

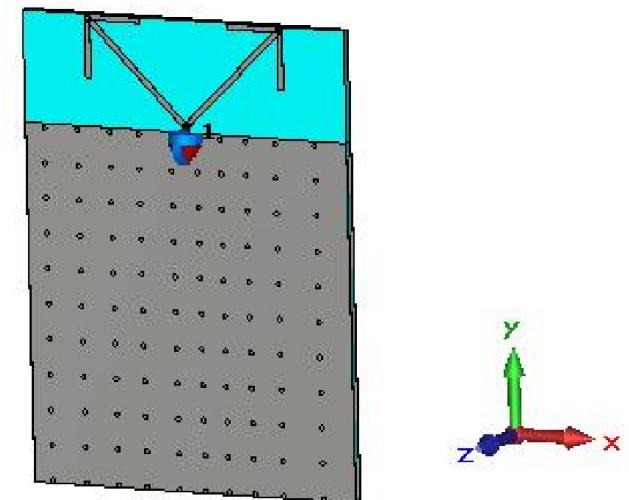
# SW TECHNOLOGY Ltd.

**Purpose: to prove the proposed 2.4G  
antenna has better performance**

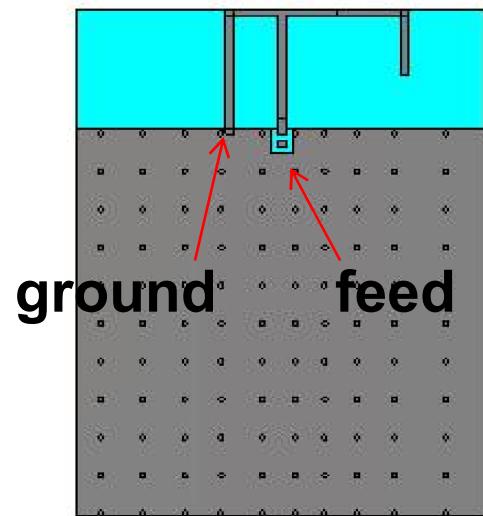
**JACKY HU/2015-11-23**

# Antenna specification/requirement

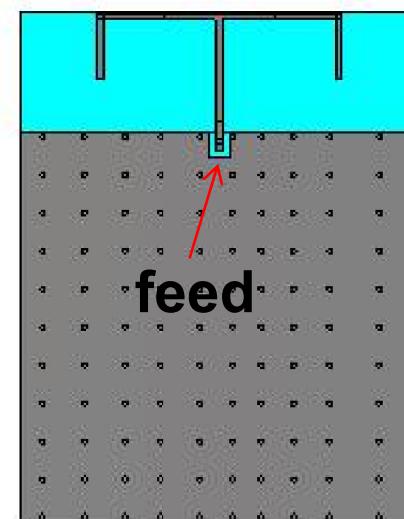
- return loss:  $S_{11} \leq -6\text{dB}$
- antenna gain: high and flat in entire BT band
- antenna efficiency:  $\geq 60\% \text{ (-2.2dB)}$
- radiation pattern flatness:  $\leq 1.5\text{dB}$ , uniform radiation pattern in horizontal (XZ) plane



