EE609 Project

Group No.-18

—

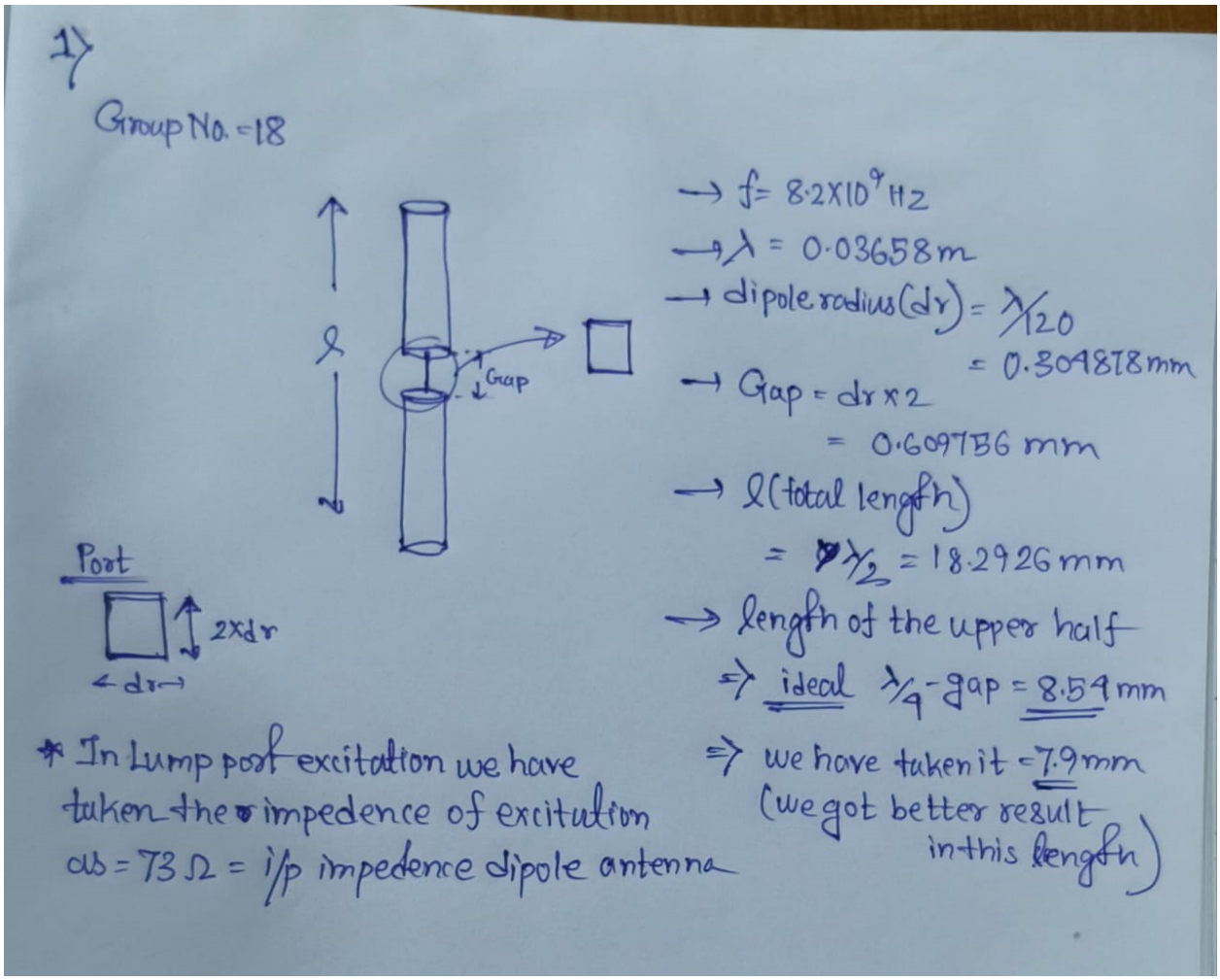
Kadiyala Sai Susrush (210070038)
Khokale Raviraj Dadaram (21d070037)
Om Unhale (210070058)
Soumyadeep Jana(21D070075)

Problem Statement

1. Design and Simulate a halfwave dipole antenna operating at a resonant frequency of [1 + (Group.no)*0.4] GHz. Calculate the appropriate length, radius and gap length.

