

# **X-Band Substrate Integrated Waveguide Cavity-backed Patch Antenna**

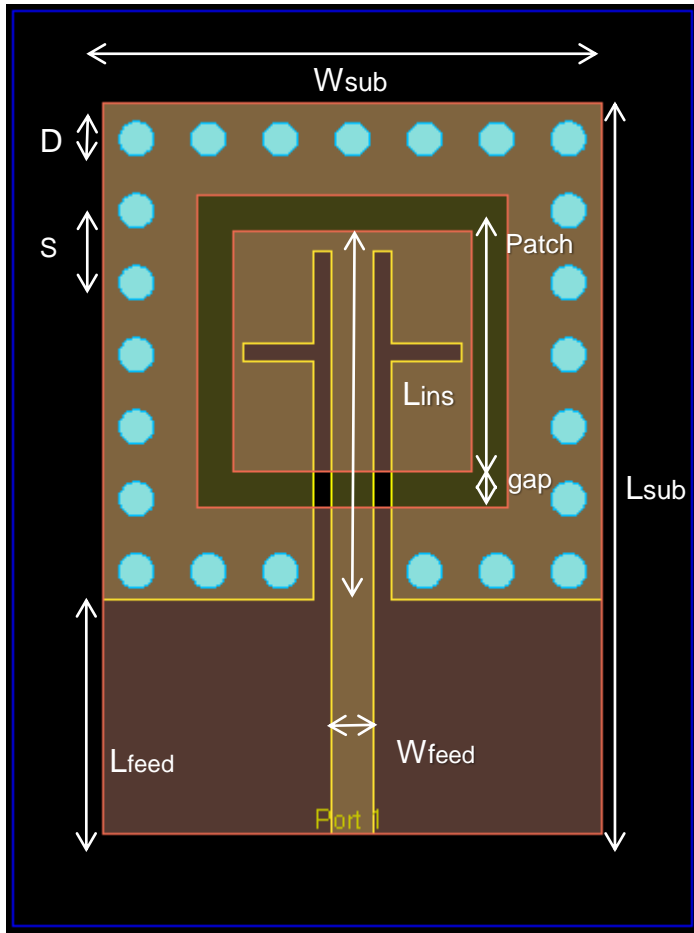
Anil Pandey

# X-Band Substrate Integrated Waveguide Cavity-backed Patch Antenna

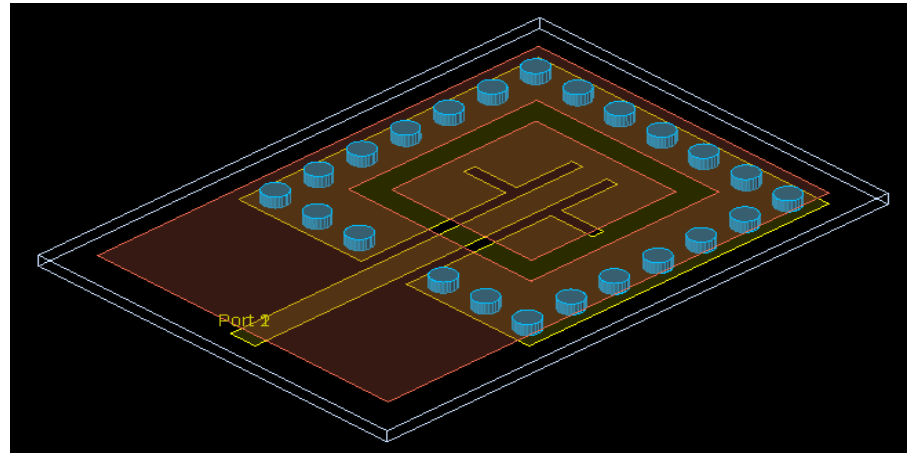
The application is focused on designing a substrate integrated waveguide (SIW) cavity-backed patch antenna . The cavity-backed antenna structure permits to overcome potential problems such as heat dissipation and unwanted surface wave modes Full-wave FEM-based analysis is used to design the antenna, whose frequency responses have been evaluated for different values of certain geometrical parameters. Compact, single substrate prototypes are presented. These low cost implementations could be useful in radar and communication applications.

