EE609 Radiating Systems
PROJECT REPORT

Problem Statement: Design and Simulate a half wave dipole antenna operating at a resonant frequency of 6.6 GHz. Calculate the appropriate length, radius and gap length.

Submitted By

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Antenna Geometry

Operating Frequency – 6.6 GHz
Length of Antenna – 21.67 mm
Feed Gap poles - 0.1083 mm
Radius of Antenna - 0.04545 mm
Material of Antenna - PEC

Resonant Frequency

[1 + Group. No*0.4] GHz
1+14*0.4 = 6.6GHz

Wave length

$\lambda = c/f$
$\lambda = 3x10^8 / 6.6x10^9$ cm
$\lambda = 45.45$ mm

Length of Antenna ($L=\lambda/2$)

In practical we can consider it smaller than that to eliminate the imaginary part of Radiation resistance

143/f(MHz)= 21.67 mm

Dipole Radius(R)

λ/1000 = 0.045mm

Feed Gap(g)

L/200 = 0.108mm

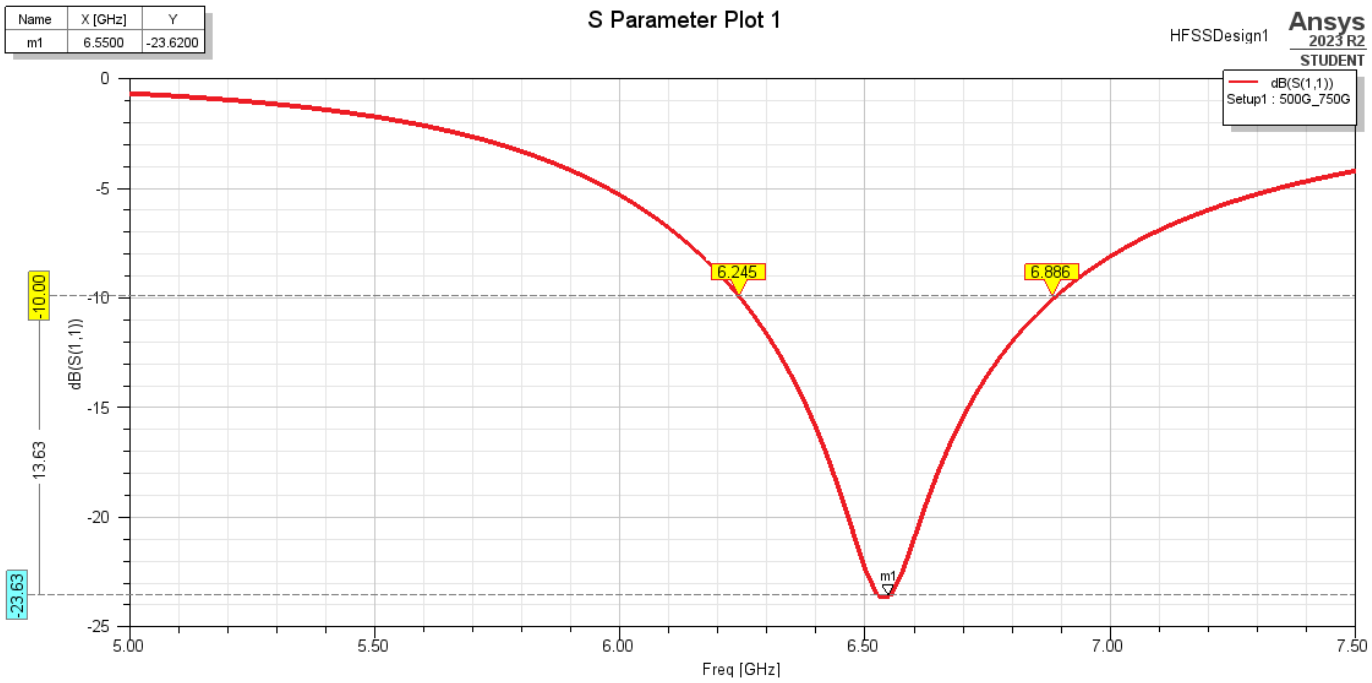
Matching Impedance (Z0)

73ohm

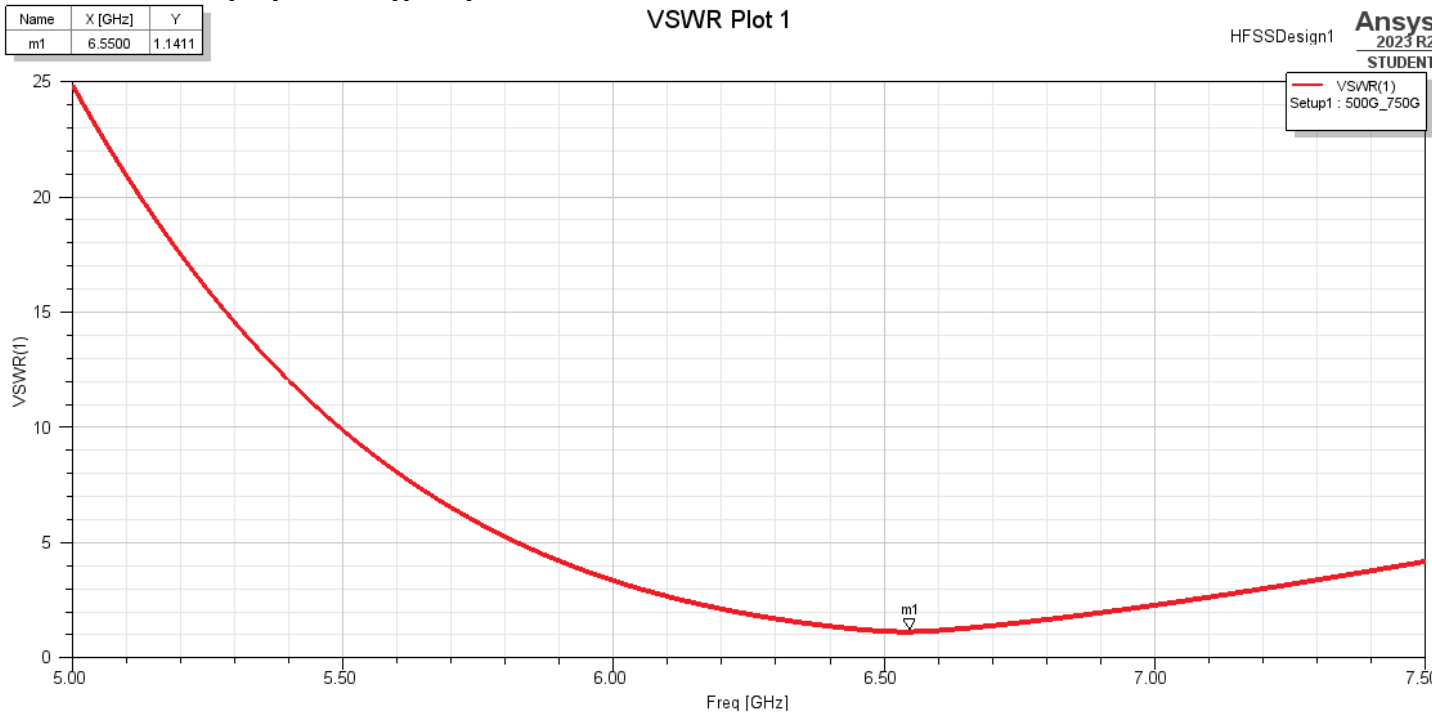
Element	**Shape**	**X mm**	**Y mm**	**Z mm**	**Pos(x,y,z) mm**	**Radius(mm)**	**Axis**	**Material**
Dipole	Cylinder	0	0	21.67	(0, 0, -10.83)	0.04545	Z-axis	PEC
Feed Gap	Cylinder	0	0	0.1083	(0,0,-0.0541)	0.04545	Z-axis	Vaccum
Excitation	Rectangular Sheet	Lumped port, Impedance-75 ohm					YZ-plane	-
Radiation Boundary	Box	40	40	40	(-20,-20,-20)	-	-	Air

Plot results

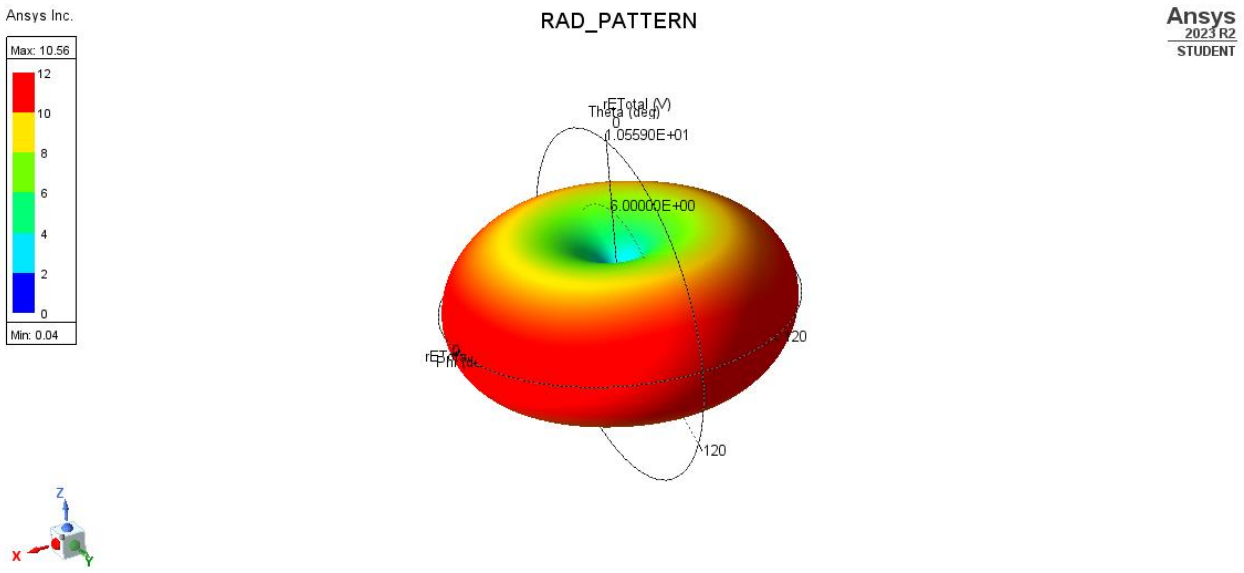
1. S11(dB) Vs Freq(GHz)



2. VSWR(dB) Vs Freq(GHz)

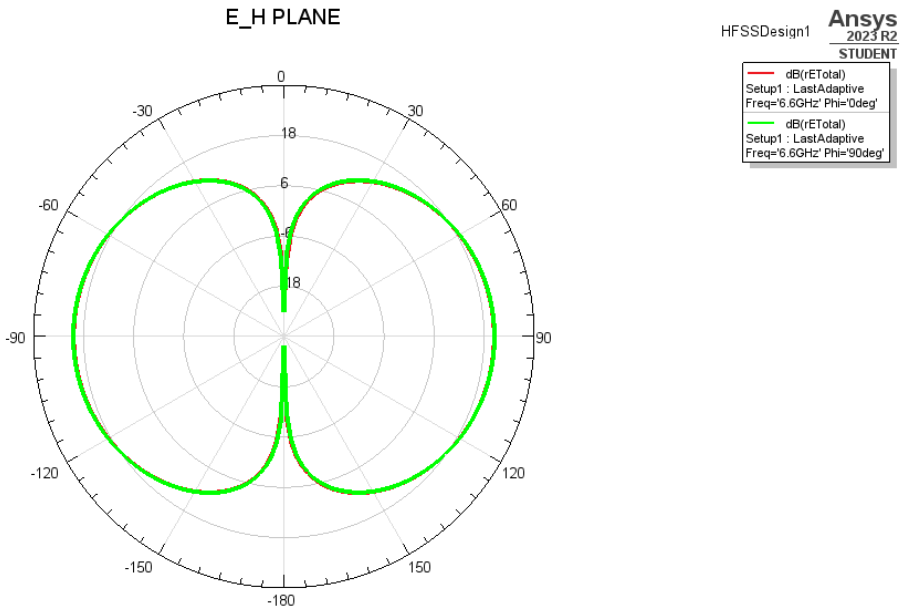


3. 3D radiation pattern

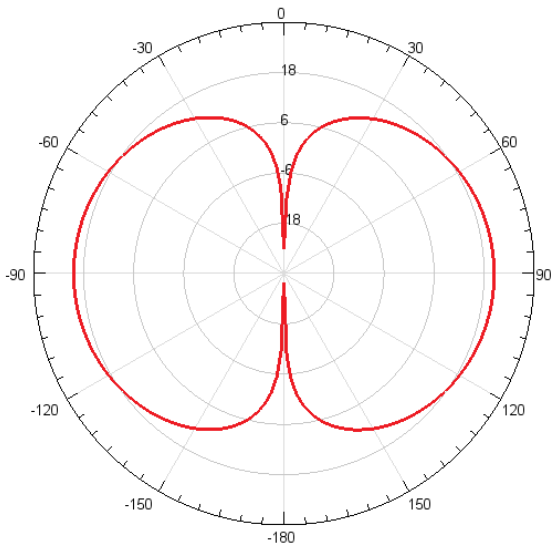


4. E-plane and H-plane radiation pattern

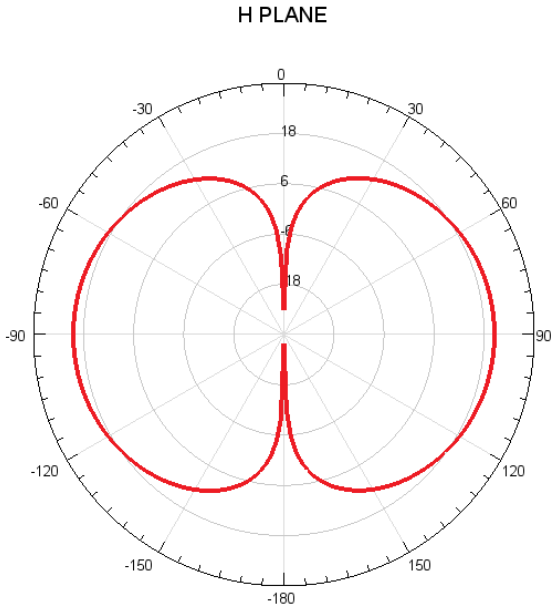
E-PLANE – pi- 0 deg
H-PLANE – pi- 90 deg



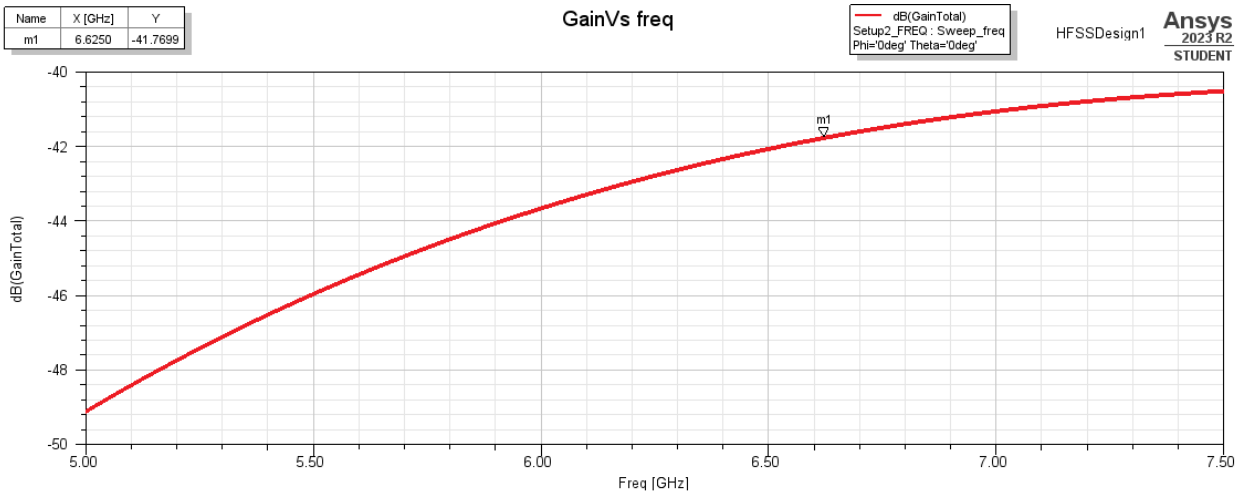
E PLANE



H PLANE



5. Gain(dB) vs Frequency



6. Directivity(dB) vs Freq