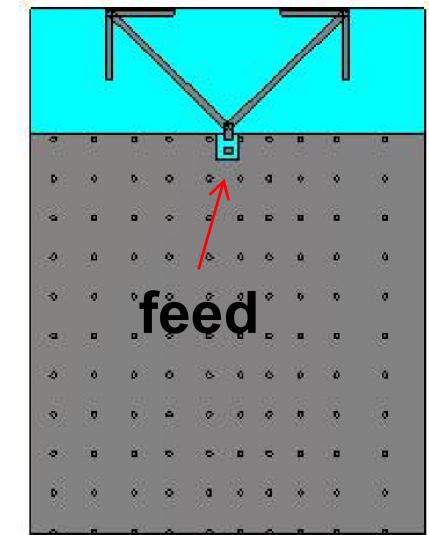
## Traditional & proposed 2.4G Antennas



ground feed



feed



feed

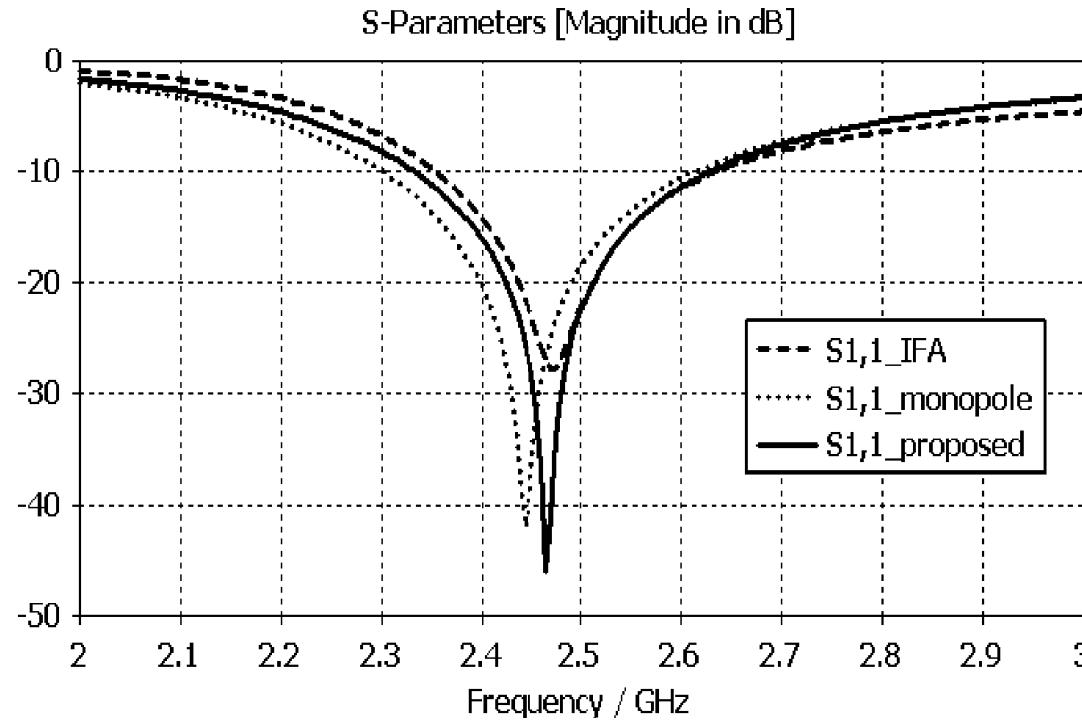
IFA

monopole

proposed

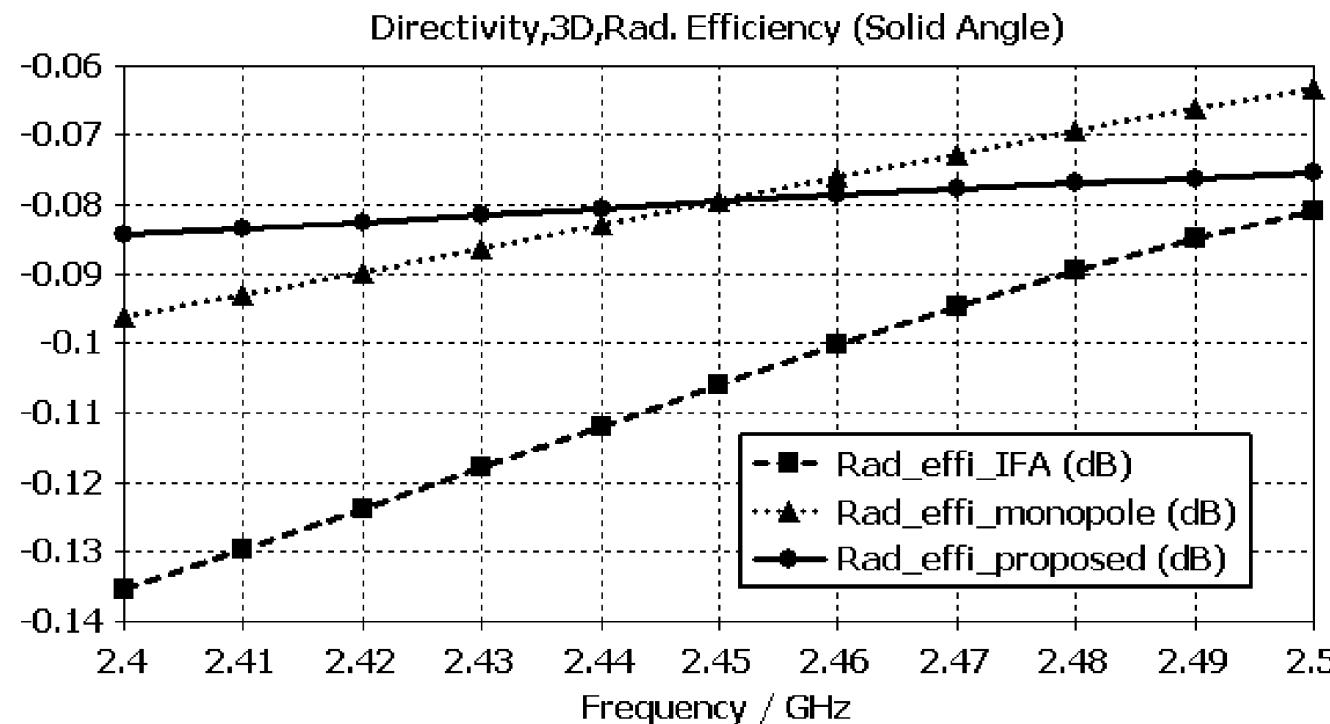
- ◆ Traditional type 2.4G antenna: IFA (inverted-F) and monopole antennas
- ◆ Proposed antenna: V-type antenna

