Review of Bandwidth Step Up Techniques For Microstrip Antenna

Mr. Bhandare S. S
Department of EXTC
RMCET, Ambav/ Mumbai University, India

Abstract-*In This paper a method for bandwidth enhancement of microstrip antennas by combination of individually investigated methods like electrically thick elements, stacked multipath, multilayer elements, and multiple-resonator element etc hence improve bandwidth different techniques are used. This review paper delivers various bandwidth enhancement techniques since last few years.*

Keywords-Microstrip antennas, resonator elements, bandwidth enhancement.

I. INTRODUCTION

Microstrip antenna plays significant role in modern communication. Antennas have many interesting properties (e.g., low profile, light weight, cheapness) but applications in many systems are impeded by their inherent narrow bandwidth.

Microstrip antenna has a narrow bandwidth besides that today wireless communication system demands higher operating bandwidth. These communication devices need higher bandwidth so as to work in the broader band in order to shoulder high speed internet, multimedia communication like for a digital communication system (1710-1880 MHz), for universal mobile telecommunication system (1920-2170 MHz), for global system for mobile communication (890-960) [1].

In order to fulfill the demands of the bandwidth various techniques are employed and some of them are described in this review paper.

II. STRUCTURE OF MICROSTRIP ANTENNA

In its most basic form, a Microstrip patch antenna consists of a radiating patch on one side of a dielectric substrate which has a ground plane on the other side as shown in Figure 1. The patch is generally made of conducting material such as copper or gold and can take any possible shape. The radiating patch and the feed lines are usually photo etched on the dielectric substrate [2].

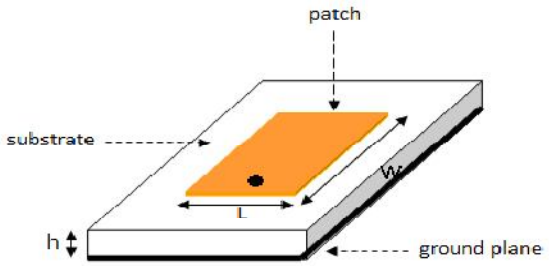


Fig.1 Microstrip patch antenna

Techniques To Enhance Bandwidth Of Microstrip Patch Antenna

The techniques used to boost the bandwidth of the microstrip patch antenna are described below.

Modified Patch Shapes

Bandwidth is enhanced by simply modifying the shape of radiating patches the bandwidth improves. The quality factor reduces, as the less energy will be stored under the patch and produces higher radiation [4].

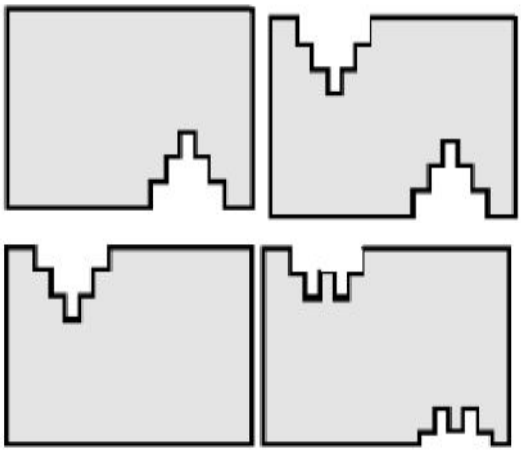


Fig.2 Slots with irregular shapes

Multilayer Configuration

In case of multilayer configuration. The patches are planted over the various dielectric substrates and are stacked on each other, Multilayer structures provide maximum

bandwidth but its size increases with the increase in number of layers.

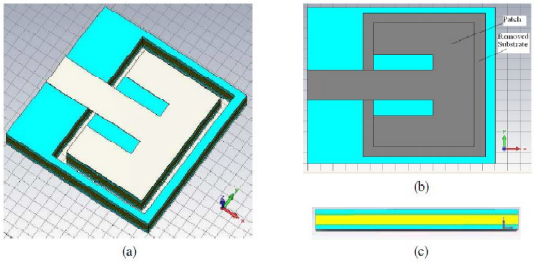


Fig.3 Multilayer Configuration (a) Isometric view (b) Top view (c) Side view

Multiresonator Configuration

In the planar multi-resonator configuration the multiple resonators are placed close to each other and only one is fed and others are parasitically coupled also called as gap coupled.

Limitation of this configuration is that this configuration is not suitable for an array configuration, as their size is too large and there are changes in the radiation pattern over the impedance matching [5].

