Input Impedance of Probe-fed RDRA Theoretical & Experimental Investigation

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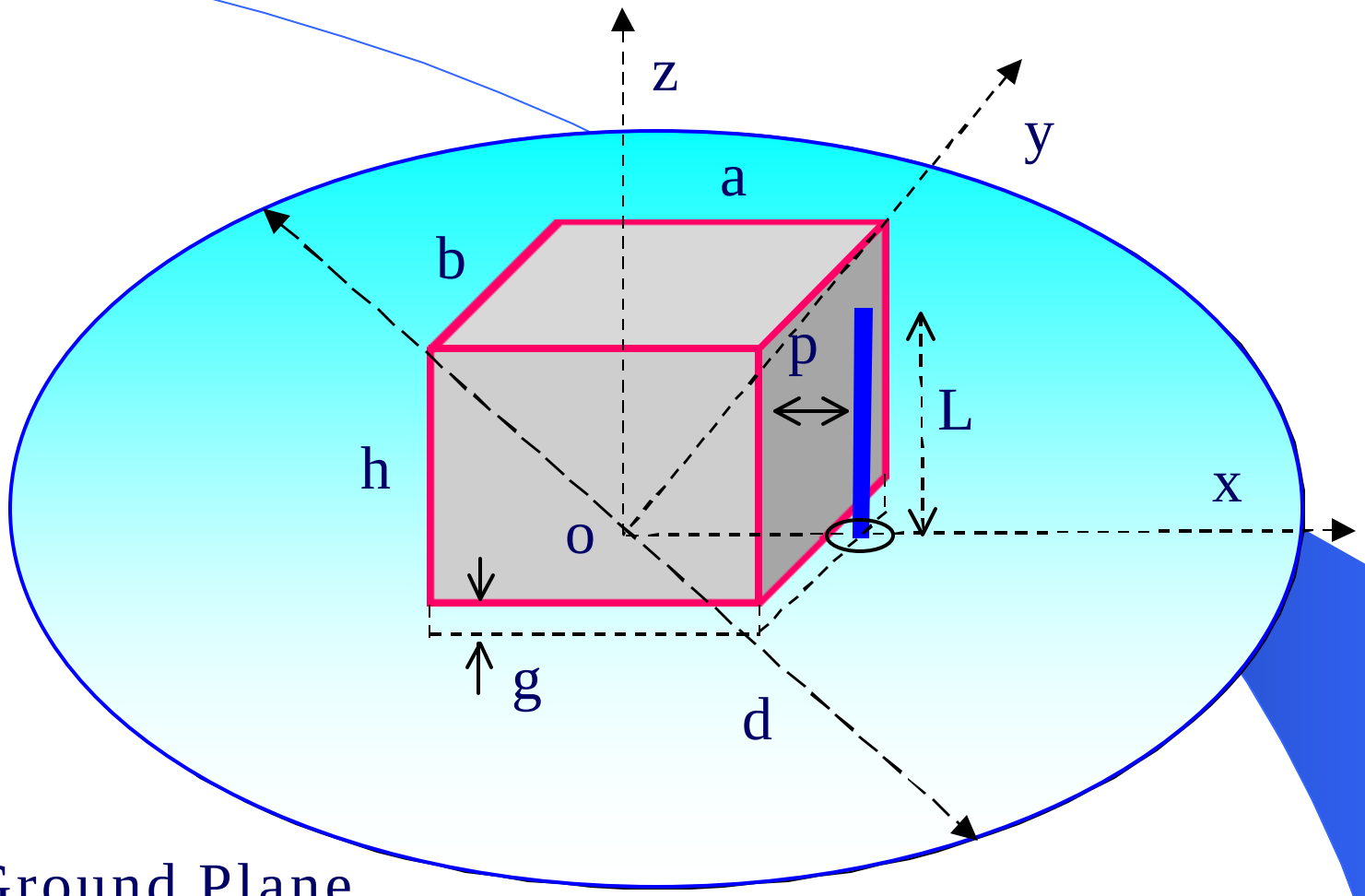
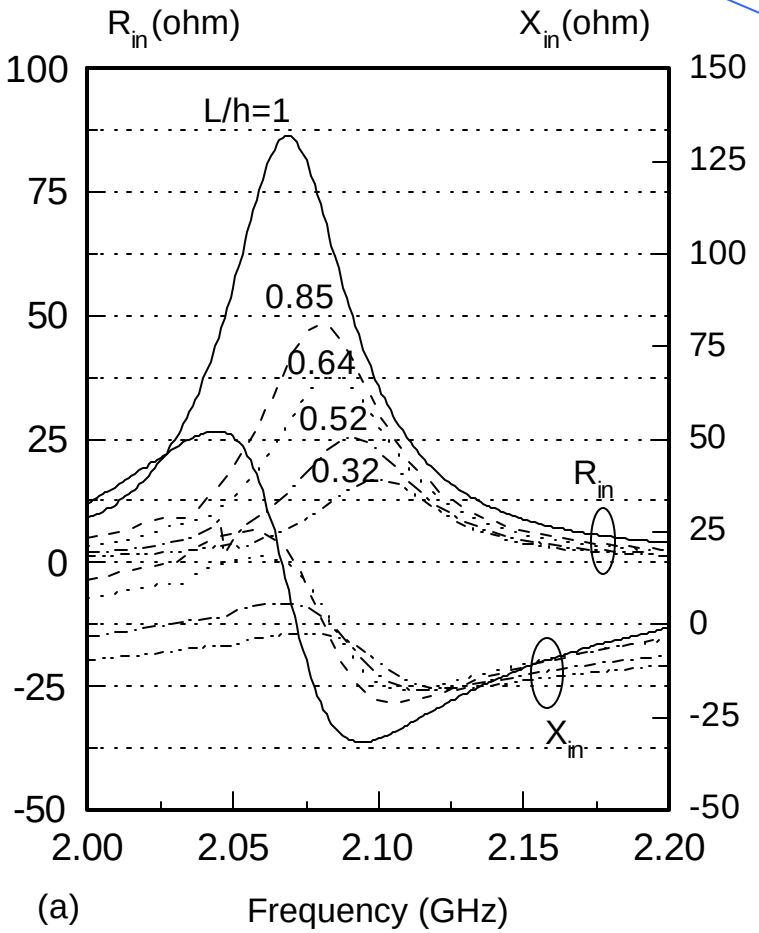


