



DUAL RESONANCE PATCH ANTENNA WITH A SLIT AND SLOT

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PRESENTATION CONTENTS

- Introduction
- Patch Size and Antenna Geometry Design
- Feeding Point Design
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- Analysis Results
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IEEE STANDARD

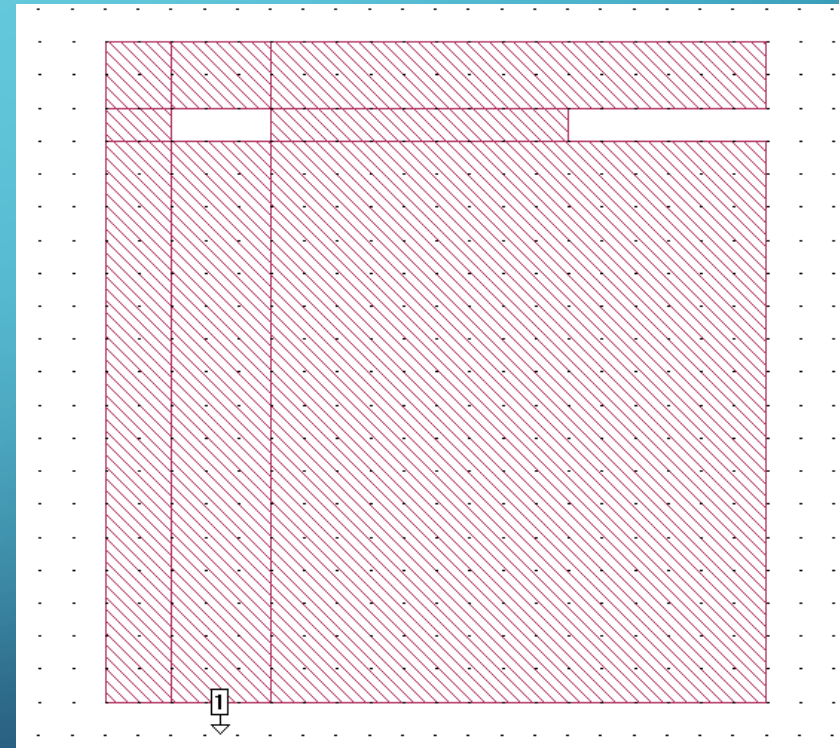
- C band range is between 4 to 8 GHz. It is used for wireless telephones, radar systems and satellite communications.
- X Band range is between 8 to 12 GHz. It is used for short range tracking, marine radar and airborne intercept.
- C Band and X Band are defined by IEEE standards with the frequency range from 4 to 8 GHz and 8-12 GHz, respectively.

INTRODUCT₁ON

- The field of electromagnetics had a tremendous opening with the introduction of artificial negative index medium (metamaterials) and its feasibility in microstrip patch antenna structures. Tuning of patch antenna at a particular resonant frequency is becoming very important in order to make it applicable in different communication purposes. Microstrip Antennas have attracted much interest due to their low profile like compact in size, light weight, low cost on mass production, ease of installation, compatible with MMIC designs. The enhancing bandwidth and size reduction mechanism that improves the performance of a conventional microstrip patch antenna. In many wireless communication applications such as telemetry and communications, aviation, naval communications, automatic guidance of intelligent weaponry, radar, GPS systems, micro strip antennas are used because of its advantages and also makes them popular. This structure of an antenna is simple to manufacture and versatile in nature.