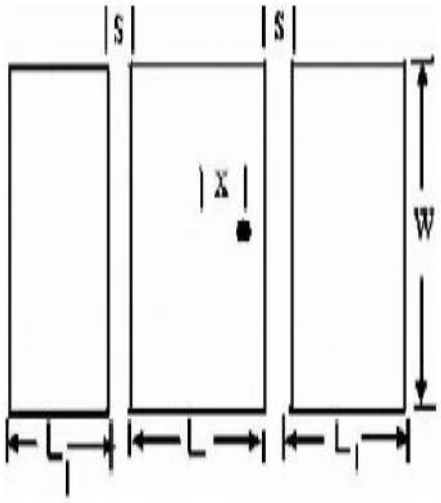


Fig.4 Multiresonator gap coupled patches

Multilayer Multiresonator Configuration

In this configuration combination of Multilayer configuration and multi-resonator configuration had done in order to further enhance the bandwidth. It provides very high bandwidth and gain but size of the stacked multi-resonator microstrip patch antenna is large [1].

Dual Feed

Dual feed structure is another available technique to enhance bandwidth, especially at higher resonating frequencies.

Double feeding configuration in antenna structure is used to enforce the vertical current mode. It also prevents other modes such as horizontal and asymmetrical current modes from being excited. These horizontal and asymmetrical current modes degrade the polarization properties and reduce the impedance and gain performance of the antenna

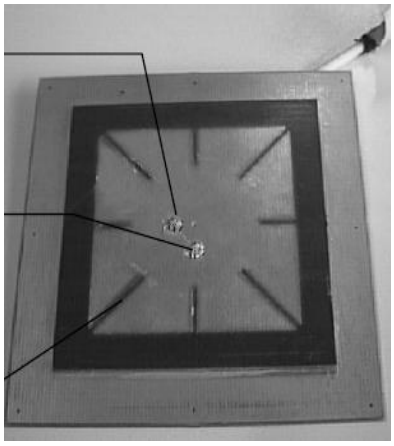


Fig. 5 Microstrip patch antenna with dual feed

Suspended antenna configuration

To improve the Bandwidth of antenna increases the height of substrate and decrease dielectric constant. This effect can be realized by using suspended nature of the antenna .In this configuration patch is fabricated at one side of the dielectric substrate and it is suspended in air with air gap Δ. Suspended

In this suspended antenna weight of the antenna gets reduced due to the air gap [3].

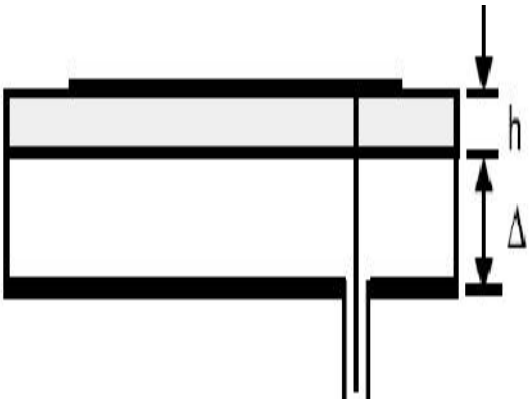
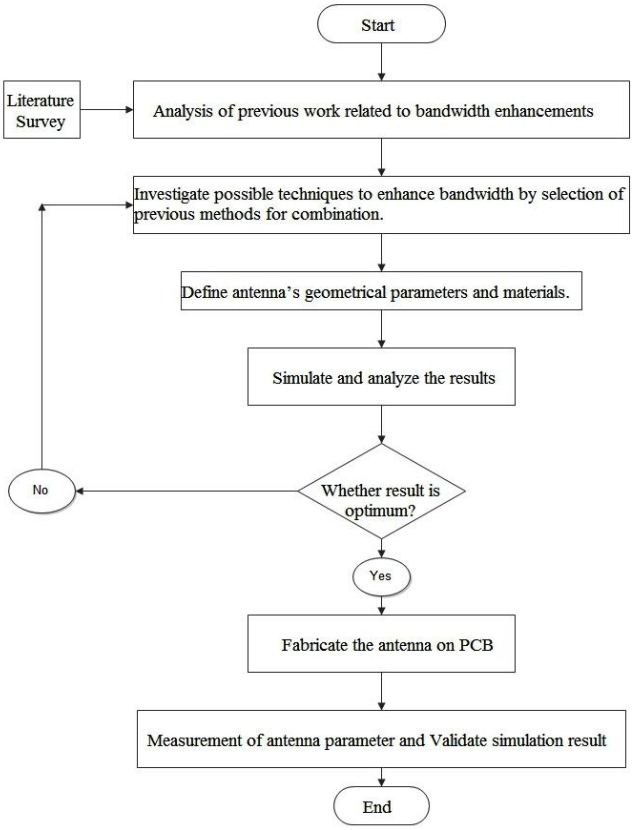


Fig. 6 Suspended microstrip antenna

III. METHODOLOGY

The proposed work will consider all earlier approaches and work .It proposes to combine earlier methods in order to effectively increase bandwidth of microstrip antenn



IV. CONCLUSION

Low bandwidth is always the limitation of MPA. The impact of different configurations on the bandwidth of the microstrip patch antenna has been reviewed in this paper so as to increase the operating bandwidth. After an extensive study of literature work it is supposed that each configuration has certain limitations and advantages. If we combine any two methods we can have better result of bandwidth improvement in minimum limitations.

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