The SIW technology allows to make cavity-backed antennas. These kinds of antennas have better performance because suppress the propagation of surface wave, increase the bandwidth, decrease end-fire radiation, decrease cross-polarization radiation and increase the applicable frequency range.

# SIW Cavity backed Antenna Design Parameters

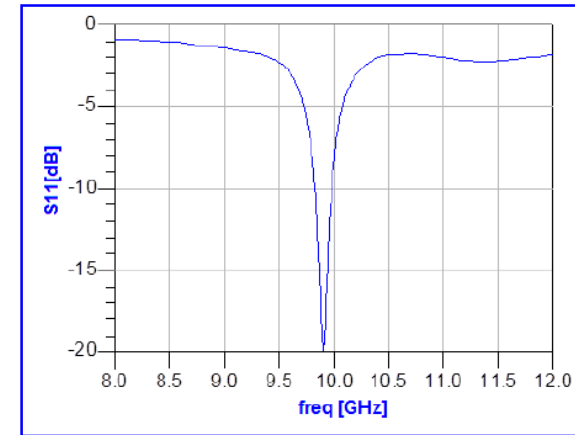
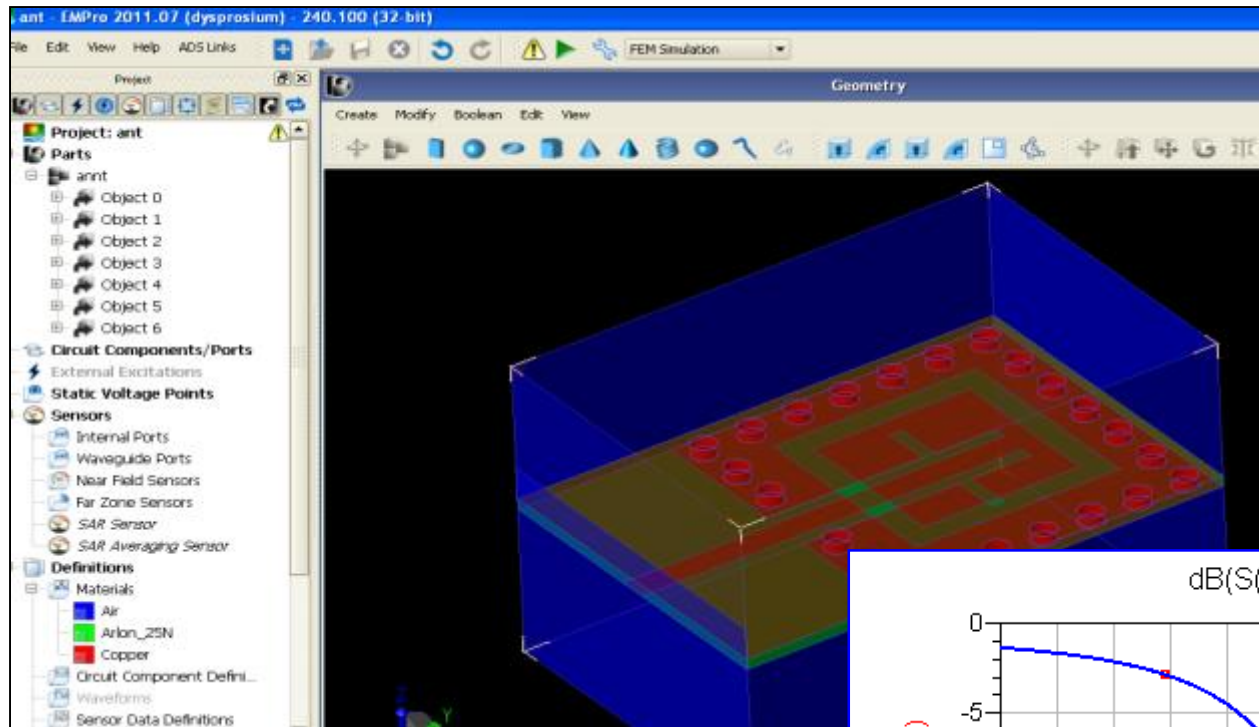