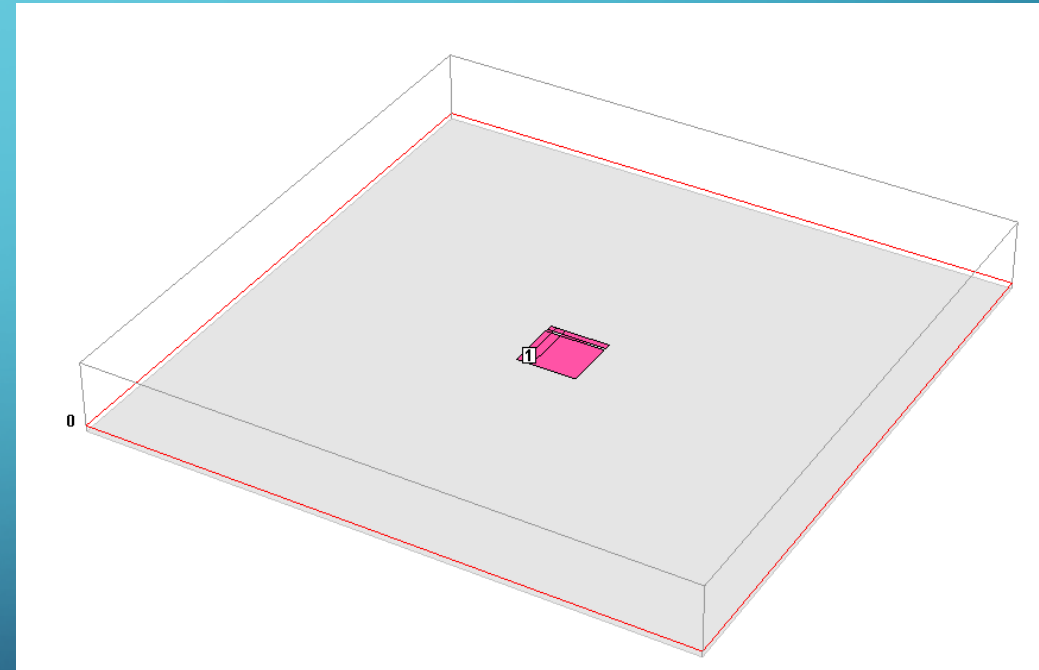
PATCH SIZE AND ANTENNA GEOMETRY DESIGN

- Geometry of rectangular patch antenna is shown in the figure. Top thickness is 11 mm while dielectric thickness is 1mm. Dielectric constant of the following antenna is concluded to be 1. The antenna has a slot at the top left corner and a longer slit next to that at the top right corner which changes current distribution and affects resonance frequencies.



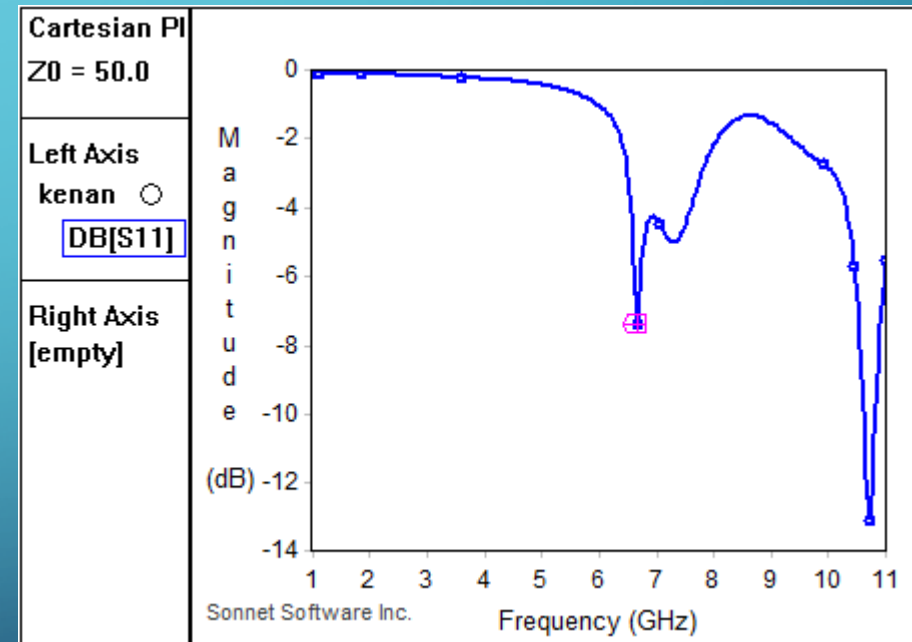
FEEDING POINT DESIGN

- On the bottom left corner of the antenna a port has been added with resistance of 50 Ohms.



