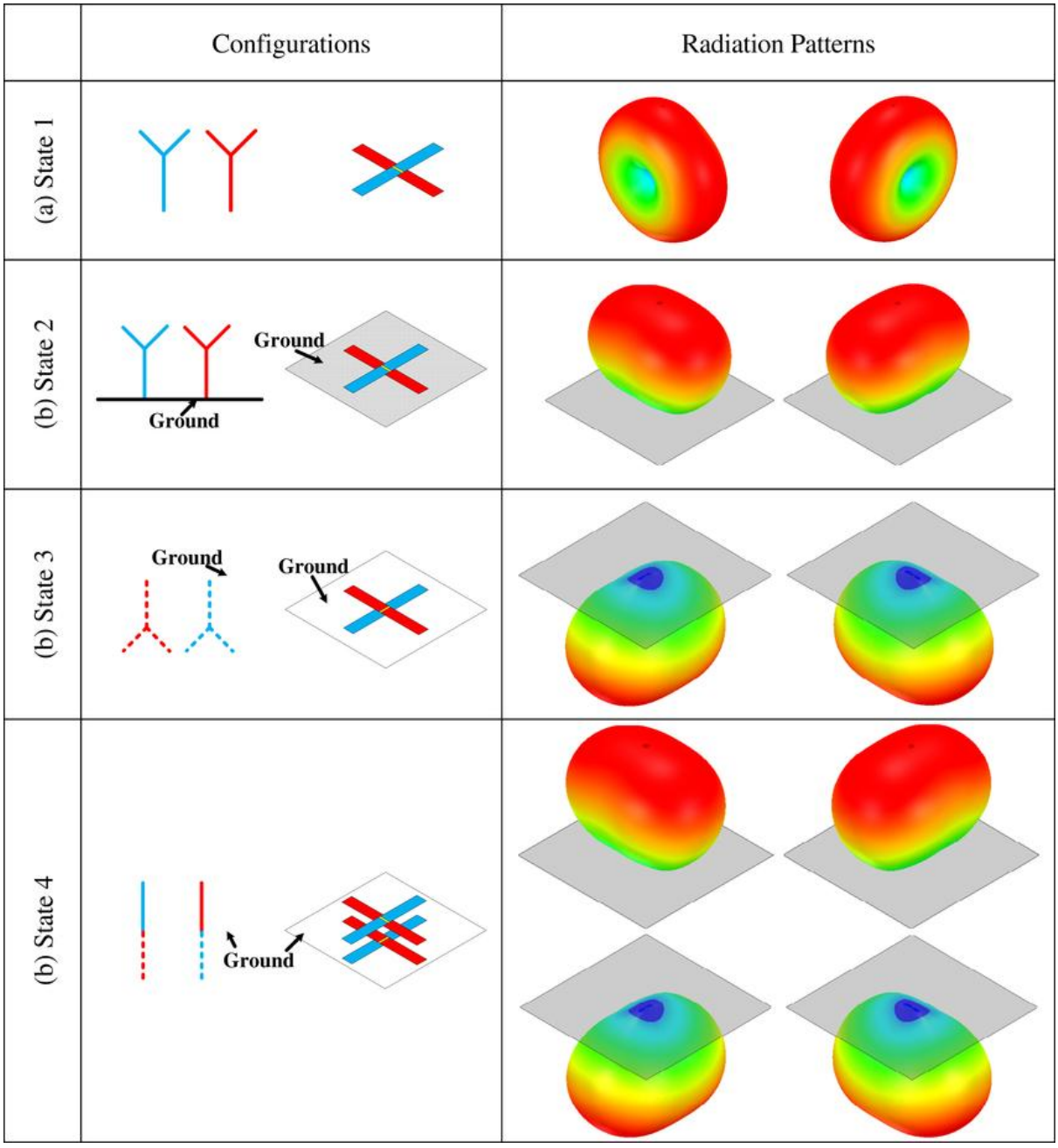

Fig 1: Orthogonal modes or configurations and its radiation pattern for dual frequency microstrip patch antennas.

