

Design of Microstrip Patch Antenna by Using Probe Feed Method

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ABSTRACT- A micro strip patch antenna is a metal patch placed on a substrate. Different feeding modes are used like: micro strip line feed, proximity-coupled feed, coplanar wave guide feed (CPW), coaxial probe feed and others. These feeding modes are divided in sorts, oblique or direct. The patch can take distinctive shapes; the most recognized bureaucracy is round, square, square, hexagonal... The patch antenna is low-profile, appropriate for each non-planar and planar surface reasonably-priced and simple for manufacturing and the use of printed-circuit technology. In this challenge, a micro strip patch antenna for 2.45GHz programs is designed much like the transmission line technique. It is optimized with the Method of the Moments (frequency vicinity technique) because it's one of the correct techniques for planar antennas and wiring. The direct feeding modes are studied, artificial and measured. Simulations were completed with CADFEKO and measurements were performed with Vector Network Analyser (VNA) Anritsu MS2026C.

KEYWORDS- Micro strip-CPW-modem printed circuit technology-VNA

I.INTRODUCTION

Integration in restrict environment like smart telephones, laptops and other embedded systems, the micro strip patch antennas are widely used due to their planer structure, low profile, light weight, desirable performance, ease of manufacturing and integration with active devices. The maximum famous are the coaxial probe, micro strip line, proximity coupling, coplanar wave manual and others. Each feeding mode have some hazards and benefits and it's far used depending at the necessities. In this undertaking, first, a design methodology is offered. Next, the three direct feeding modes are simulated, synthesized and measured. After that, a comparison of the results is presented.

II.SYSTEM FUNCTION

Radiation is ascribed the patch duration. The fie component is with recognize to 't' the section due to the fact the patch cancels within the wide (in the ground aircraft) are in radiated discipline normal to the field. Therefore, the patch may also get excited in phase. A patch may be represented and radiating in the half of patch will increase due to e is 1/2 long; therefore, the along way field radiates inside the facet direction. The tangential element (t phase, and the ensuing fields combines in the shape of the floor i.e., extensive y be represented via slots $\lambda/2$ aside as s and it radiates in the 1/2 area above the two slots $\lambda/2$ aside. The powerful field. 1: Radiation mechanism of micro strip patch of micro strip satellite tv for pc link telemetry is having a s, which may be antennas. H have parallel n them. But in the opposite, to radiating patch, frequency of the antennas. This with its slender y. The patch is alongside the width d excited with the aid of the edges of l and tangential are 1800 out of on produced with the aid of those parallel to given maximum side path. Proven in discern plane

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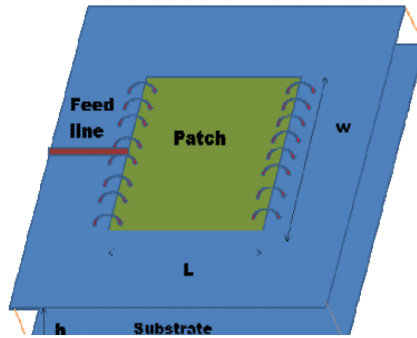


Fig.1.Radiation mechanism of micro strip patch

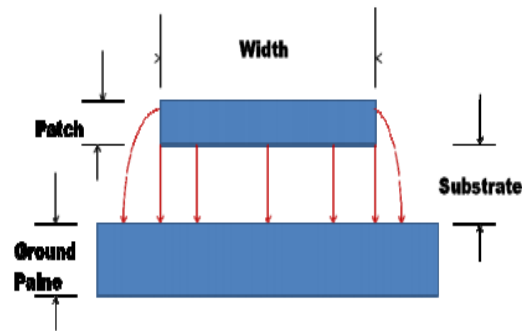


Fig.2.Electric field from a micro strip patchantenna

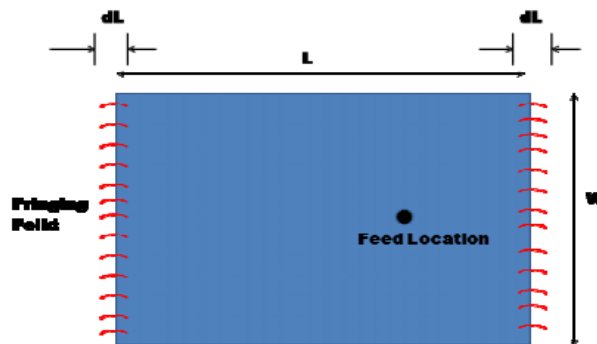


Fig.3.Increase in length of the micro strip patch

Fig.1.Represents the mechanism of microstrip antenna patch. Electric field from a micro strip patchantenna is shown in Fig.2.Increase in length of microstrip patch antenna is shown in Fig.3.

III. ANTENNA SPECIFICATION

A. THE DESIGN OF MICROSTRIP PATCH ANTENNA

In the micro strip antenna the dielectric substrate inside the higher element helps the printed conducting strips that is appropriate when contoured, even as the decrease surface of the substrate is backed through a conducting floor plane Such antennas on occasion called as revealed antennas due to the fact the fabrication strategies are much like that of a printed circuit board. Many types the micro strip antennas have been developed which might be the versions of the basic systems. Micro strip antennas can be designed as very thin planar revealed antennas and they're additionally very beneficial for elements for verbal exchange applications.