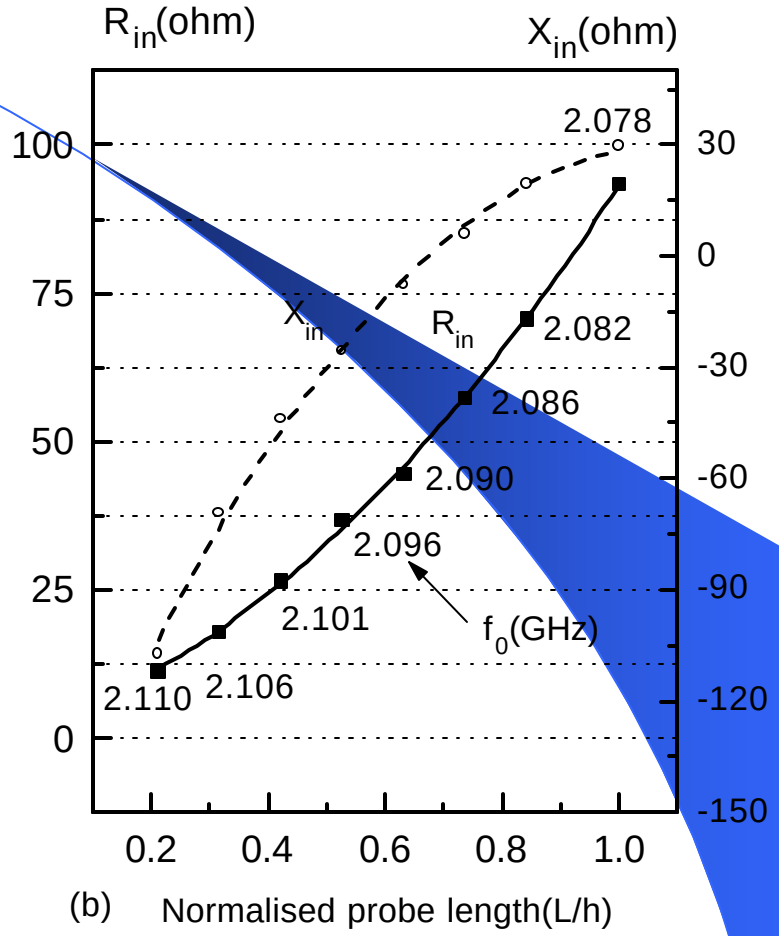
Antenna Structure

Abstract:

- Input Impedance of an RDRA Operated at TE^{y}_{111} Mode is Studied Numerically and Experimentally
- Antenna is Simulated Using HFSS
- The effects of Probe Length and Gap between Probe and Resonator on the input Impedance are Investigated
- A few Experimental set-ups were examined and the Antenna Parameters were measured
- Results show Good agreement between Theory and Experiments

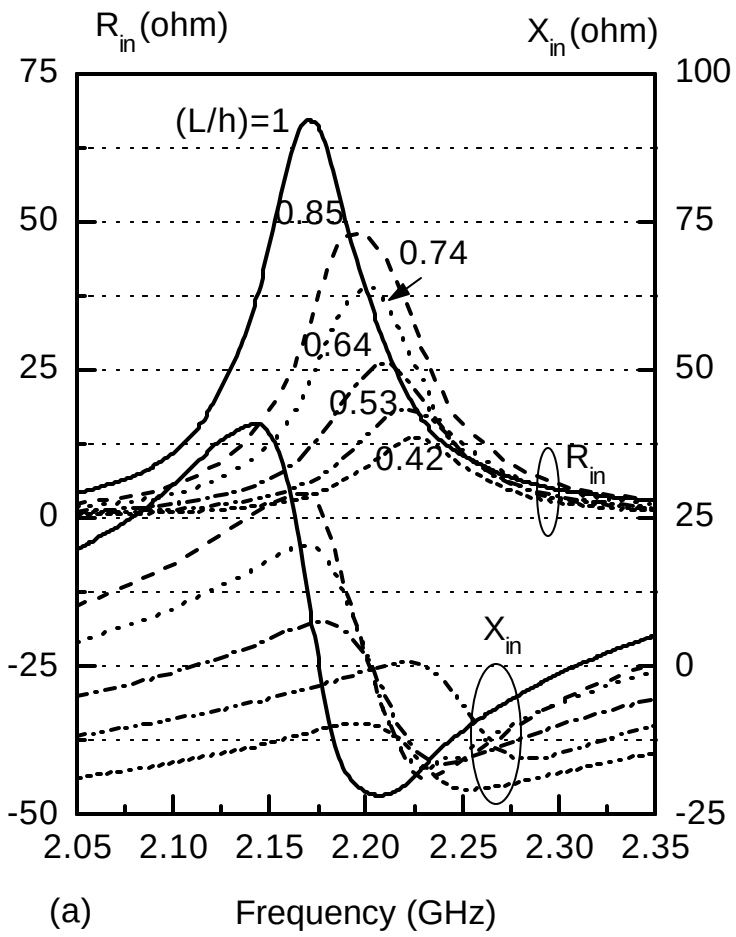
Numerical Results:

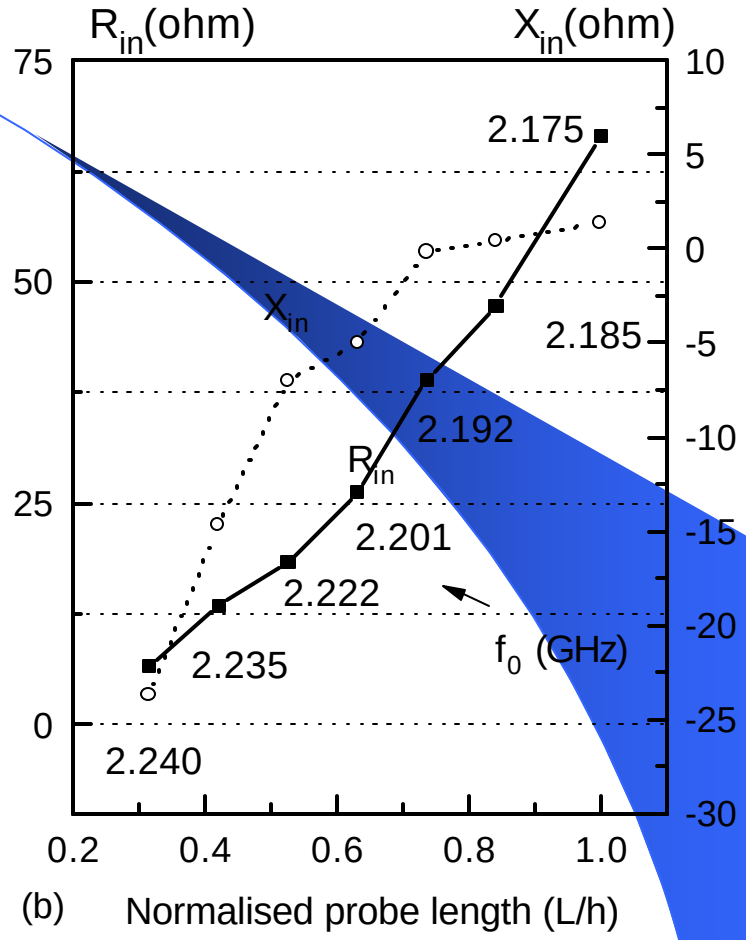




Simulated Results of Input Impedance of RDRA

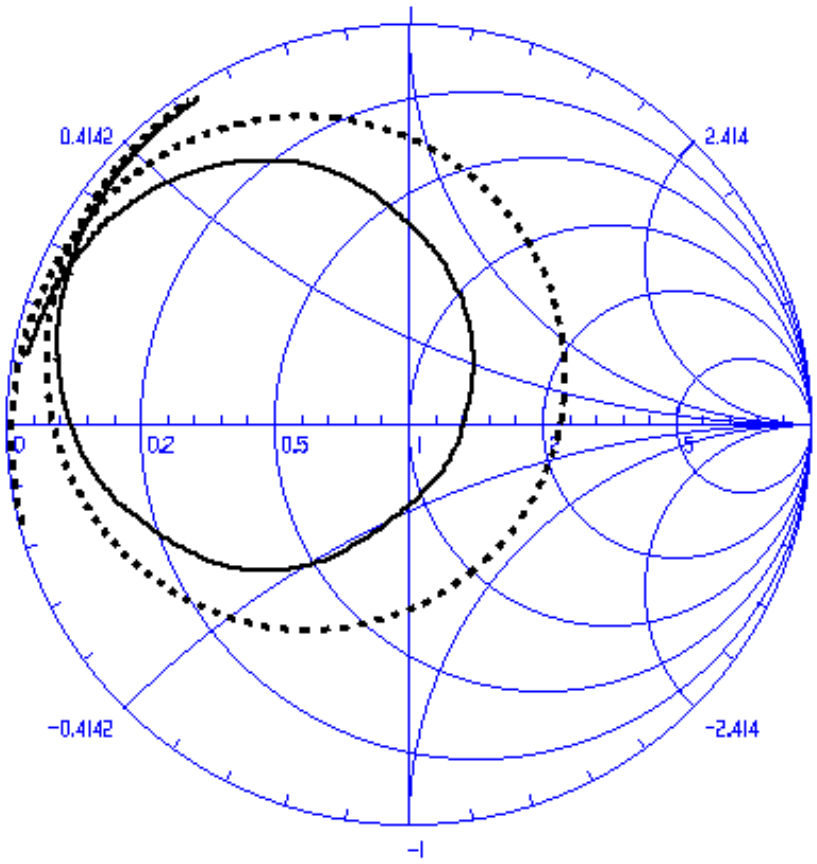
Measured Results:



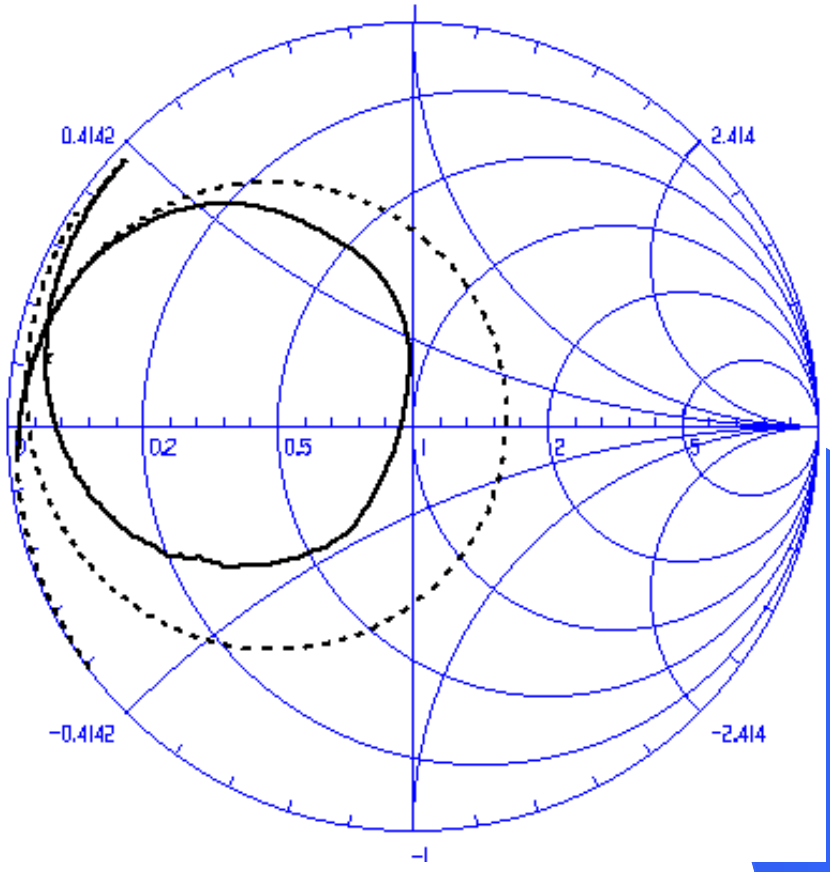


Experimental Results of the Input Impedance of RDRA

Input Reflection Coefficient (1):