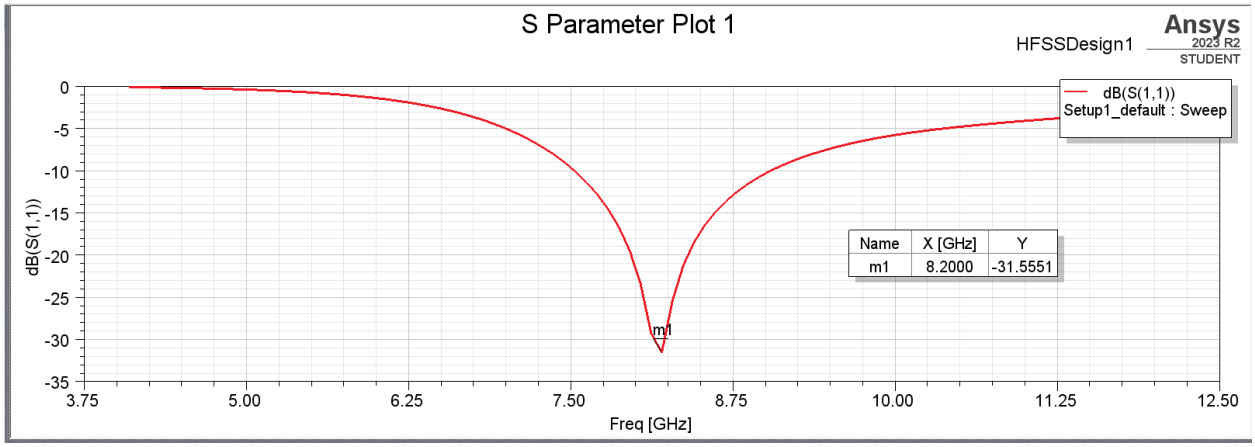
Specifications

The material of dipole is copper.We have taken the measurements as follows

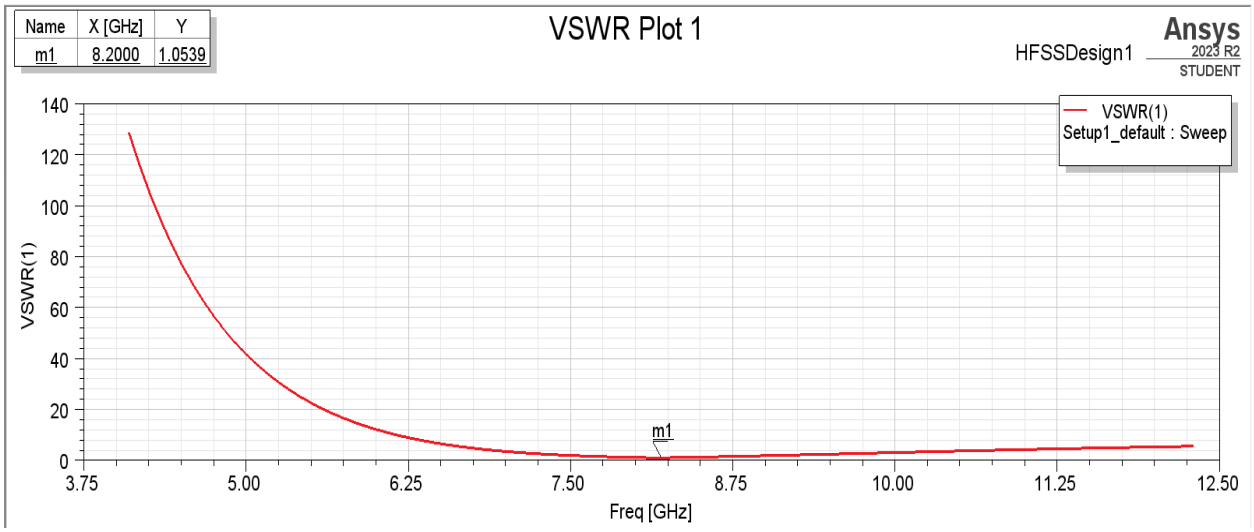


Results

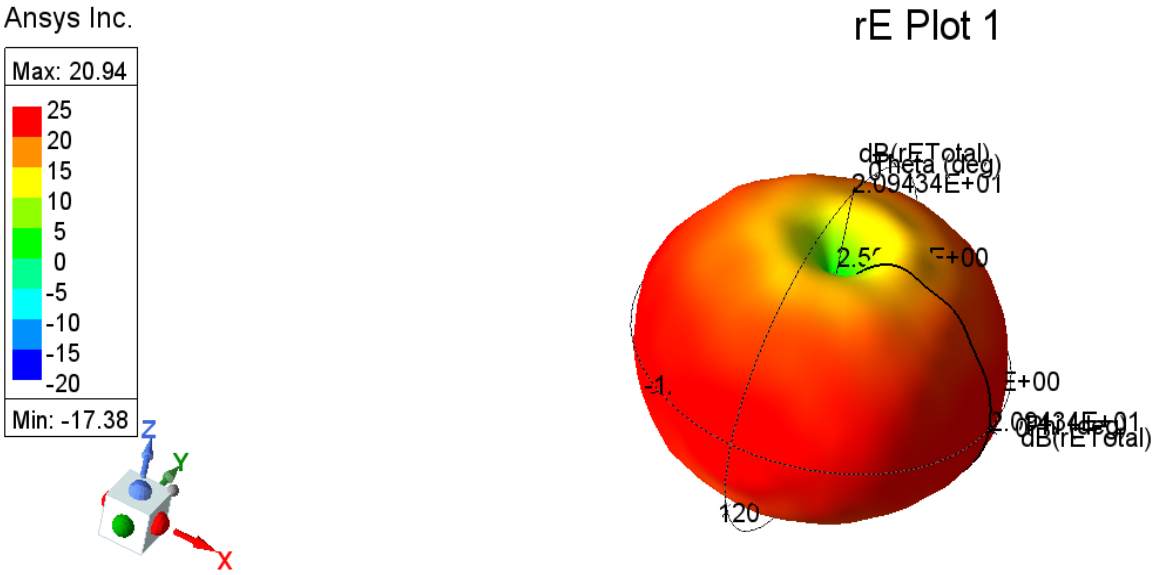
I. S11 (dB) vs Freq



II. VSWR vs frequency