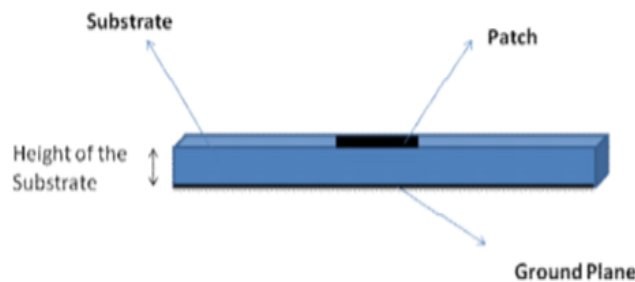


Fig.4. Basic Structure of Micro strip Patch Antenna

In Fig.4. Micro strip antenna's basic structure is depicted. Many types the micro strip antennas have been developed which might be the versions of the basic systems. Micro strip antennas can be designed as very thin planar revealed antennas and they're additionally very beneficial for elements for verbal exchange applications.

IV. SYSTEM SPECIFICATION

First, the basics of antenna simulation are offered in precise, comprehensible and smooth-to-comply with processes thru the study of the most effective types of radiators, i.e., Loop and dipole antennas. Second, contrast between theoretical analysis and full-wave simulation effects are given for an expansion of antenna sorts, which useful resource the readers with a higher know-how of the idea, approximations, and obstacles within the theoretical evaluation, and solution accuracy. Third is the visualization of the antenna modern distribution, radiation patterns, and different radiation traits that are made to be had via complete-wave simulations using FEKO.