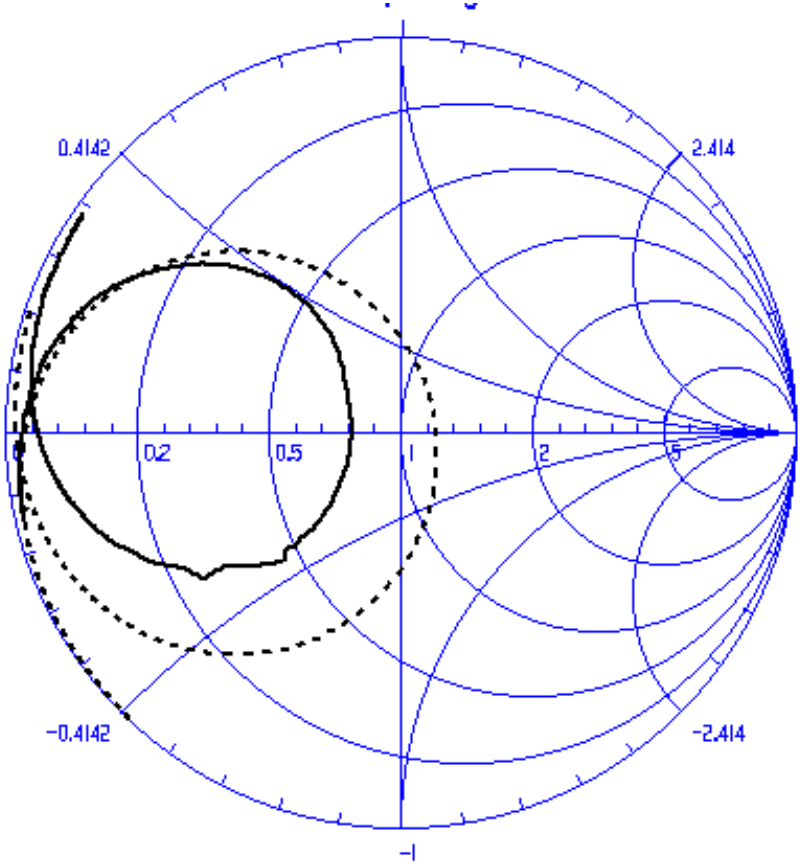


a) L/h = 1

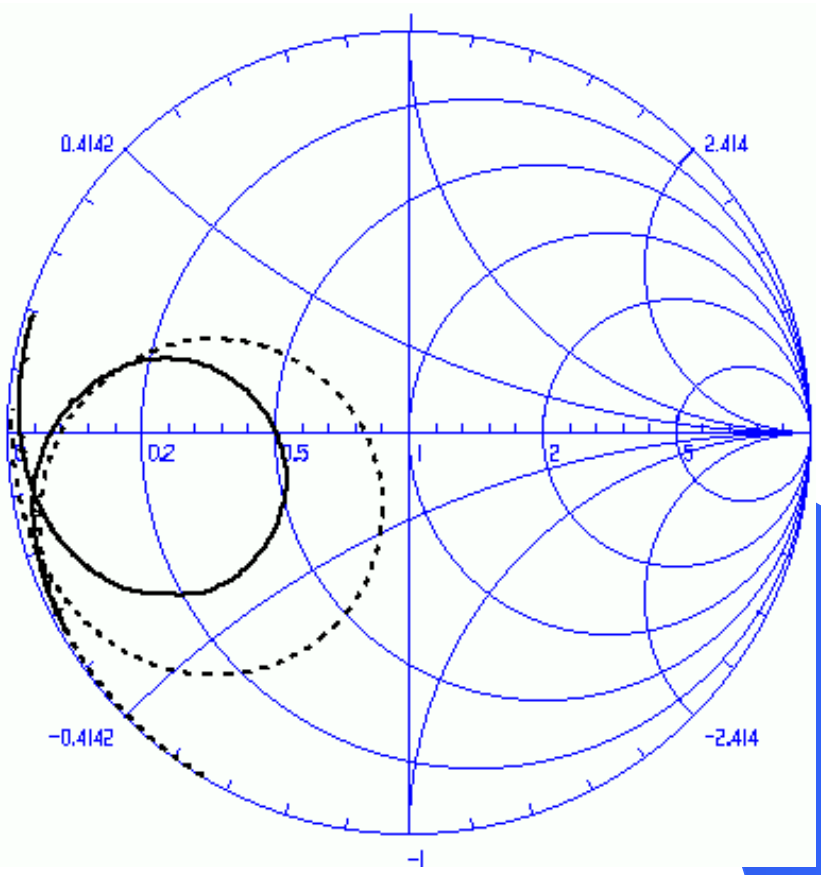


b) L/h = 0.84

Input Reflection Coefficient (2):