**Substrate:** Arlon 25 N  
 $\epsilon_r$  : 3.38 ,  $\tan \delta$  : 0.0025  
 H (thickness) : 0.508 mm



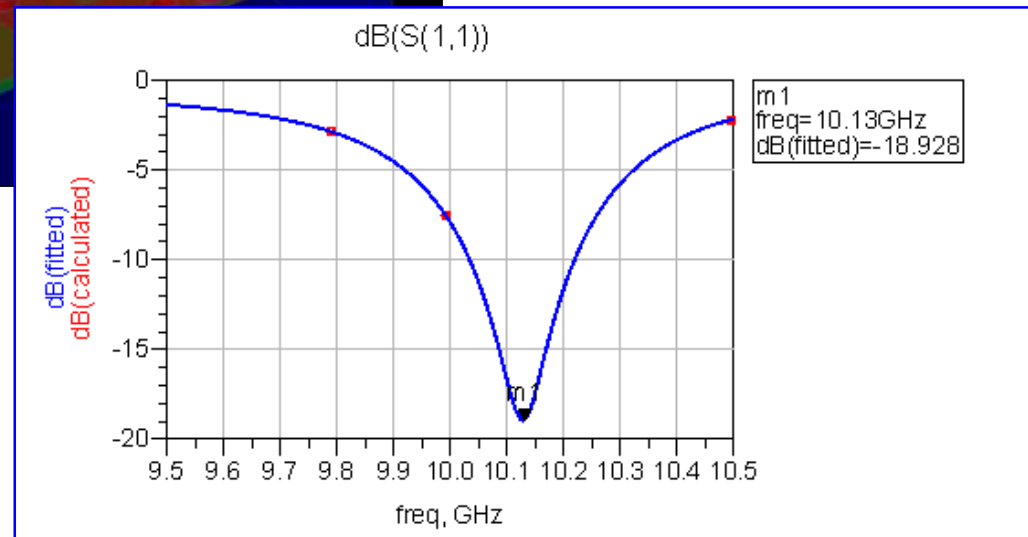
Dimensions of the cavity backed antenna			
Symbol	Value(mm)	Symbol	Value(mm)
Wsub	13.8	Wfeed	1.16
Lsub	20.3	Lfeed	6.5
D	1	Lslot	1.9-2.1
s	2	Wslot	0.5
Lind	9.5-9.9	Patch	6.65
space	0.5	gap	1