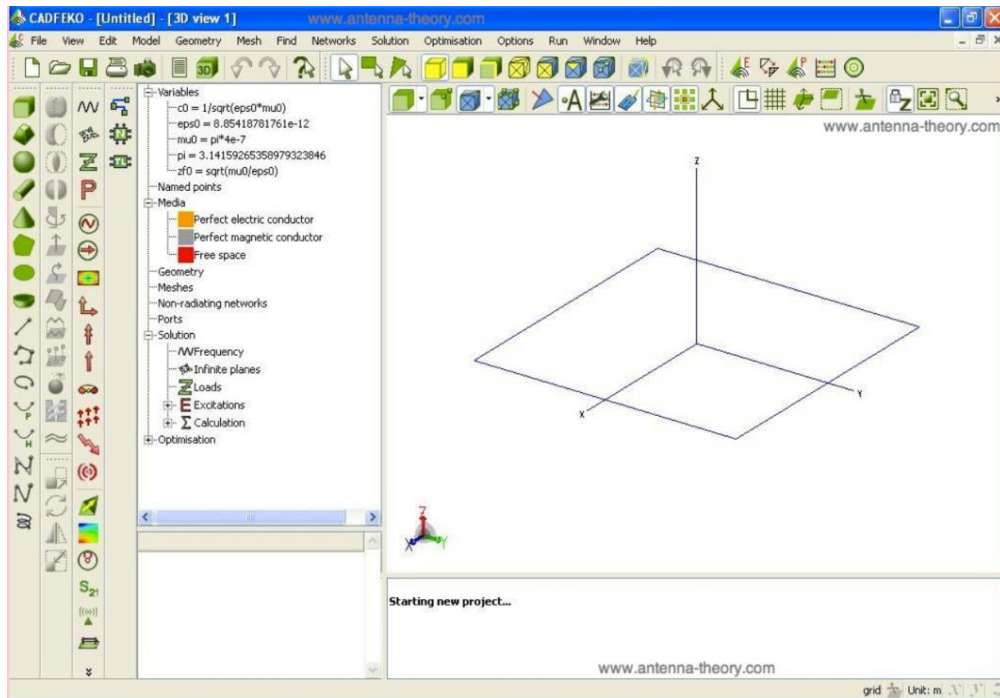


Fig.5. Antenna Simulation in CADFEKO Software

In Fig.5. represents the antenna stimulation in CADFEKO Software

V. RESULTS

A. COAXIAL PROBE FEEDING

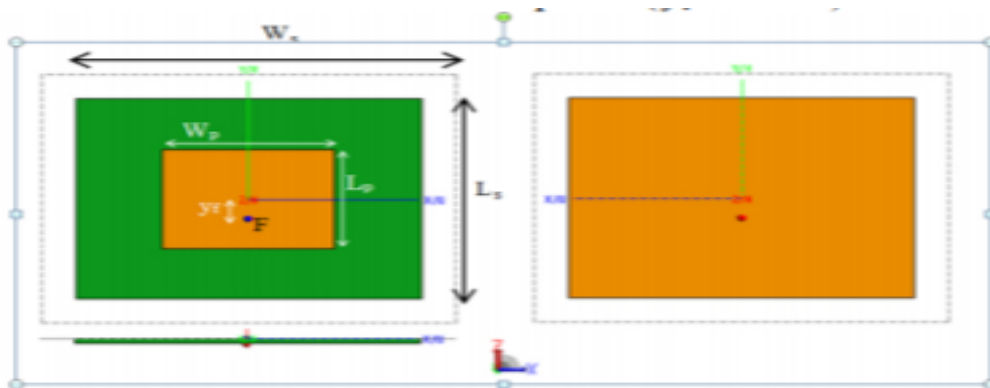


Fig.6. shows the S11 parameters

B. MICRO STRIP LINE FEED

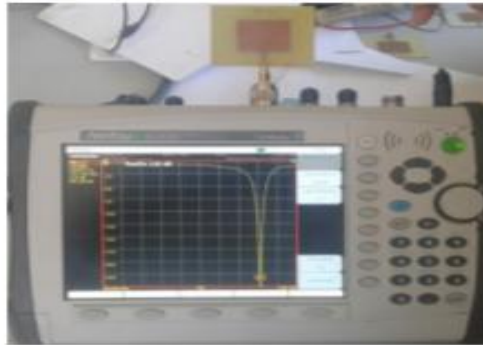


Fig.7. Result Obtained

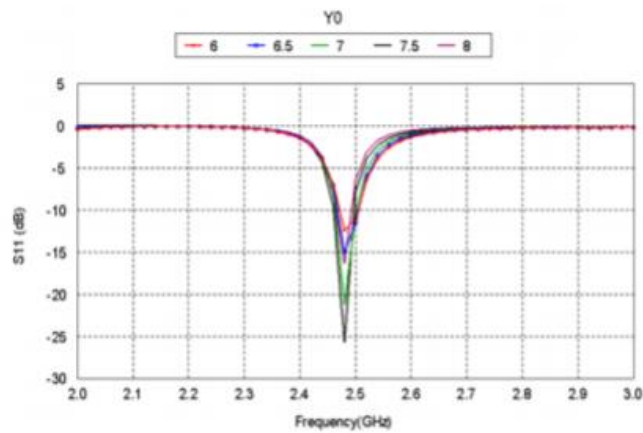


Fig.8. Parametric study of S11 versus y0

C. CPW-FEEDING MODE

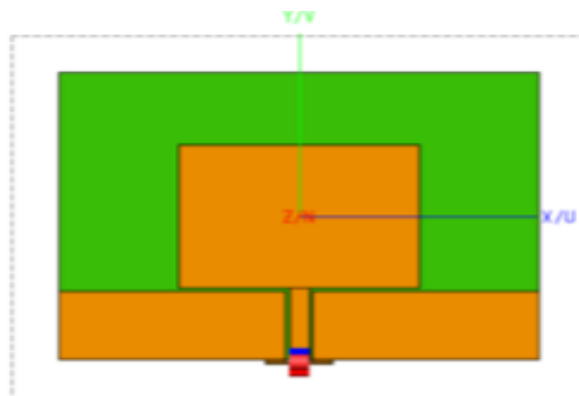


Fig.9. Geometry of the patch antenna with CPW-feeding

This kind of feeding technique is also called Co Planar Wave guide feeding (CPW-feeding). The ground plane is placed on the same plane as the patch. This antenna is easy to manufacture compared to the three first antennas using the Printed Circuit Board technique (PCB), in general it's used to obtain a large bandwidth, several studies used this technique to design antennas for Ultrawide Band (UWB) and Broadband antennas.

D.COMPARISON OF DIFFERENT FEEDING MODES

	<i>Resonance frequency (GHz)</i>	<i>S₁₁ (dB)</i>	<i>Bandwidth (From-To)</i>
Probe feeding			
Simulated	2.44	-17.6	45MHz (2.41-2.46)
Measured	2.49	-13	30MHz (2.48-2.51)
Microstrip Line feeding			
Simulated	2.48	-26.2	40MHz (2.46-2.5)
Measured	2.58	-24.7	60MHz (2.56-2.62)
CPW feeding			
Simulated	2.6	-11.4	420MHz (2.4-2.82)
Measured	2.8	-12.54	700MHz (2.3-3)

Fig.10. Comparison of different feeding modes

In fig.6.shows the S₁₁ parameters.Fabricated patch antenna with micro strip line feeding and with ANRITSU VNA is shown in fig.7. Study of S₁₁ Versus Y₀ parameter in fig.8.In fig.9. shows the patch antenna with CPW feeding, geometry. Different in feeding modes comparison is shown in fig.10.

VII. CONCLUSION

The micro strip patch is an adequate solution to design low profile antennas with important performances. It's also a good solution for designing embedded systems where the weight, cost and the easy installation are the important requirements. The different modes allow having some advantages: The CPW feeding mode increases the bandwidth of antenna and having omni directional gain pattern. The coaxial probe and micro strip line feeding modes allow having antennas with short bandwidth and important gains. To design microstrip patch antenna, the adopted feeding mode will depend on the requirements performances. As perspective of this work, the indirect feeding modes like proximity coupled and aperture feeding should be studied.

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