III. 3D radiation pattern



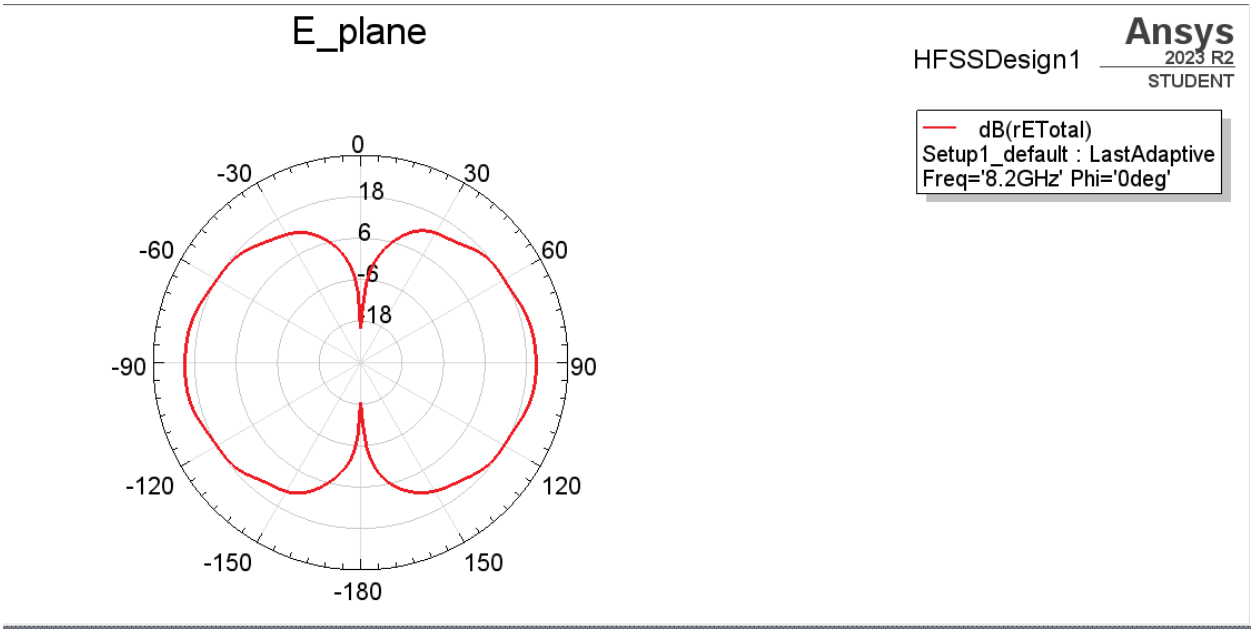
IV. E-plane and H-plane radiation pattern

E plane is XZ plane so we put phi = 0 and theta = 0 to 360

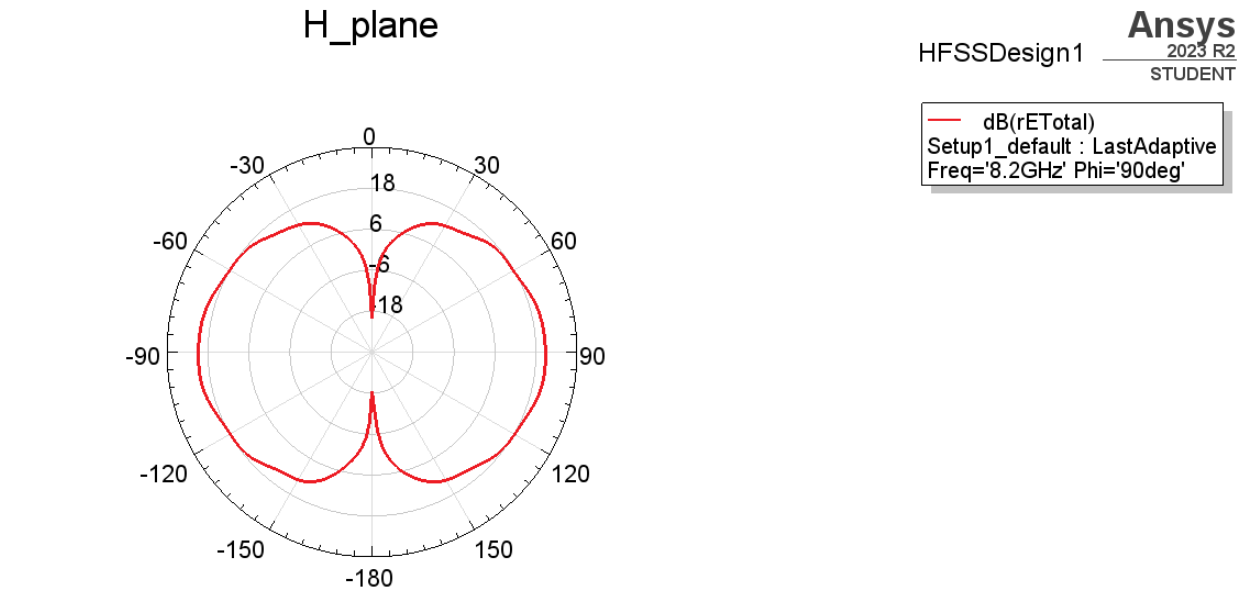
H plane is YZ plane so we put phi = 90 and theta = 0 to 360

