Micro strip Patch Antenna

Title : Design of micro strip patch antenna under TV band frequency

D.Vasudha(BT17ECE014)

Mohammad Saad(BT17ECE048)

Under the guidance of Dr. Ashwin Kothari

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Introduction*:*
An individual microstrip antenna consists of a patch of metal foil of various shapes (a patch antenna) on the surface of a PCB (printed circuit board), with a metal foil ground plane on the other side of the board. Most microstrip antennas consist of multiple patches in a two-dimensional array.

How Does patch antenna work?
The antenna is usually connected to the transmitter or receiver through foil microstrip transmission lines. The radio frequency current is applied (or in receiving antennas the received signal is produced) between the antenna and ground plane.

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A television antenna, or TV aerial, is an antenna specifically designed for the reception of over-the-air broadcast television signals, which are transmitted at frequencies from about 47 to 250 MHz in the VHF band, and 470 to 960 MHz in the UHFband in different countries

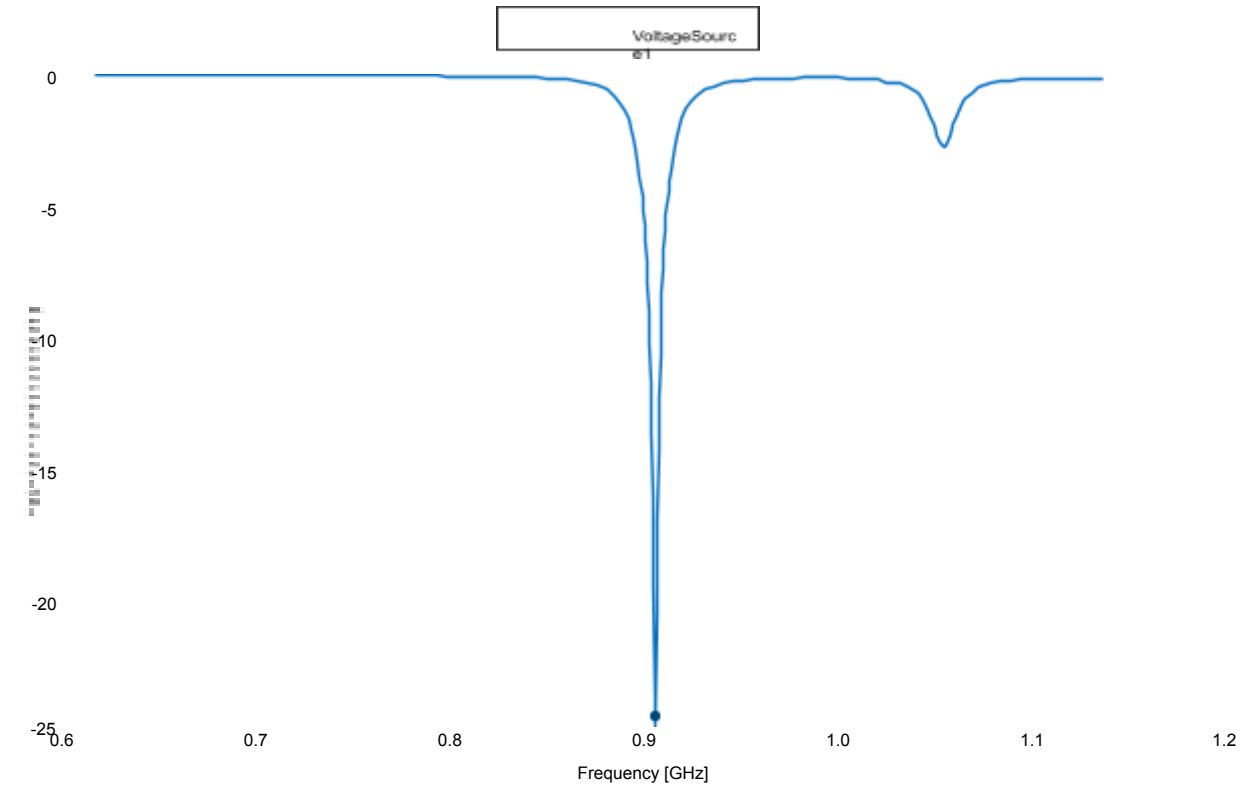


Figure 1: Reflection coefficient Magnitude [dB] - final_asg

Far field

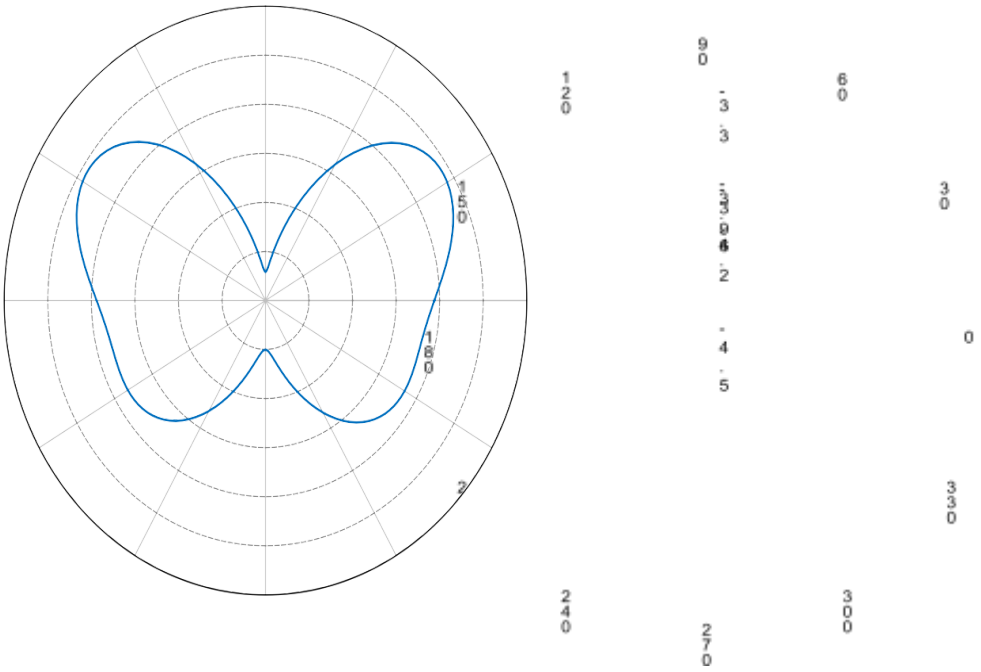


Figure 2: Total Gain [dBi] (Frequency = 0.897438 GHz; Theta = 90 deg) - final_asg