c) L/h = 0.74

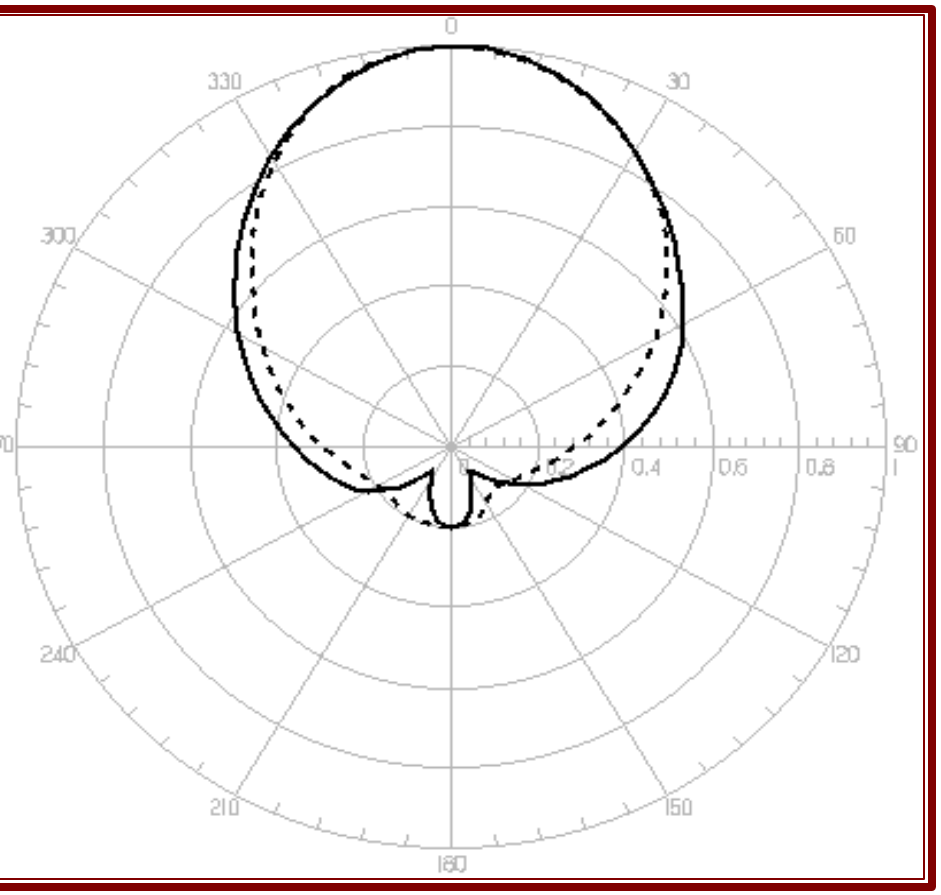


d) L/h = 0.64

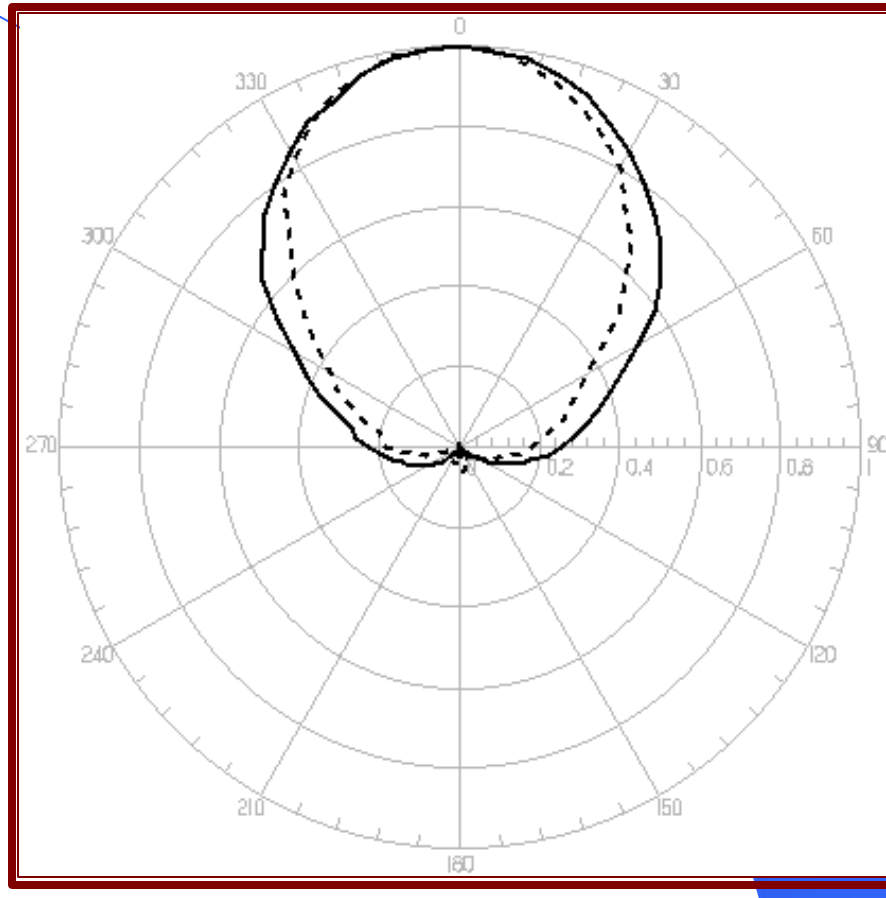
Measured and Simulated Reflection Coefficient versus frequency & different Normalised Probe Length

Radiation Patterns:

(Finite Circular Ground Plane)



Numerical Results



Experimental Results

The Simulated Radiation Patterns agree well with Experimental one

Numerical Results:

- TE_{111} Mode is strongly Exited at *(L/h)>0.5*
- Resonance Frequency is Decreased with Increasing Probe Length
- Input Impedance is increased with probe length
- Best Matching point at *(L/h)=0.7*
- Better Matching is obtained Considering a Small Gap

Experimental Results:

- TE_{111} Mode is Strongly Exited at *(L/h)>0.5*
- Resonance Frequency is Decreased with Increasing Probe Length
- Input Impedance is increased with probe length
- Best Matching point at *(L/h)=0.85*

Conclusions :

- Numerical & Experimental Study is Presented
- Input Impedance were Measured
- Mode of Interest is Strongly Excited at *(L/h)>0.5*
- Predicted Input Impedance agrees well with Experimental Results
- Agreement could be better Considering a Small Gap
- Probe length is Key Factor for Impedance Matching