# SIW Cavity backed Antenna Design in EMPro

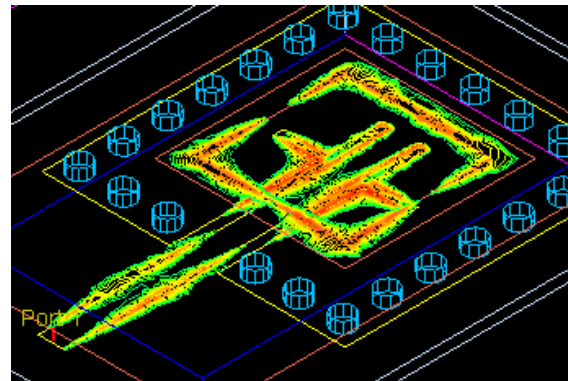
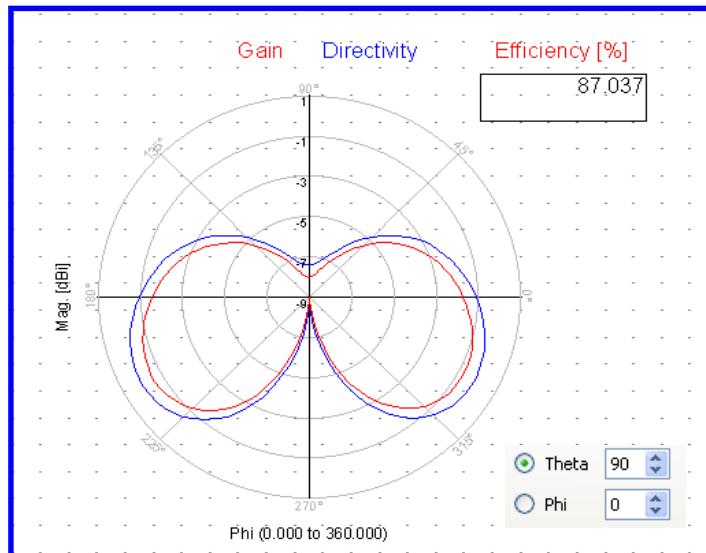
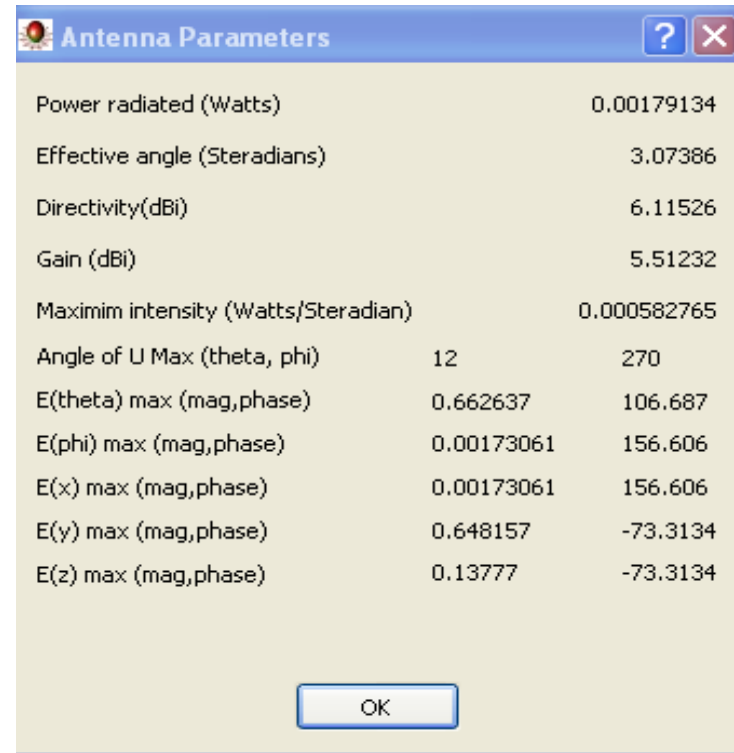
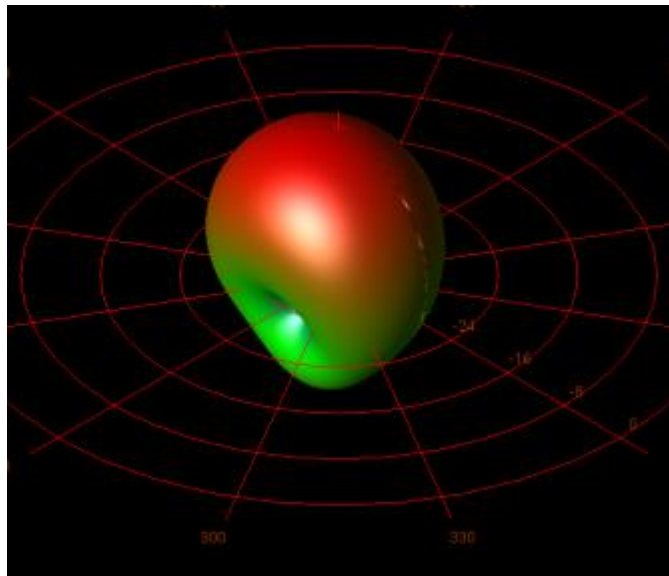


Measured Data

Resonance freq- 10.15 GHz  
Bandwidth (10 dB)- 190 MHz  
Simulation Time-  
Process Size  
Number of unknowns-



# Radiation Pattern Plot



Antenna Parameters

Contour Plot

# 2D Far Field Cuts