Far field

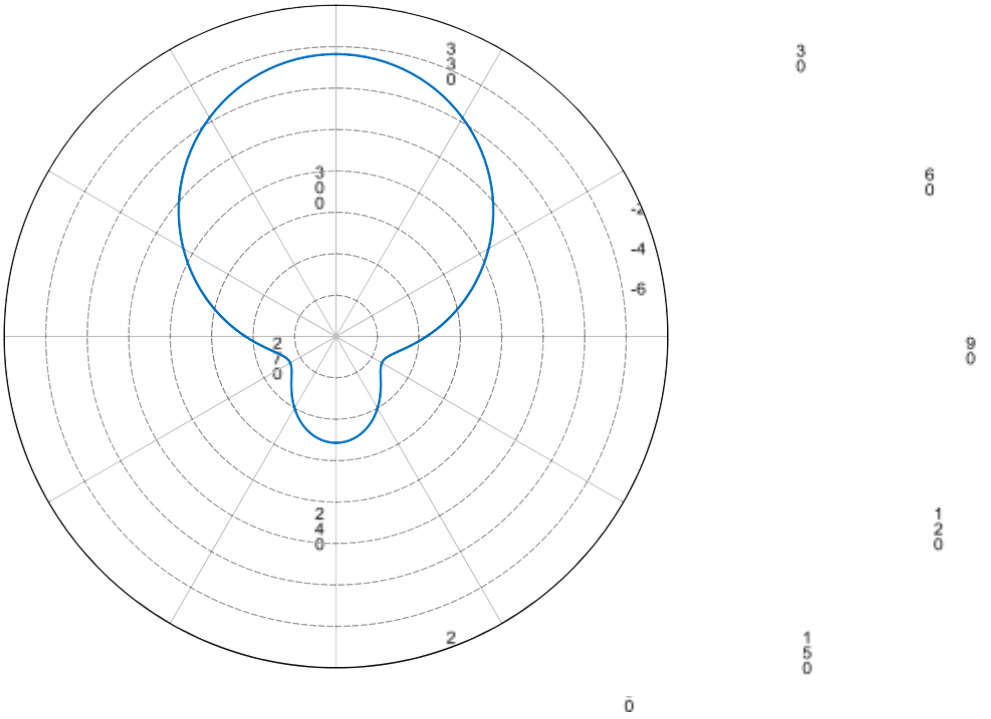


Figure 3: Total Gain [dBi] (Frequency = 0.897438 GHz; Phi = 0 deg) - final_asg

Far field

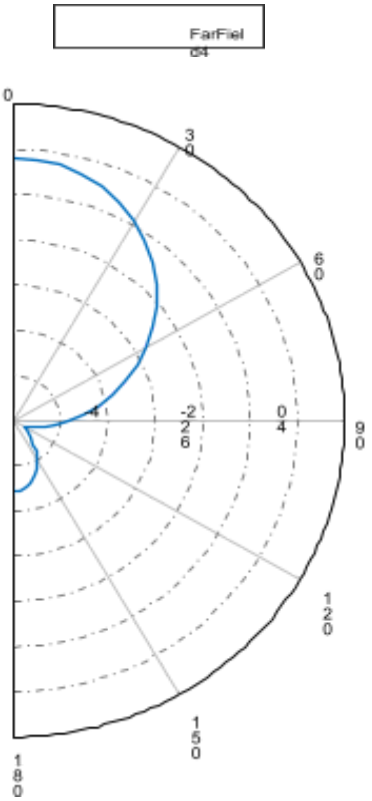
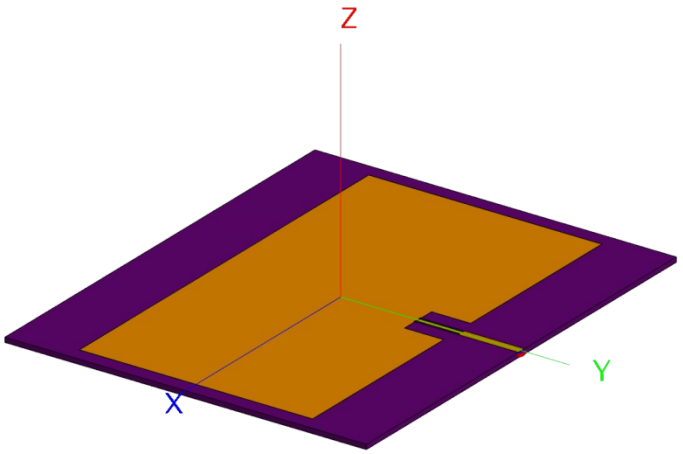