We got following radiation pattern

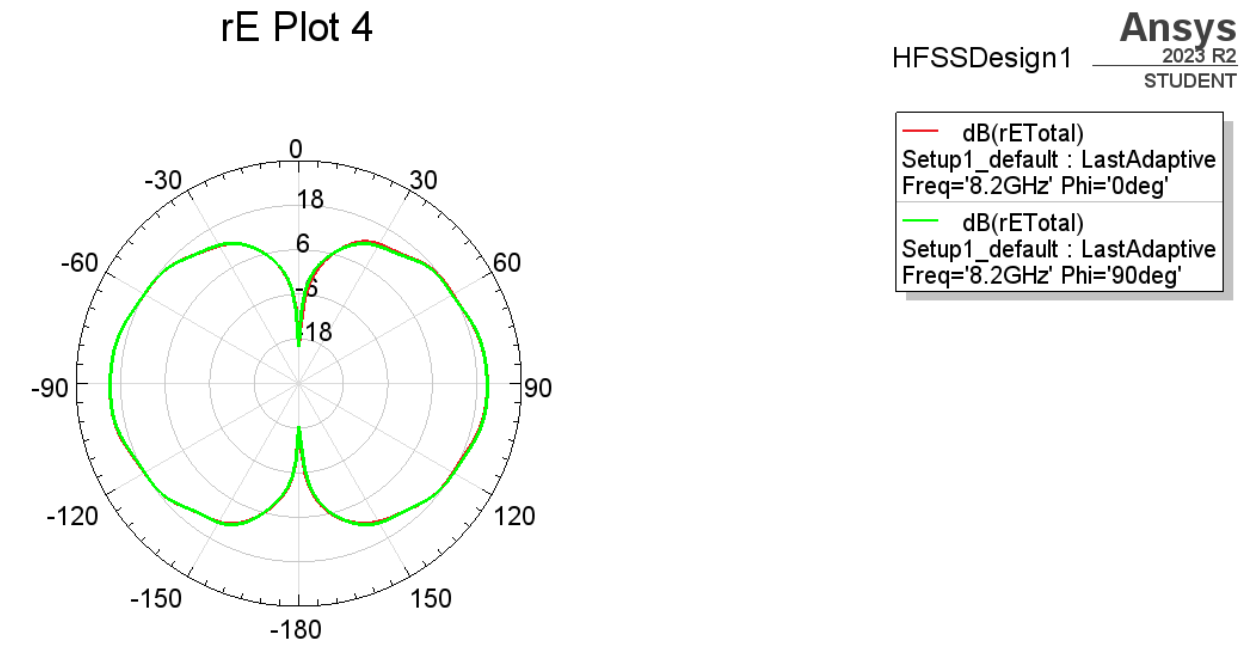
E- plane:-



H-plane:-

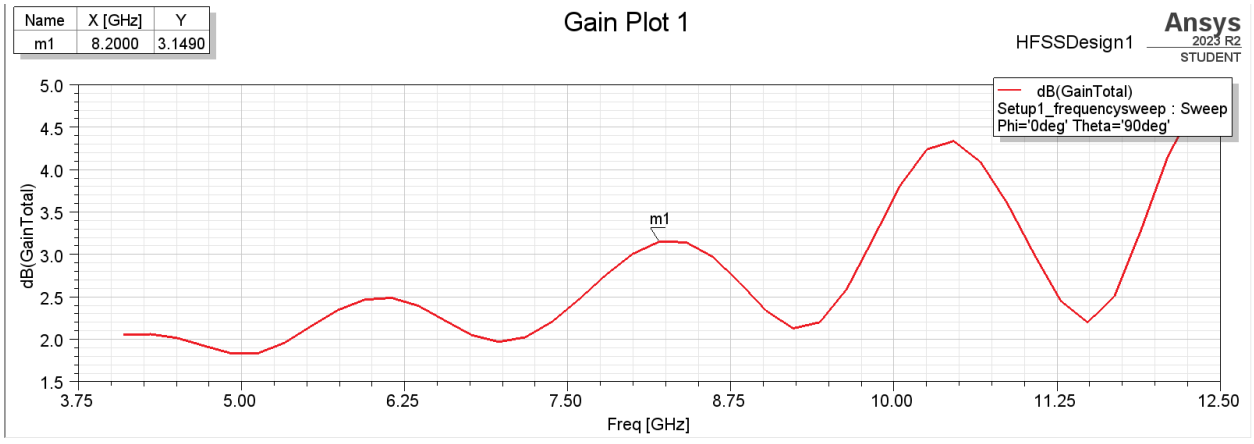


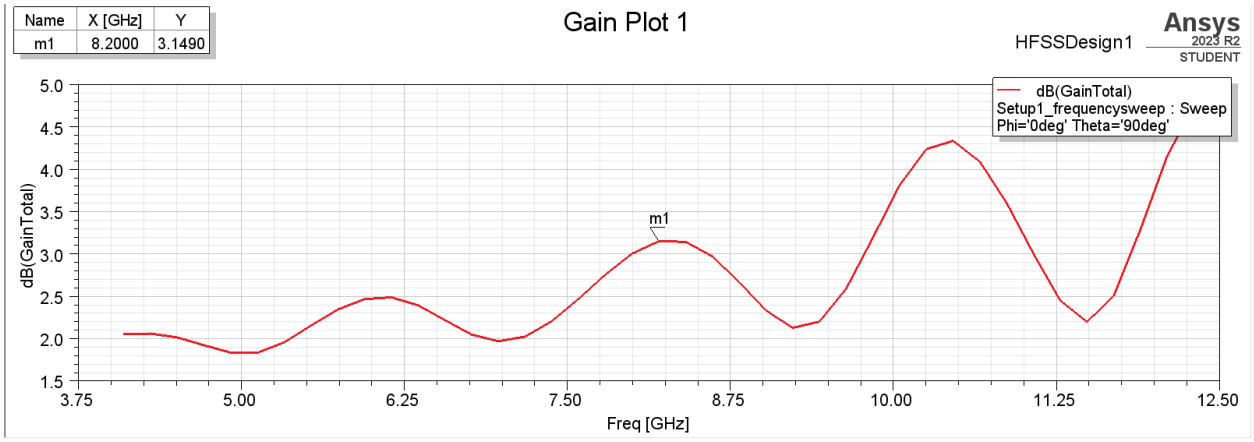
Combine:-



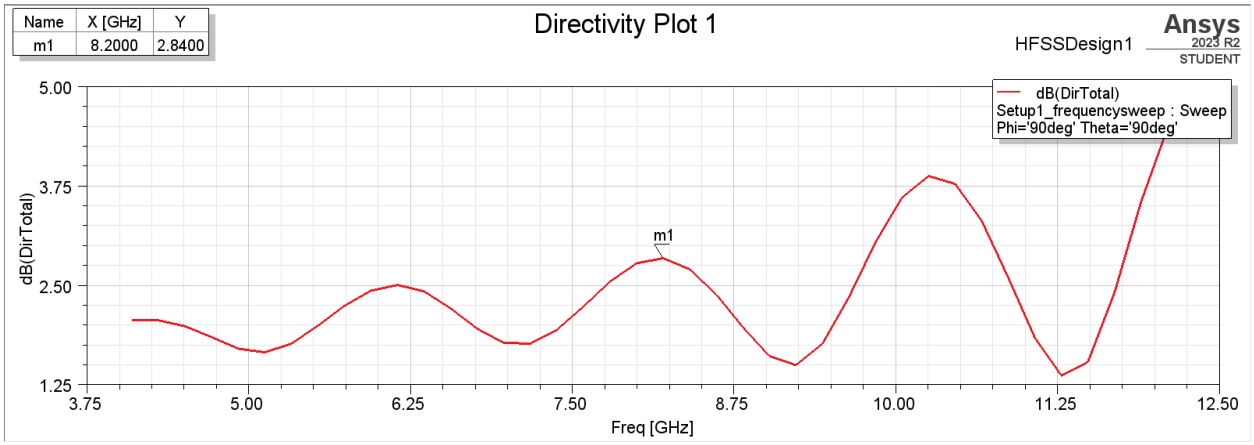
V. Gain vs Frequency

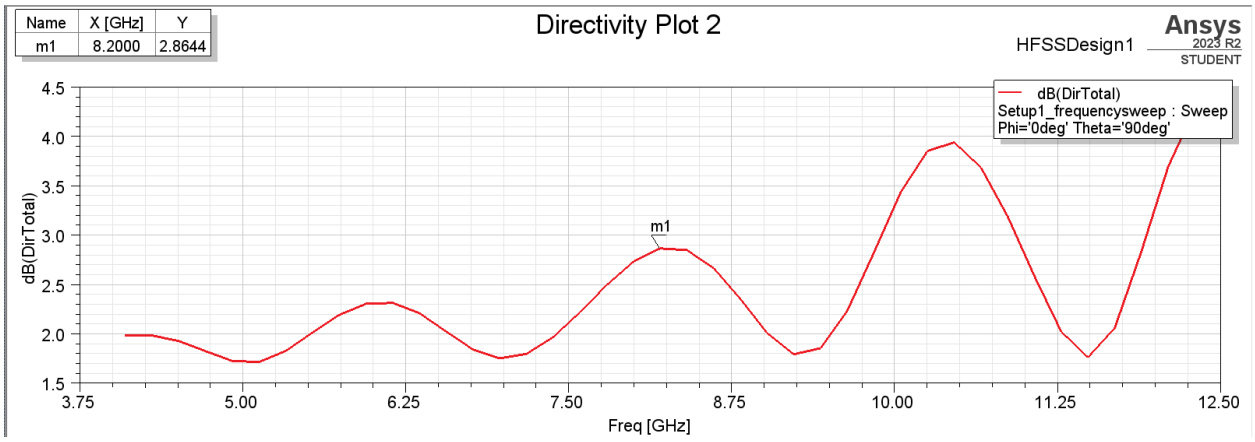
As from the above radiation we can seen there will be two position where we will get maximum gain for our resonating frequency





VI. Directivity vs frequency



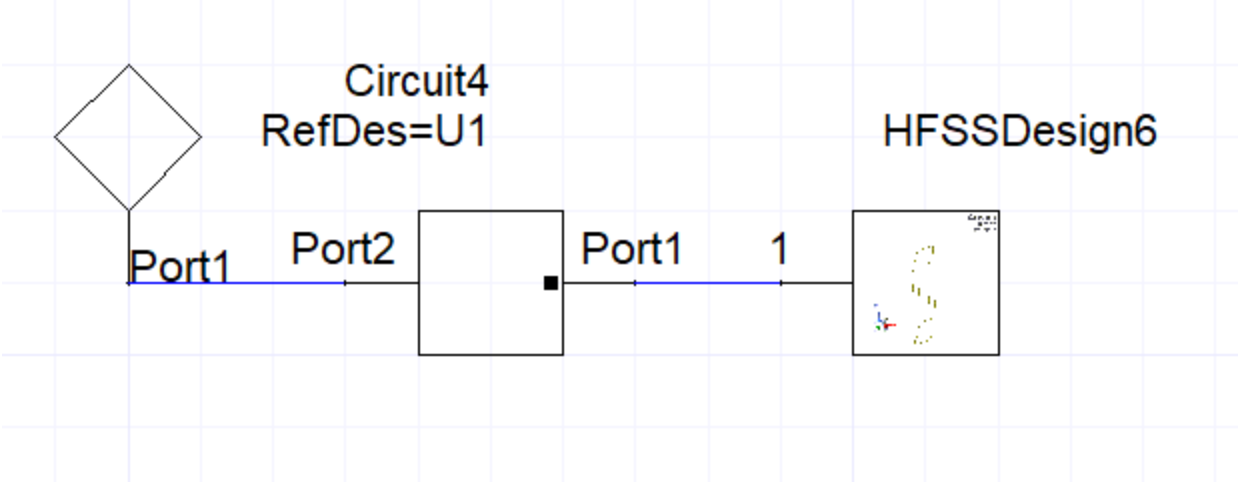


Bonus

For this part we have to design appropriate feed elements and corresponding matching networks

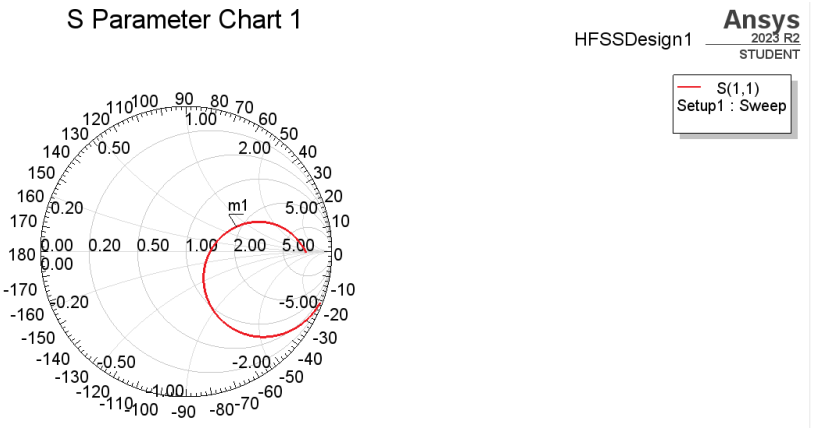
So for this part we have design the antenna same as above but just changed the excitation impedance to 50 ohm

For impedance matching we make an extra circuit by smith tool (adding passive element to bring the normalized impedance to 1)

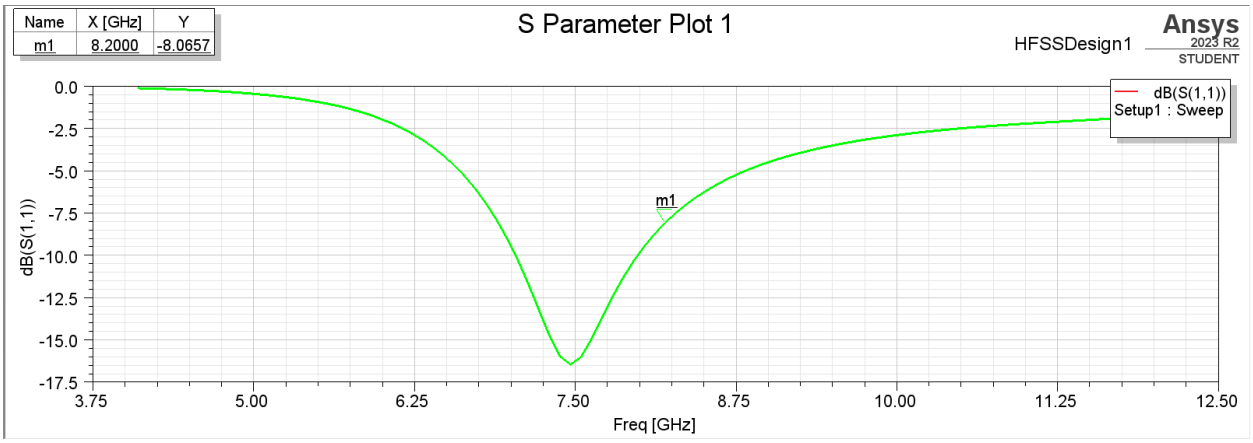


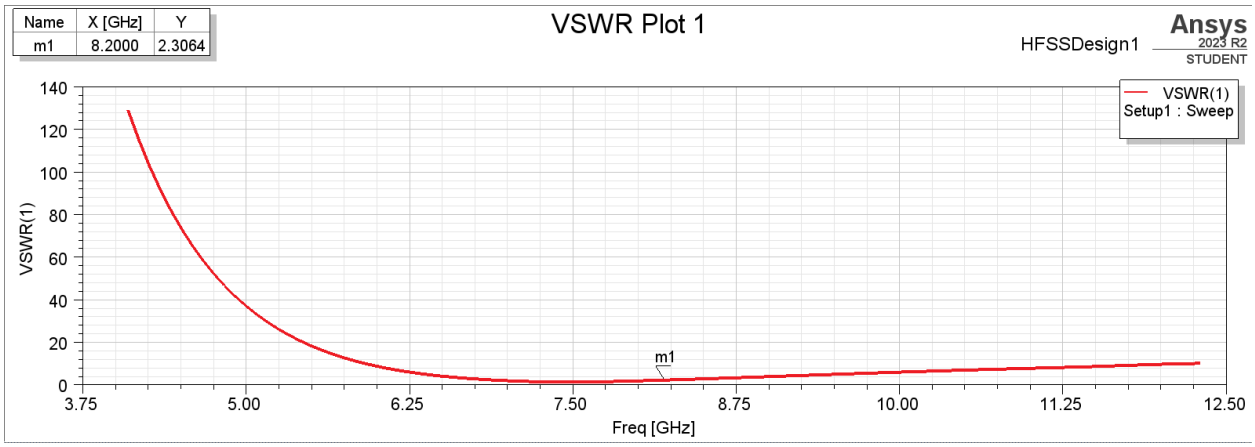
Before impedance matching:-

Name	Freq [GHz]	Ang	Mag	RX
m1	8.2	26.3672	0.3951	1.8832 + 0.7832i

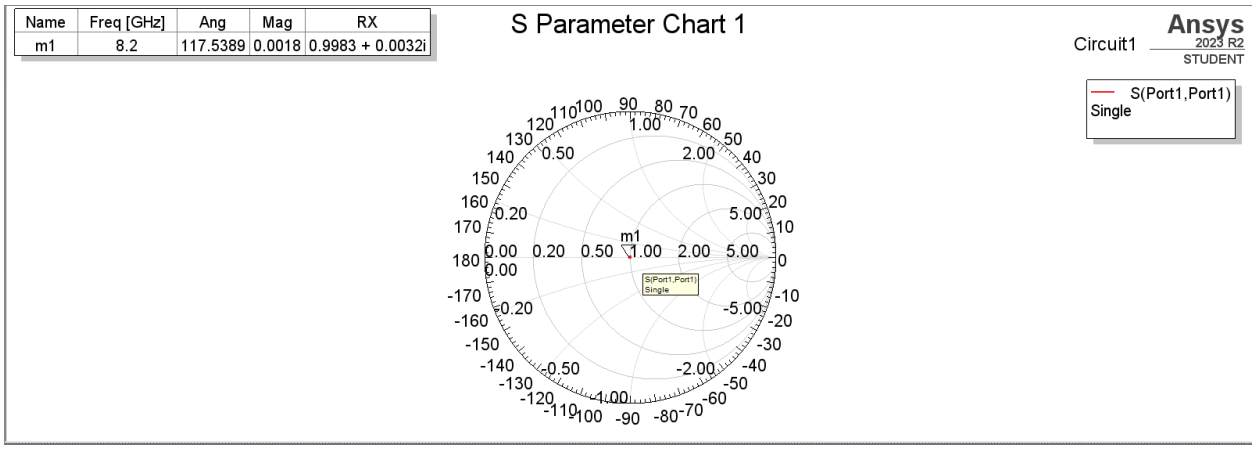


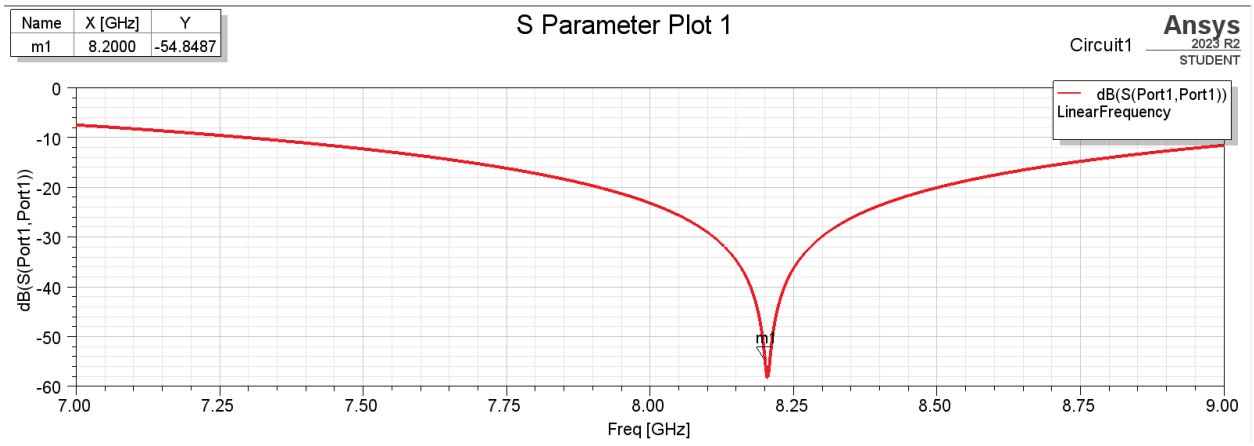
Name	X [GHz]	Y
m1	8.2000	-8.0657

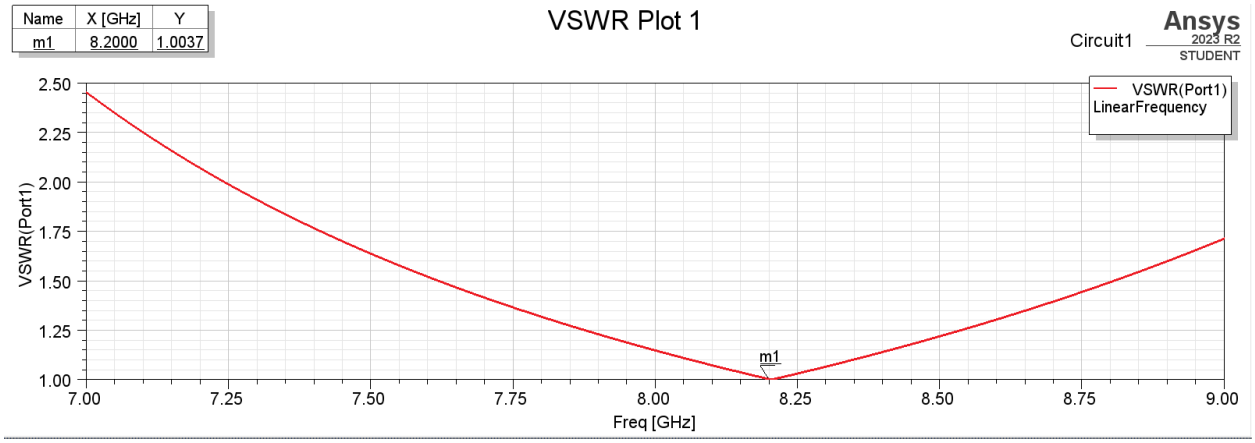




After impedance matching by smith tool






Name
X [GHz]
Y
m1
8.2000
1.0037
VSWR Plot 1
Circuit1
Ansys
2023 R2
STUDENT
VSWR(Port1)
LinearFrequency
2.50
2.25
2.00
1.75
1.50
1.25
1.00
VSWR(Port1)
m1
7.00
7.25
7.50
7.75
8.00
8.25
8.50
8.75
9.00
Freq [GHz]