San Jose State University
Electrical Engineering 172
Microwave Engineering
Final Project

Slot Antenna: Radiation Pattern Project
Charles Tumbaga
Outline

• The Theory
• Uses for Slot Antenna
• The Design
• Procedure
• Results
• Future Work
• Conclusion
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The Theory

- Waveguide Slot Antennas have horizontal polarization
  - Babinet’s principle

Figure 1: Slot to Dipole Relation [1]
The Theory

• Waveguide cutoff frequencies still apply

• Radiation occurs when slot is not directly in the center of the waveguide

• Allows very high transmission of EM waves

• To excite the wave, there must be a coupling of $\lambda g/4$ for E field
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Uses for Slot Antenna

- Radars Antennas
- Cell Phone Tower
The Design

Dimensions of 2.4 GHz Slot Antenna using WR-430 Parameters
The Design

• Wavelength $\lambda$ is 4.921 in

• Guided Wavelength $\lambda_g$ is 6.000 in using
  
  • $\lambda_g = (\lambda/(1 - (fc/f)))$
  
  • $fc$ is 1.375 GHz and $f$ is 2.4 GHz

• $\lambda_g/4$ distance between open end of waveguide and BNC

• $\lambda_g/4$ distance between closed end and middle of slot

• $3*\lambda_g$ between slot and BNC

• $a=4.3$ in  $b=2.15$ in  $d=15$in
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Azimuth Angle 2-D Pattern
Results

Elevation Angle 2-D Pattern
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Future Work

- HFSS Modeling
- Measure data slower and process data more accurately
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Reference