## Comparison of different antennas in S11



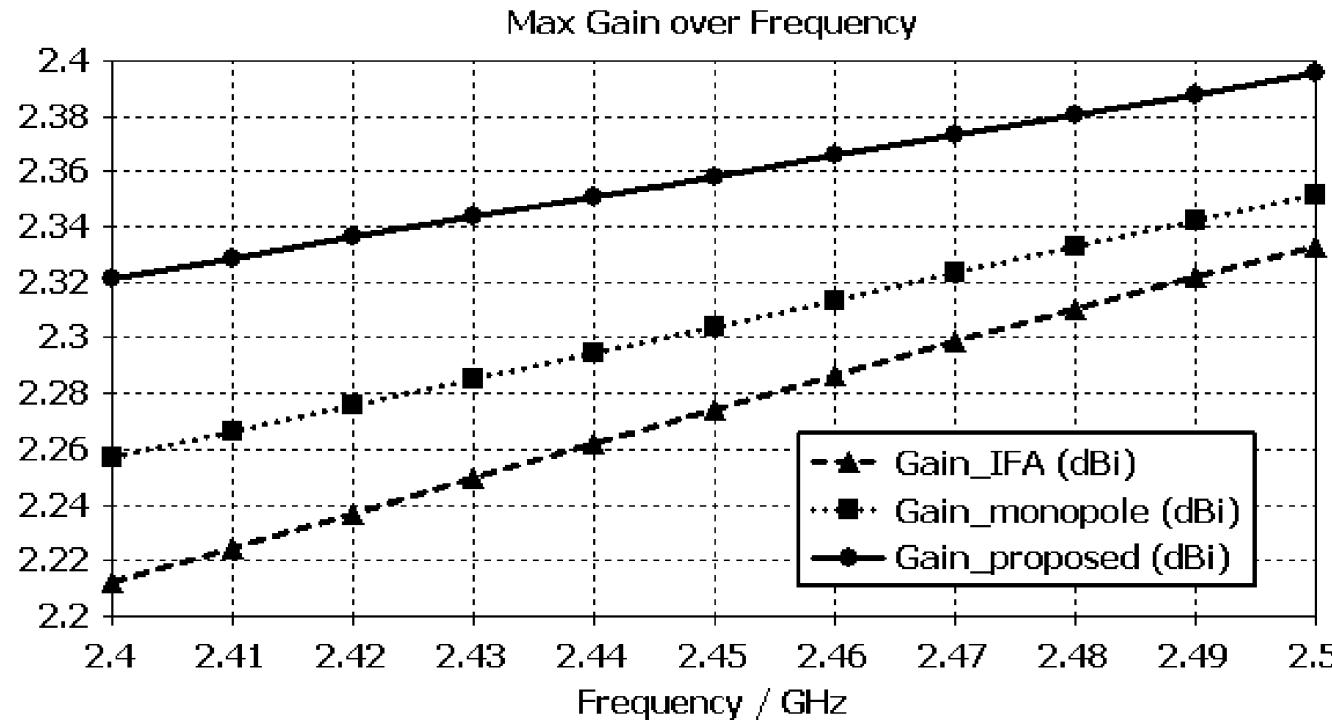
- ◆ Similar antenna performance in S11 is obtained

## Comparison of different antennas in antenna radiation efficiency



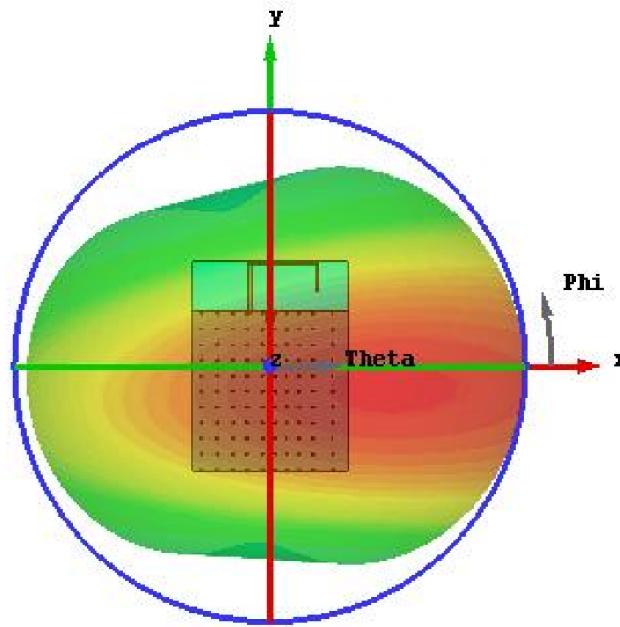
- ◆ In the entire 2.4G band (2.4-2.48GHz), the antenna efficiency of the proposed antenna is better than that of IFA antenna
- ◆ In particular, the antenna radiation efficiency of the proposed antenna is more flat or uniform than that of the monopole antenna, which leads to a better overall antenna performance