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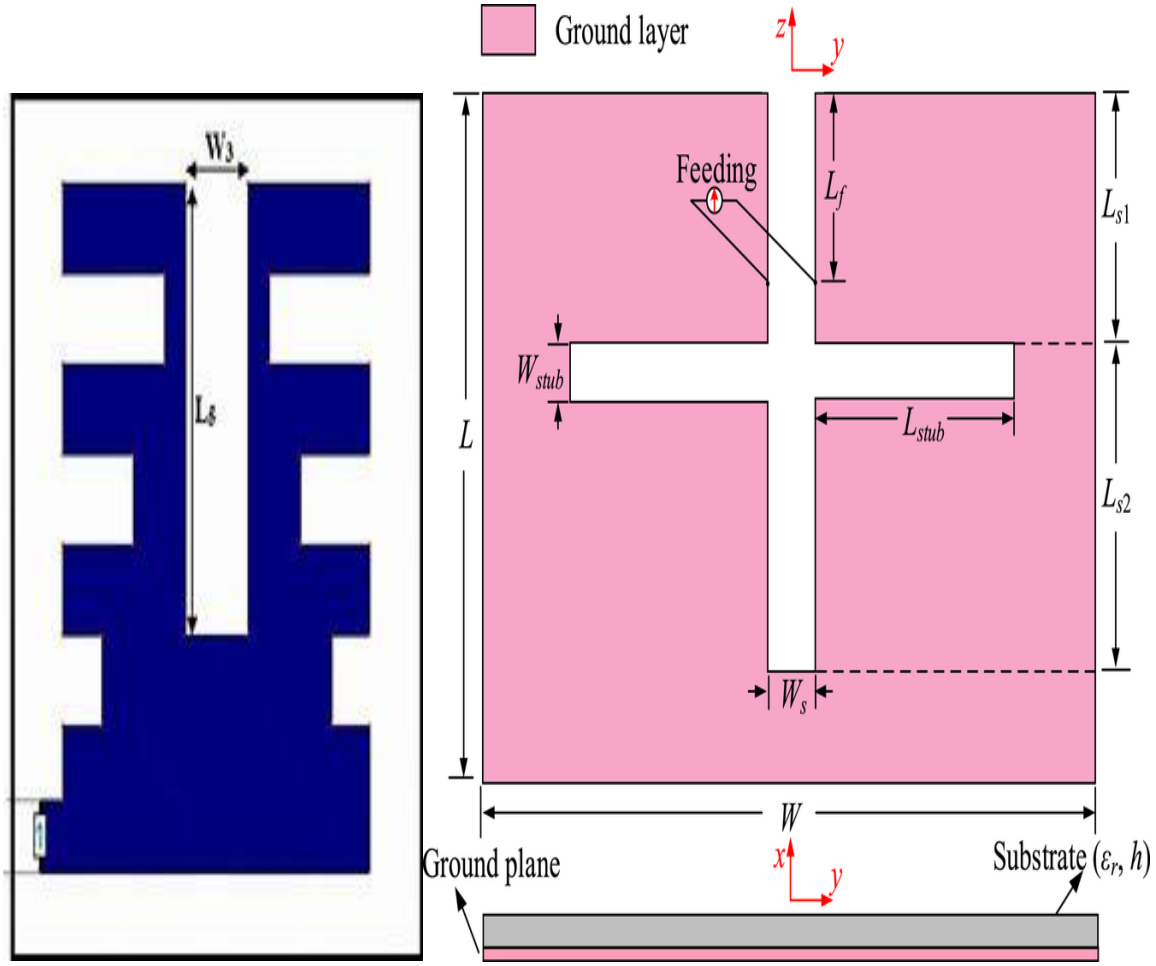

Fig2. Notches and slots reactively loaded for dual frequency microstrip patch antennas.

Orthogonal mode dual frequency microstrip patch antennas.

These antennas are characterized by two resonances with orthogonal polarizations. These may be obtained in simplest way, by a rectangular patch[1,2]. Its interesting feature is their capability of simultaneous matching of the input impedance at the two frequencies with a single feed point. It may be obtained by probe feed configurations. The performance of this approach is in terms of matching level and bandwidth is almost equal to that of same patch feed separately on the two orthogonal axes. Single feed dual frequency may be obtained by slot coupling, in which the slot inclined with respect to the feed line. Inclination of the slots may be adjusted, in order to compensate for error introducing by the matching stub, which is designed to be a quarter of a wavelength for single frequency. Orthonal modes may be exited by separated microstrips. A circular patch can also be used, in which two modes of the circular cavities are excited by those two slots.

Multiple patch dual frequency microstrip antennas.

In these given structures, the dual frequency behaviour is obtained by means of multiple radiating elements, each of these supported by two strong circuits and radiation will be at the resonance. This includes multilayer stacked patches, that can use rectangular, annular,

triangular patches[3-6]. The same multilayer structures can also be used to broadening the bandwidth of a single frequency. The lower patch can be fed by a conventional arrangements. The upper proximity will be coupling with the lower patch[7]. Multifrequency elements can also be obtained by etching or printing more resonators on the same substrate. [8]. For a large separation between the two frequencies the criteria of a drastic change in separation of the patch antennas associated with each frequency may be adopted.

Reactively loaded patch antennas.

The most important technique for obtaining a dual frequency behaviours is to introduce a reactive loading into to a single patch. The simple way is to connect a stub to one radiating edge. And further introducing resonant length that is responsible for the operating frequency.

The reactive loading technique approach first introduced [9], where an adjustable coaxial stub employed. This structure will provide both tuning and design of the frequency ratio in a simple manner. It is not well suited for high frequency. One more method that notches can be introduced, slots can be used just by placing on either side of the patch or placing three or more slots in equal placing on the particular patch.

Conclusion

Overview of dual frequency microstrip antennas has been carried out, with special configuration that are attractive for their simplicity and well designed flexibly. Focusing on geometry of the radiators, avowing the significant problems which will occur on the dual frequency feed network. The work carried out in this literature it is insufficient and research is going on. The use of single feed network for both frequencies may be practically only when the two frequencies are close to each other. For large separations between the two frequencies, two different microstrip have to be introduced.

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