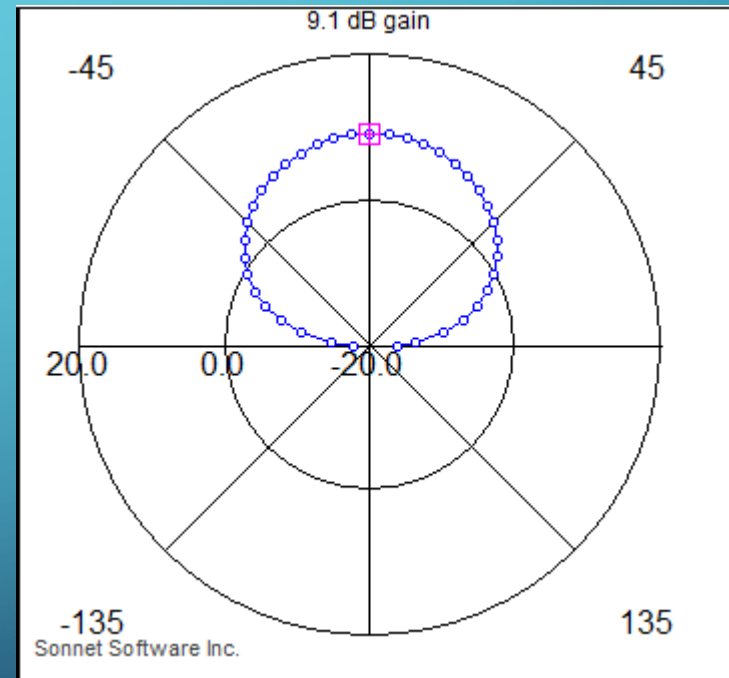
INPUT MATCH OF ANTENNA

S_{11} is -7.9 dB at 6.65 GHz and -13.3 dB at 10.7 GHz as seen in Figure



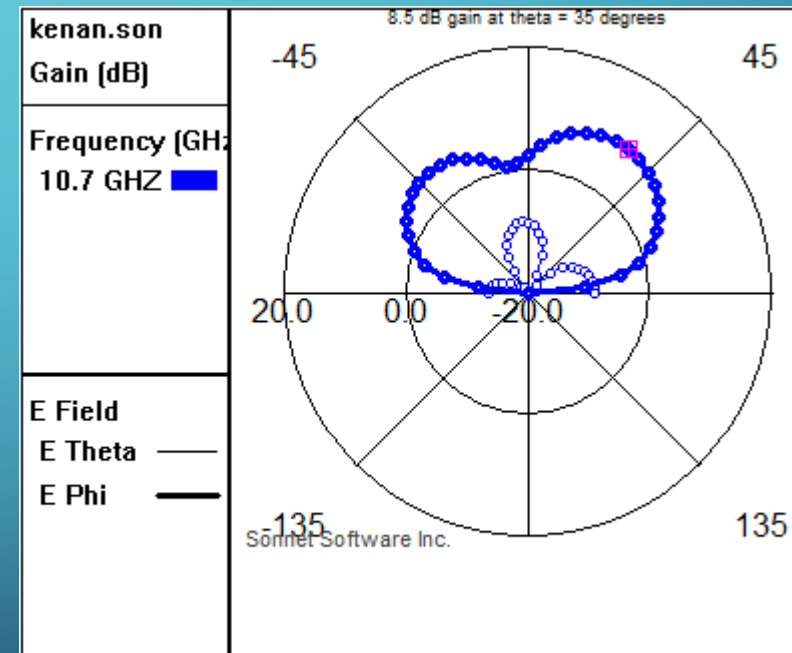
RADIATION PATTERN AT 6.65 GHz

- The gain pattern of the antenna at 9.1 dB at 6.65 GHz is shown in Fig



GA₁N PATTERN OF THE ANTENNA AT 10.7 GHZ

- Maximum gain received is 8.67 dB at 10.73 GHz with air thickness of 11.4 mm



GA₁N VALUES

- The gain values at different operating frequencies and different thicknesses are tabulated in Table.

Thickness (mm)	11	11.4	11.7	10.7	10.5	10,3
Frequency (GHz)	10,70	10,73	10,72	10,65	10,68	10,72
Gain (dB)	7,67	8,67	8,62	8,5	8,02	8,45

CONCLUSION

- In this paper, a rectangular patch antenna was designed and simulated, using Sonnet software. At 10.7 GHz, the gain of the antenna is 8.5 dB at $\theta = 35$ degrees. Gain values at different operating frequencies and different thicknesses are shown in Table 1. The simulation results are final at this stage, thus I will proceed with my research and studies.

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THANK YOU

Please e-mail me for the further questions.

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