## Comparison of different antennas in antenna gain

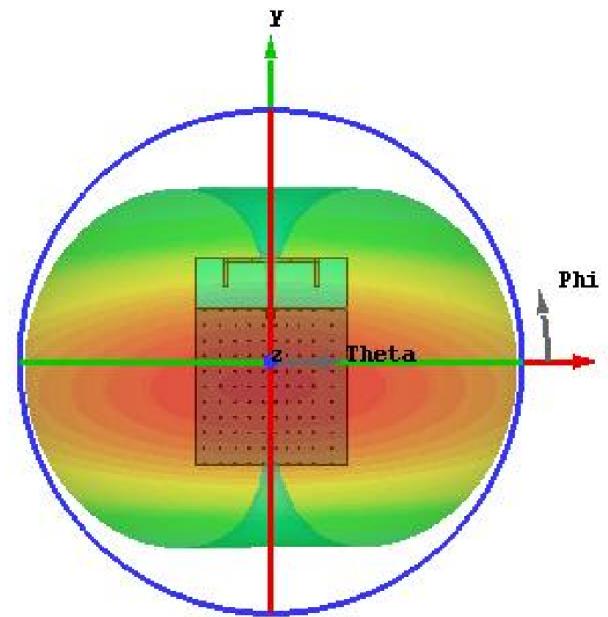


- ◆ In the entire 2.4G band (2.4-2.48GHz), the antenna gain of the proposed antenna is better than that of IFA and monopole antennas

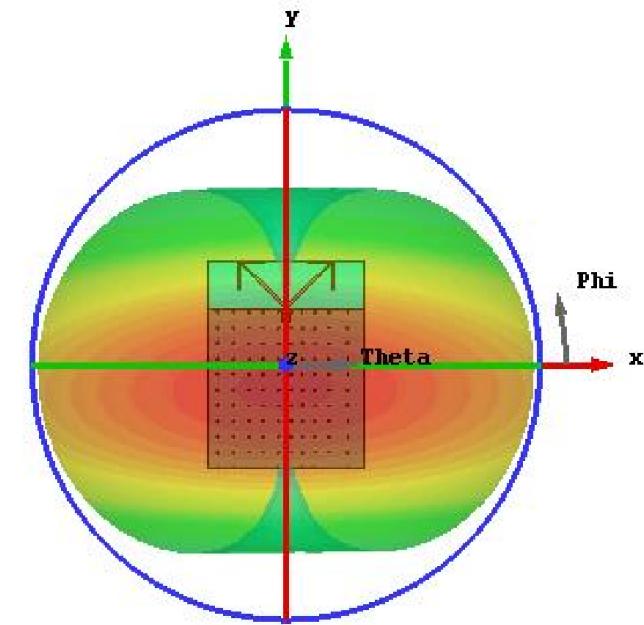
## Comparison of different antennas in 3D radiation pattern at 2.44GHz



IFA:  
Worse radiation pattern

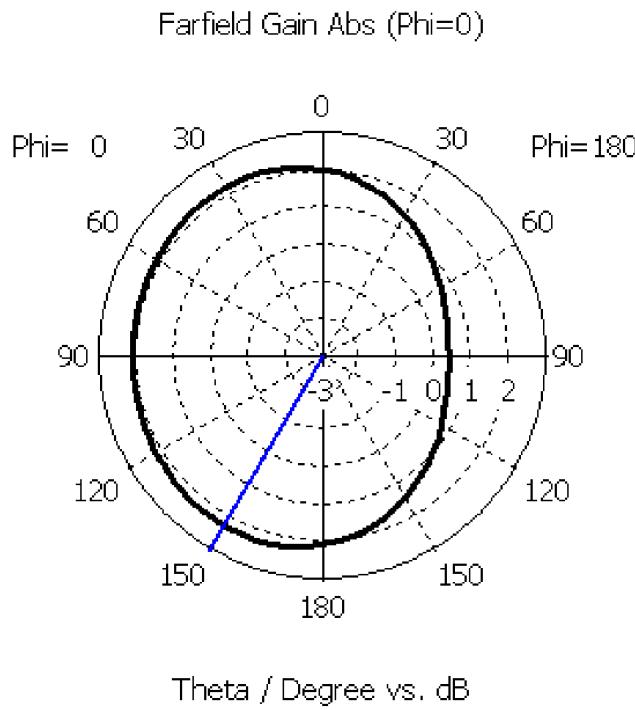


Monopole:  
Good radiation pattern

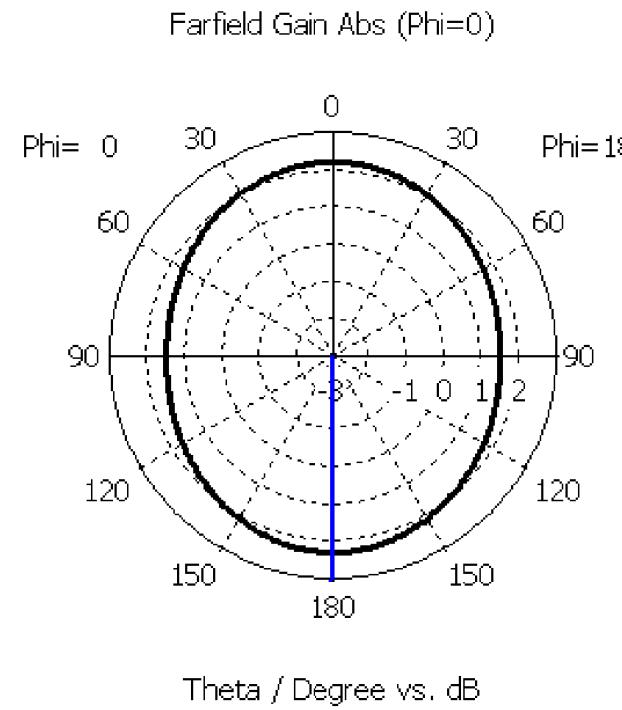


Proposed:  
Better radiation pattern

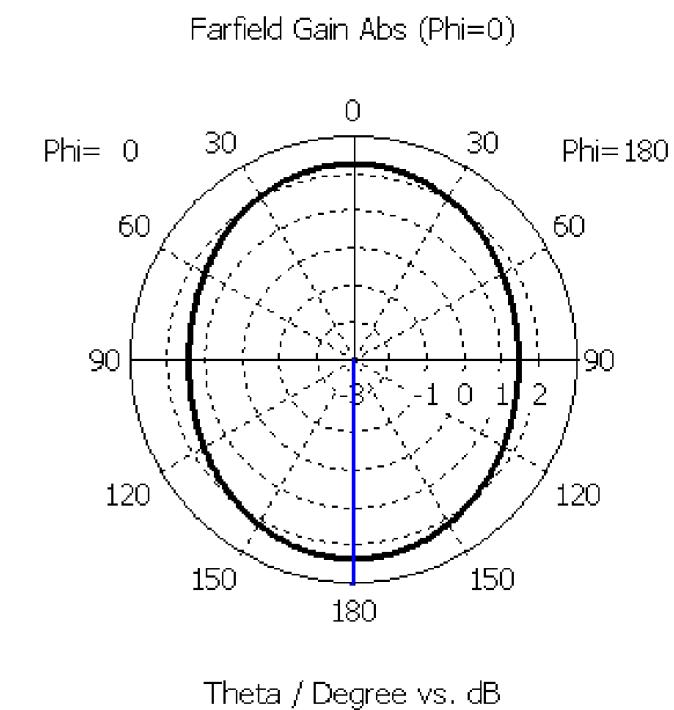
## Comparison of different antennas in XZ-plane radiation pattern at 2.44GHz



IFA:  
Worse radiation pattern



Monopole:  
Good radiation pattern

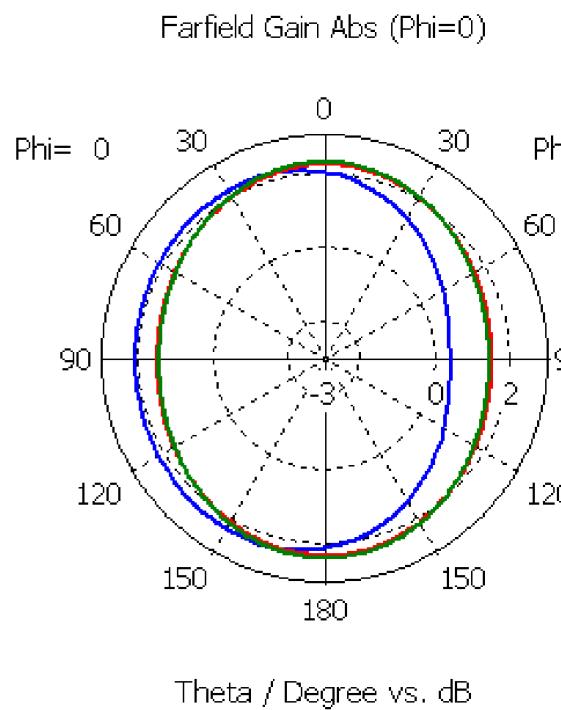


Proposed:  
Good radiation pattern

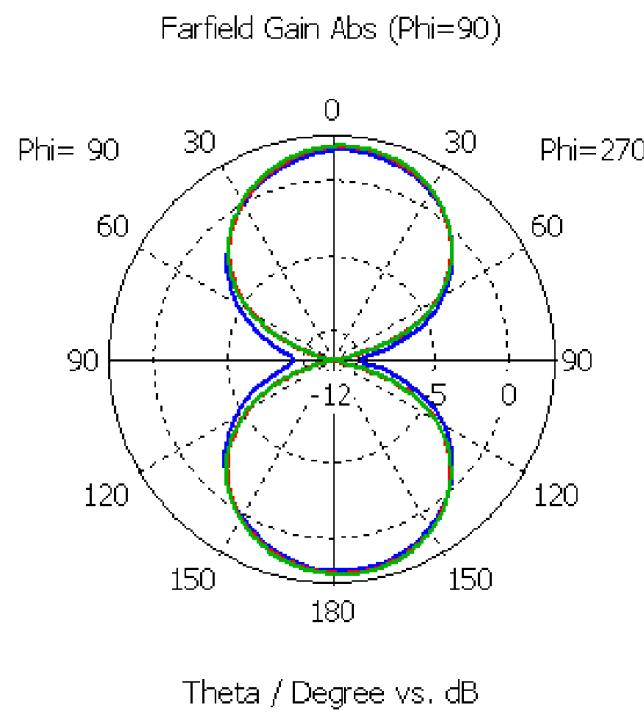
- ◆ XZ or horizontal plane is the plane that we should care about. The good radiation pattern in this plane means that the antenna will have better performance.

# Comparison of different antennas in XZ, YZ, and XY-plane radiation pattern at 2.44GHz

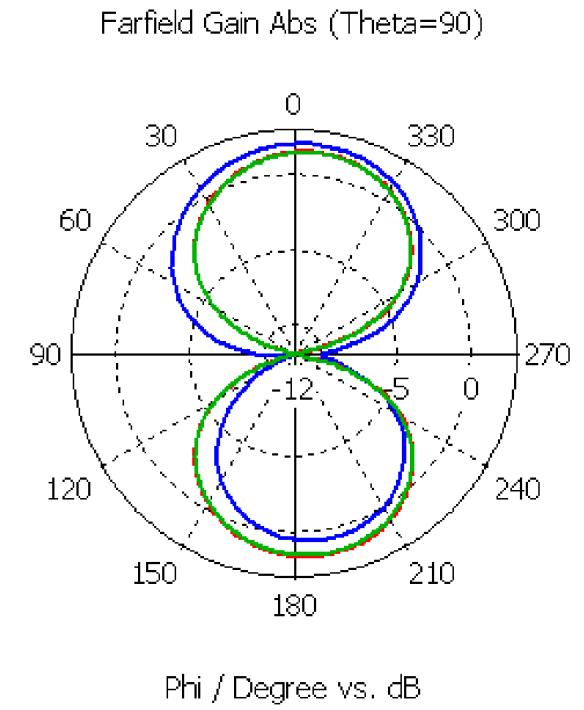
XZ plane



YZ plane

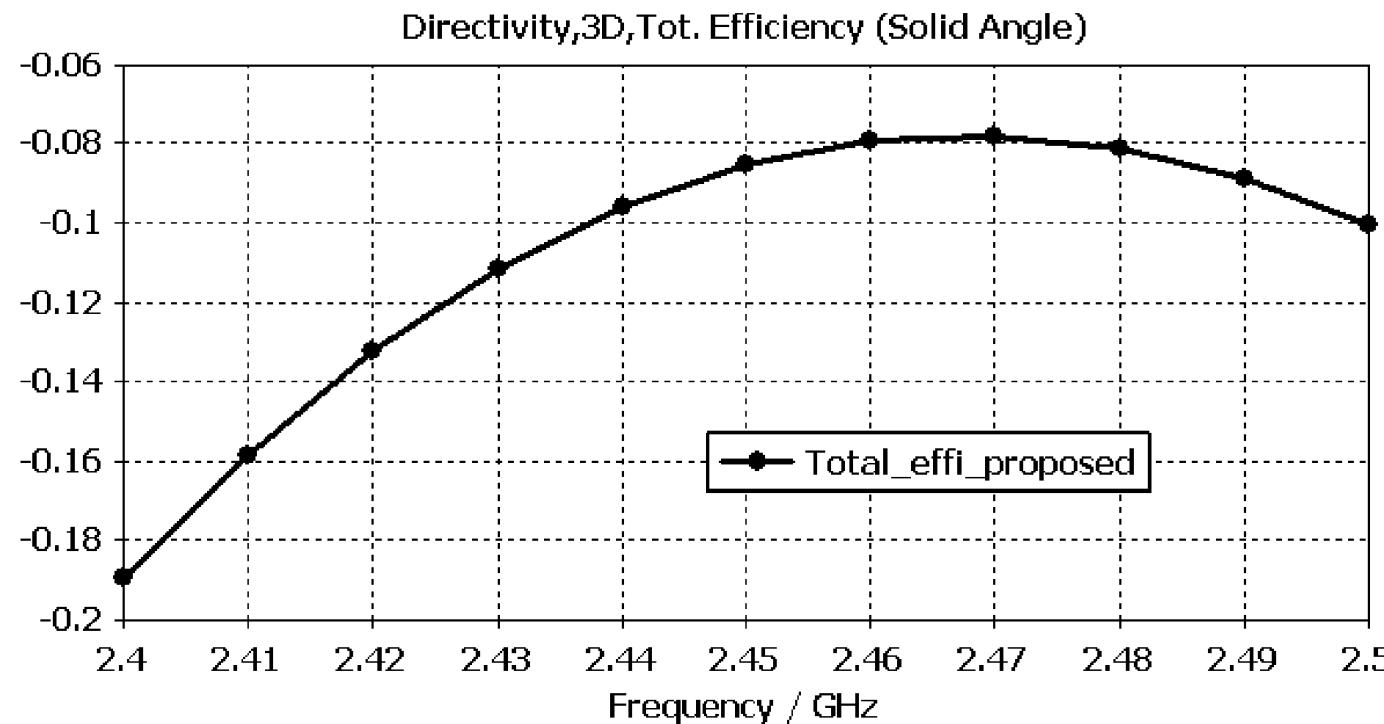


XY plane

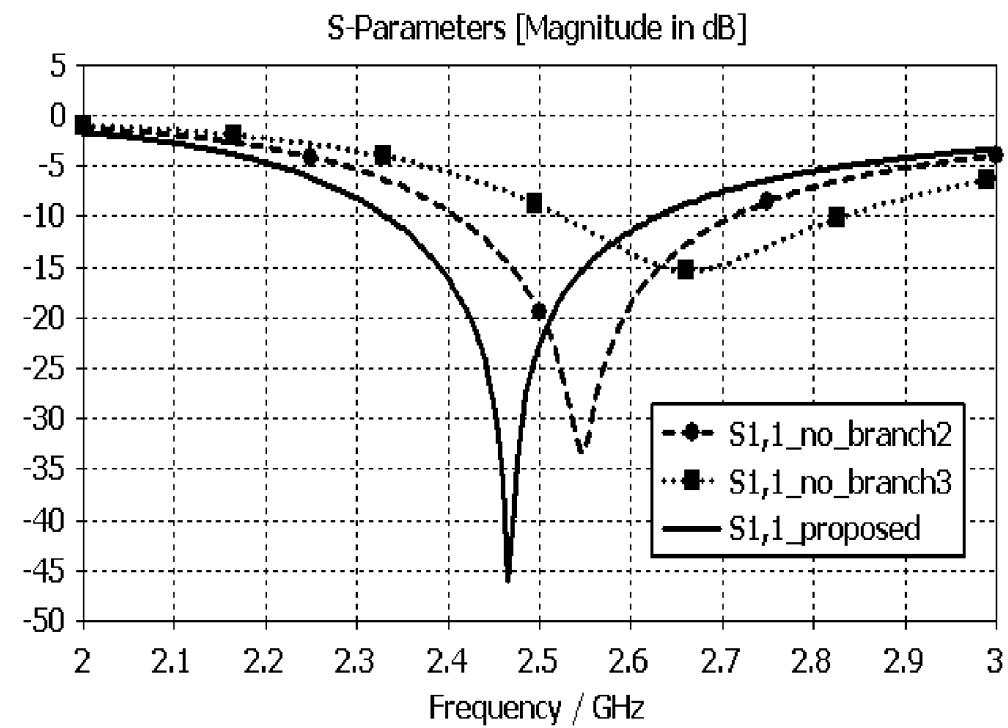
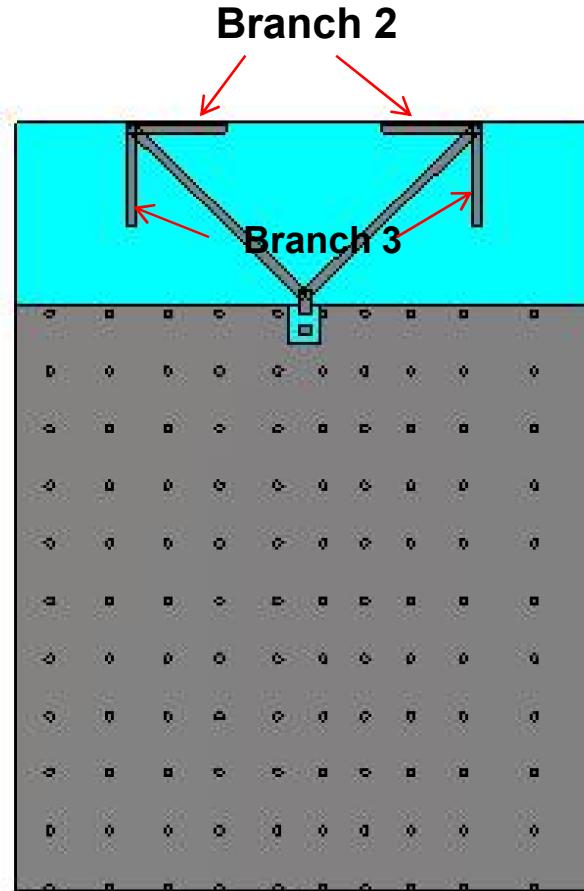


- farfield (f=2.44)\_IFA
- farfield (f=2.44)\_monopole
- farfield (f=2.44)\_proposed

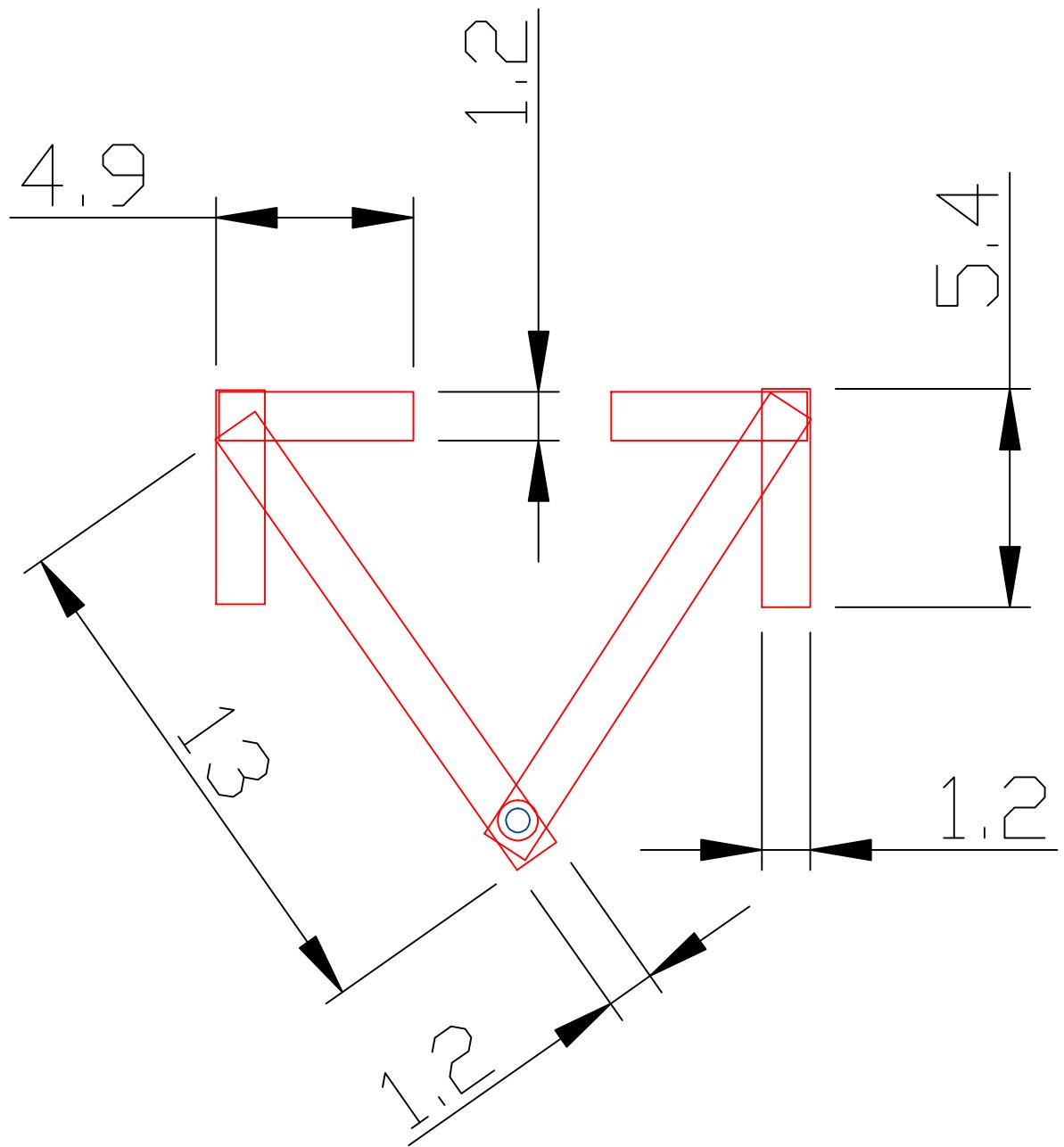
# Total Antenna Efficiency of Proposed antenna



# Parameter study of proposed antenna



- ◆ branches 2&3 are used to reduce the size of V-type antenna or to tune the antenna resonance frequency; and to fine tune the impedance matching of the antenna



## Conclusions

- ◆ the proposed V-type antenna has better performance than IFA and monopole antennas because:
  - it has better antenna gain and radiation efficiency
    - in the entire band the gain of proposed antenna has better flatness than that of monopole antenna
  - in the horizontal plane, the radiation pattern of the proposed antenna is better than that of IFA antenna

THE END