Figure 4: Total Gain [dBi] (Frequency = 0.897438 GHz; Phi = 0 deg) - final_asg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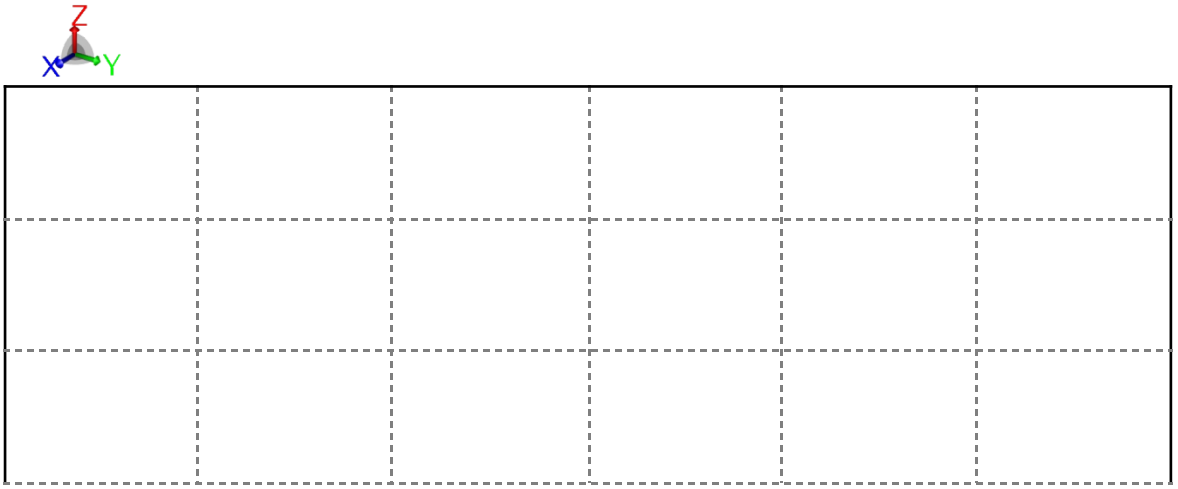
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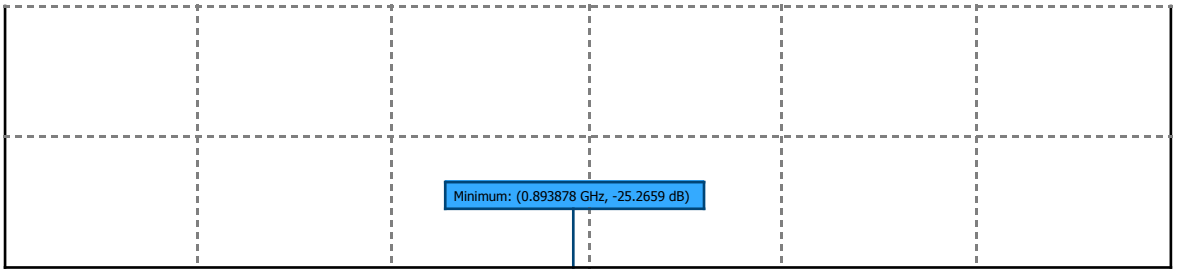


