

A Review Paper on Design and Fabrication of Patch Micros Trip Patch Antenna

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Abstract: Micro Strip Patch Antenna is designed using solid works and CM solver. The designed antenna has resonating frequency of 10 GHz. Micro strip patch antenna can be used in aircrafts and mobile satellite communication and in many other applications. This antenna of 10GHz is designed and fabricated only for measurements on VNA and seeing how it works when it connected to port and when port is short circuited.

- Substrate size 24.2*24.2 mm
- Patch element 6.2*6.2 mm
- Ground plane 24.2*24.2 mm
- Thickness 0.035 mm

The connector used in this antenna is of SMA of 3.25mm or K type with the 2.92mm port.

1. MICRO STRIP PATCH ANTENNA

Micro strip patch antenna is the part of semi directional antenna. A micro strip patch antenna also known as a rectangular micro strip antenna with a low profile, which can be mounted on a flat surface. It consists of a flat rectangular sheet or "patch" of metal, mounted over a larger sheet of metal called a ground plane.

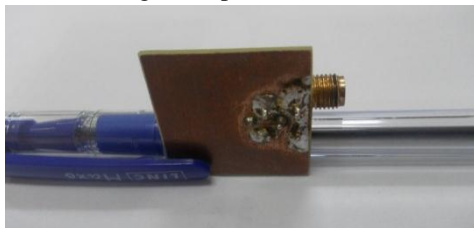


Figure 1 : Micro strip patch antenna (side view)



Figure 2 : Micro strip patch antenna (Front view)

2. MICRO STRIP PATCH ANTENNA DESIGN:

To design a patch antenna we required mainly four geometry:

1. Substrate
2. Ground plane
3. Radiating element
4. Pin feed (coaxial)

Generally used substrate is FR4. For designing of our antenna we used the following geometry by the help of computation in the solid works and the cm solver tools:

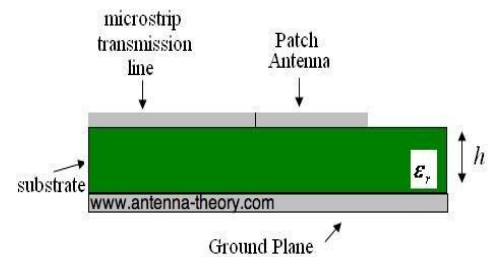


Figure 3: Side View of Micro Strip Patch Antenna

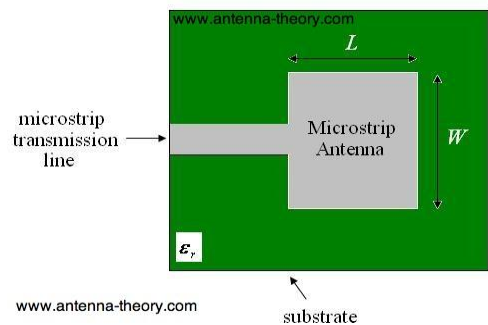


Figure 4: top view of micro strip patch antenna

3. VECTOR NETWORK ANALYZER (VNA)

A network analyzer is an instrument that measures the network parameters of electrical networks.



Figure 5 : VNA

4. MEASUREMENT OF MICRO STRIP PATCH ANTENNA

According the above graphs of VNA measurement
Bandwidth=0.55GHz

Centre frequency=11.25GHz

Out band response= 0 GHz

When the port is shorted, no energy is radiated. All the energy is reflected back to the port and we can say that the power level this time is 0 or off.

When antenna is connected to the port, the maximum energy is radiated and the response is -20dB at 10GHz, which is desired result.

When we consider the shorted port and the antenna the energy radiated in the range of 9-12 GHz and beyond this range the result is same as shorted port. So, we consider that the out band response is 0GHz.

The difference in computed central frequency and practically measured frequency is due to manufacturing process. There is not a huge difference between the computed and measured central frequency that's why we consider these results nearly equal to the computed results. So, we have done the measurements successfully.

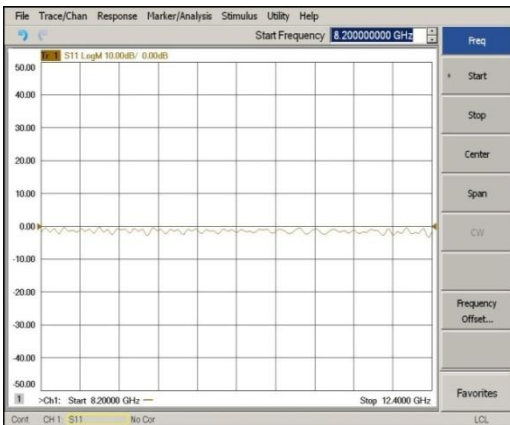


Figure 6: S₁₁ parameter when port is short



Figure 7: S₁₁ parameter when antenna is connected

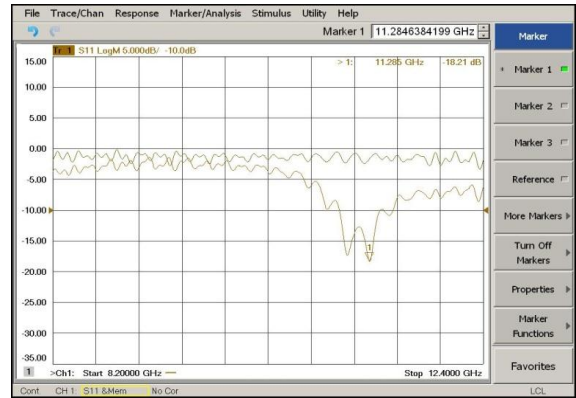


Figure 8: S₁₁ Parameter When Antenna Vs Short

5. ACKNOWLEDGEMENT

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6. REFERENCES

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