Figure 5: 3D View

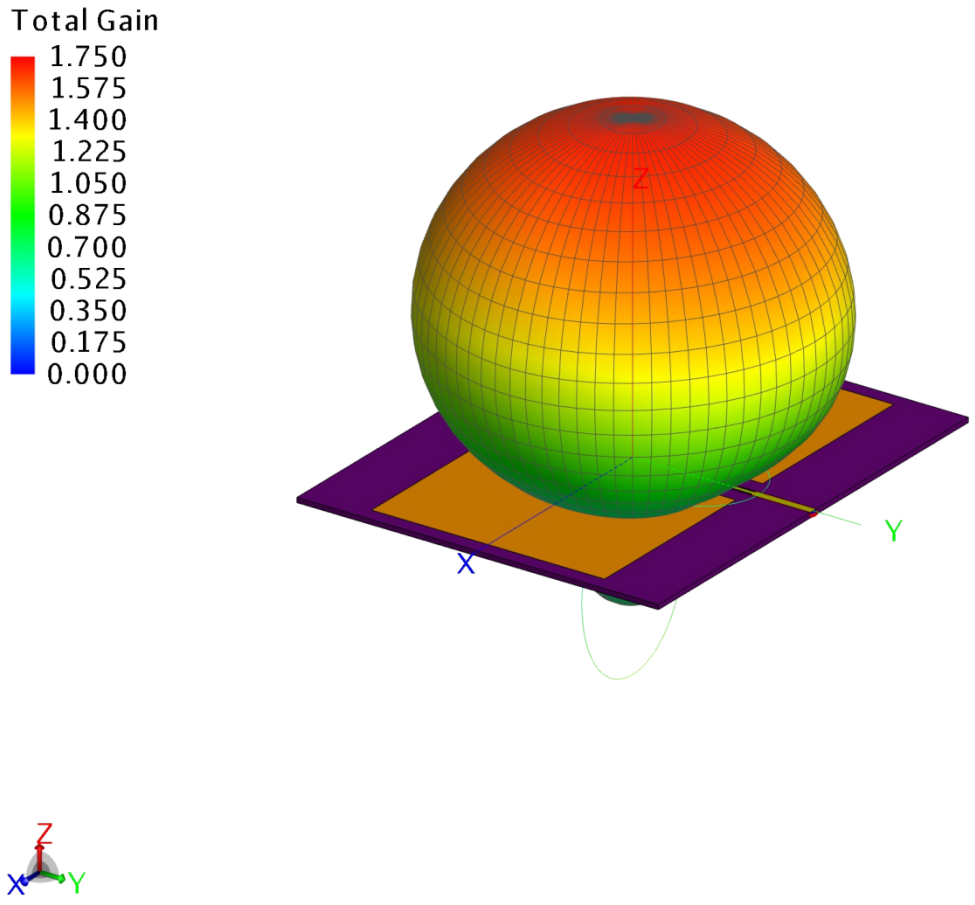


Figure 6: 3D View

Observation:

During Optimization:

1) Decrease in length increases the resonant frequency

2) Increase in width of patch increases gain

3) Also, impedance matching can be done by the change in the width of the microstrip

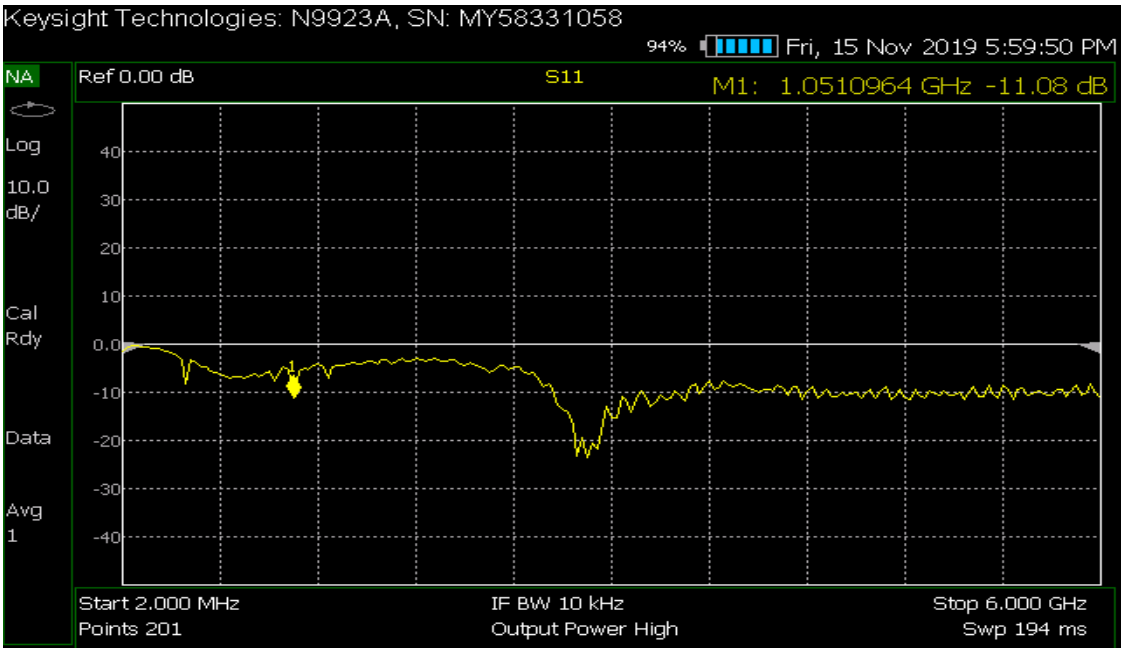
Practical Result: Unwanted slot during etching led to errors from the desired value

Conclusion:

1)For the patch antenna designed in CADFEKO resonant frequency was obtained to be 893.87 with -26db gain

2) For the practically(VNA) obtained antenna the resonant frequency was found to be 1.05GHz and gain obtained was -12db

VNA results:



Matlab plots for comparison of simulated and practical results: