HFSS Antenna Simulation

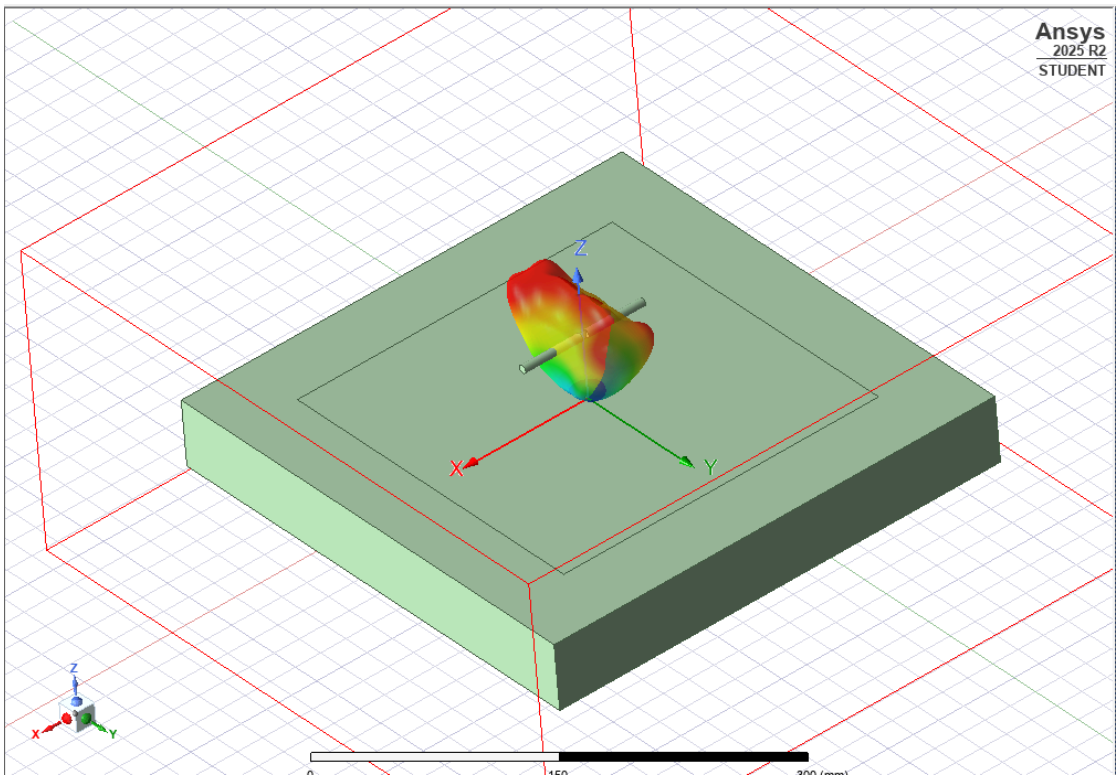


Figure 1: Dipole Antenna 3D Gain Plot

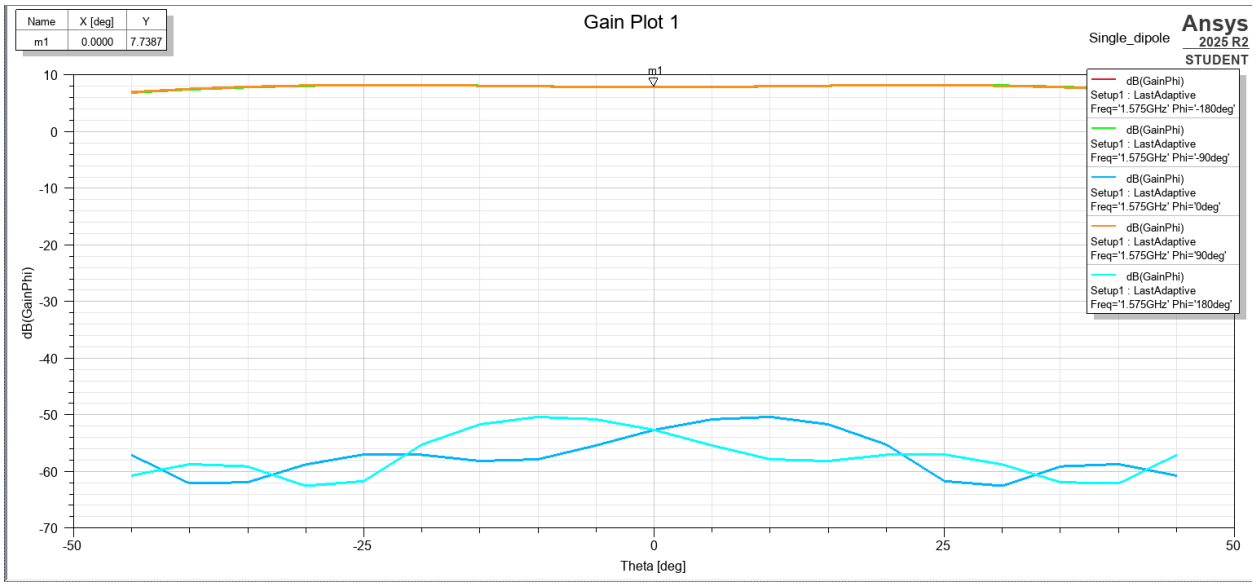


Figure 2: Dipole Antenna 2D Gain Plot

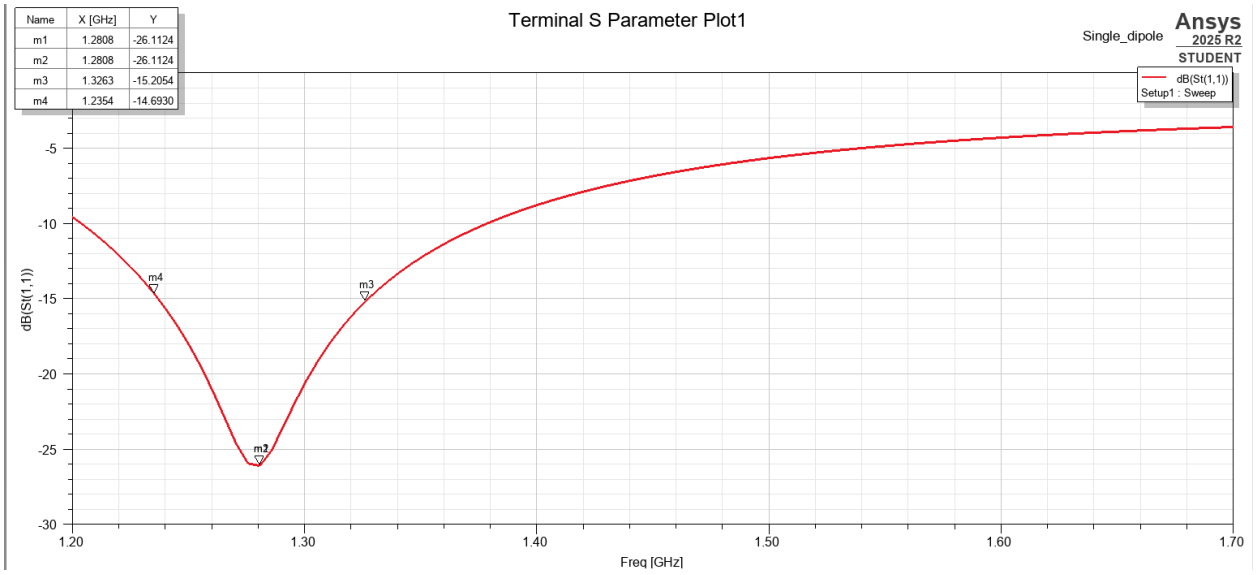


Figure 3: Dipole Antenna Bandwidth & S Parameters

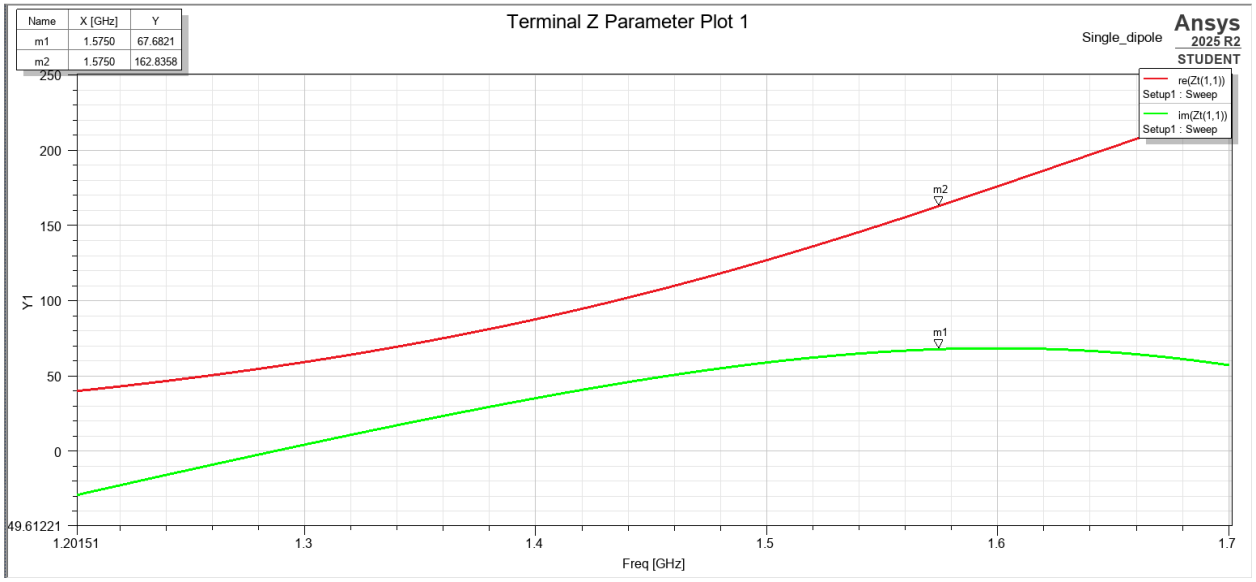


Figure 4: Dipole Antenna Impedance

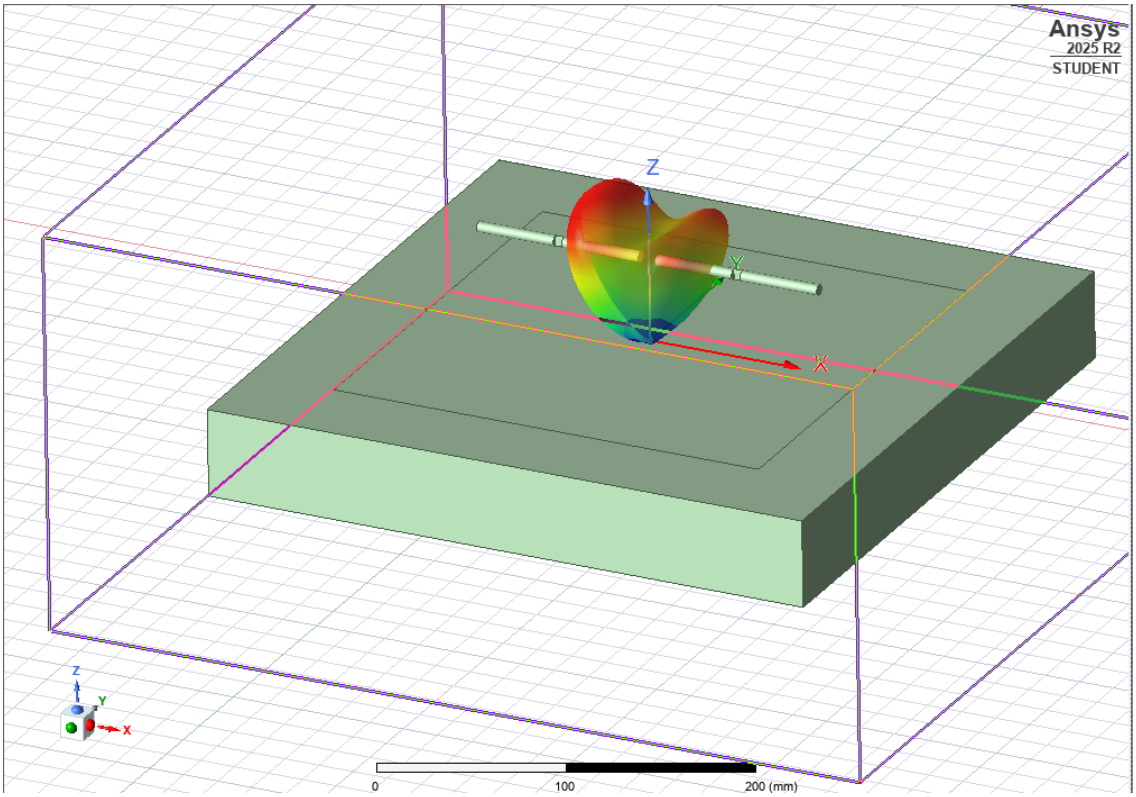


Figure 5: Series Dipole Configuration 3D Gain Plot

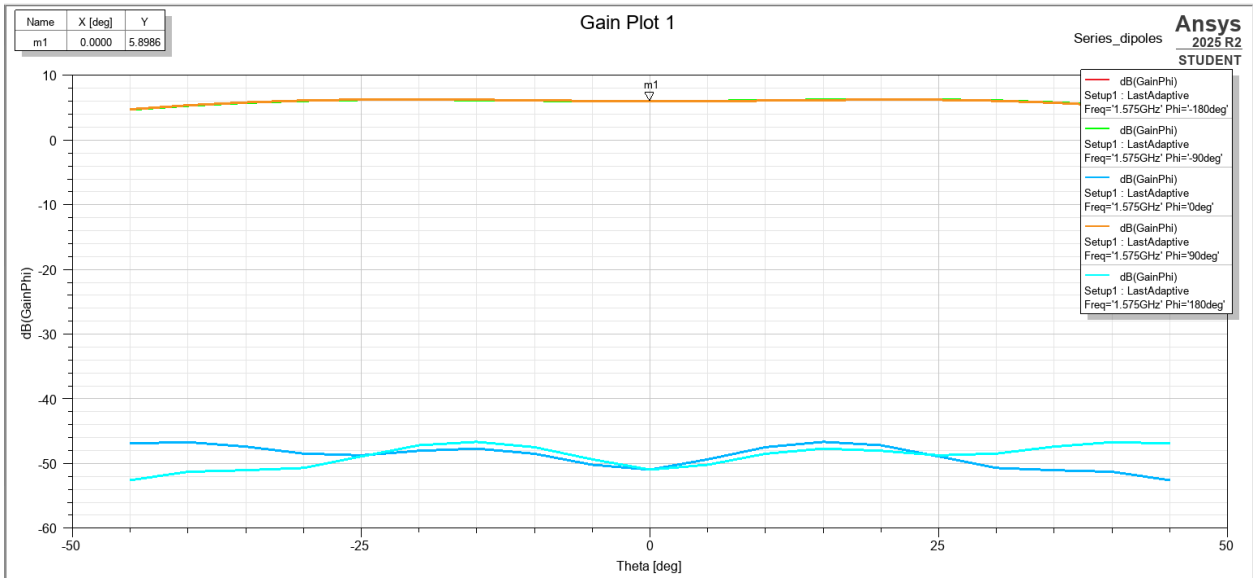


Figure 6: Series Dipole 2D Gain Plot

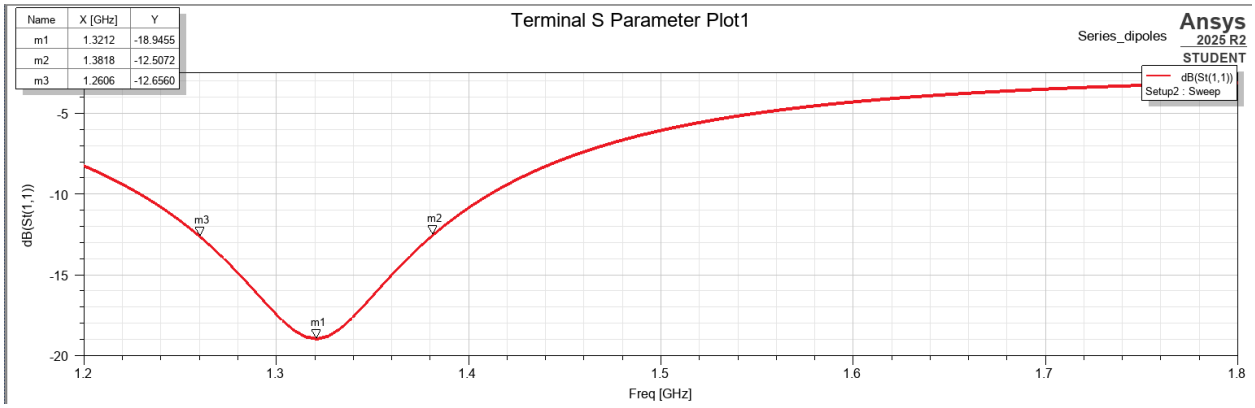


Figure 7: Series Dipole Antenna Bandwidth & S Parameters

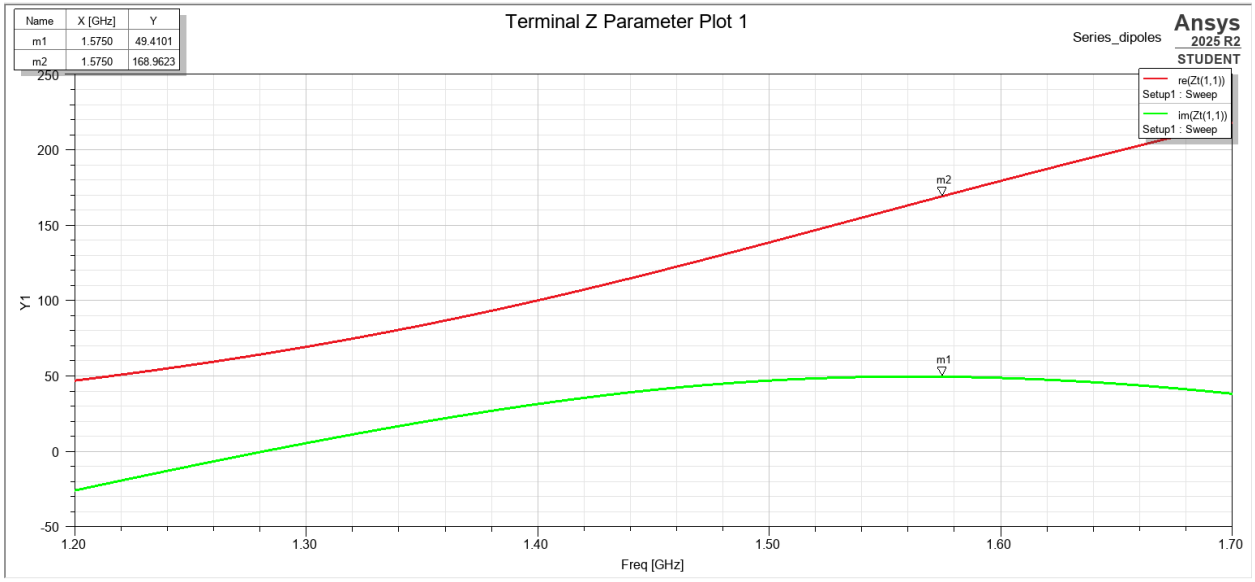


Figure 8: Series Dipole Antenna Impedance

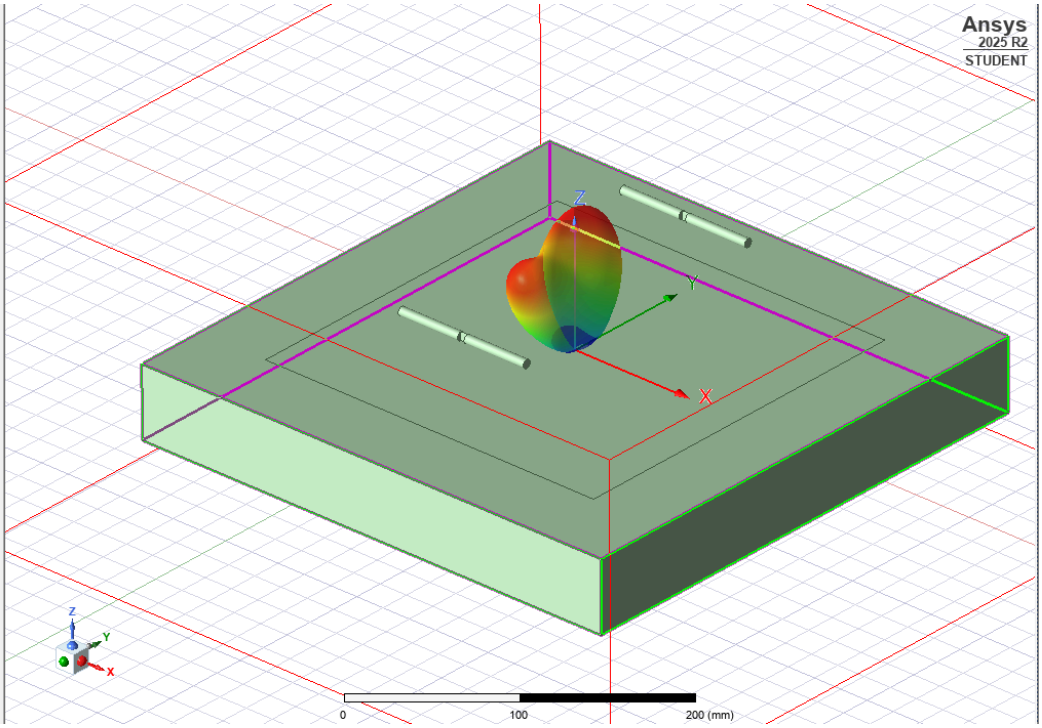


Figure 9: Parallel Dipole Configuration 3D Gain Plot

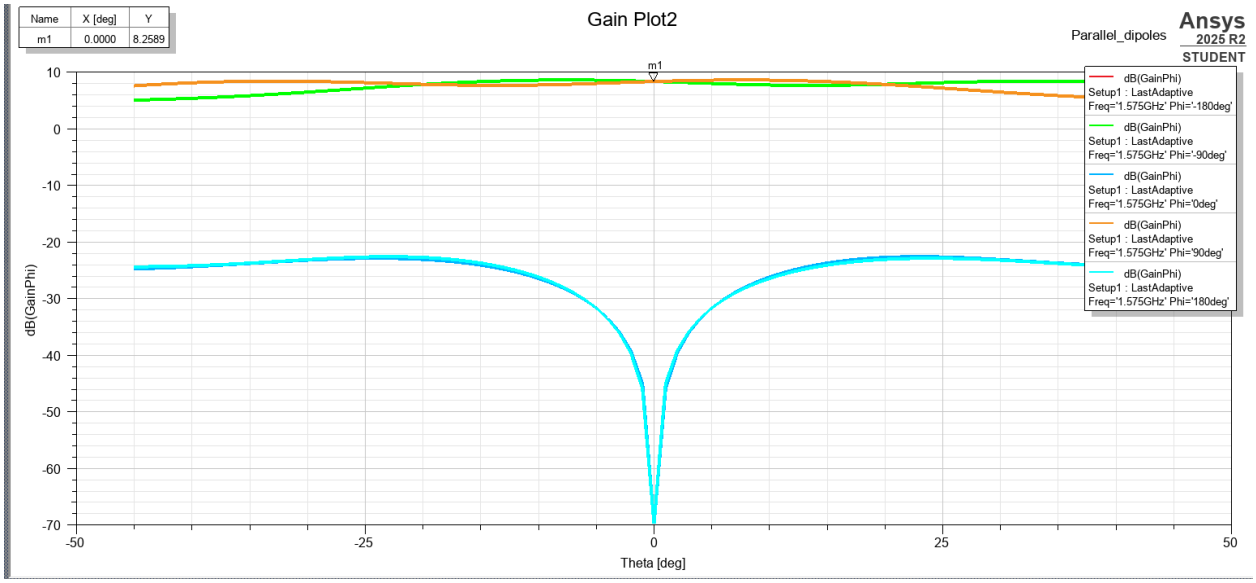


Figure 10: Parallel Dipole Antenna 2D Gain Plot

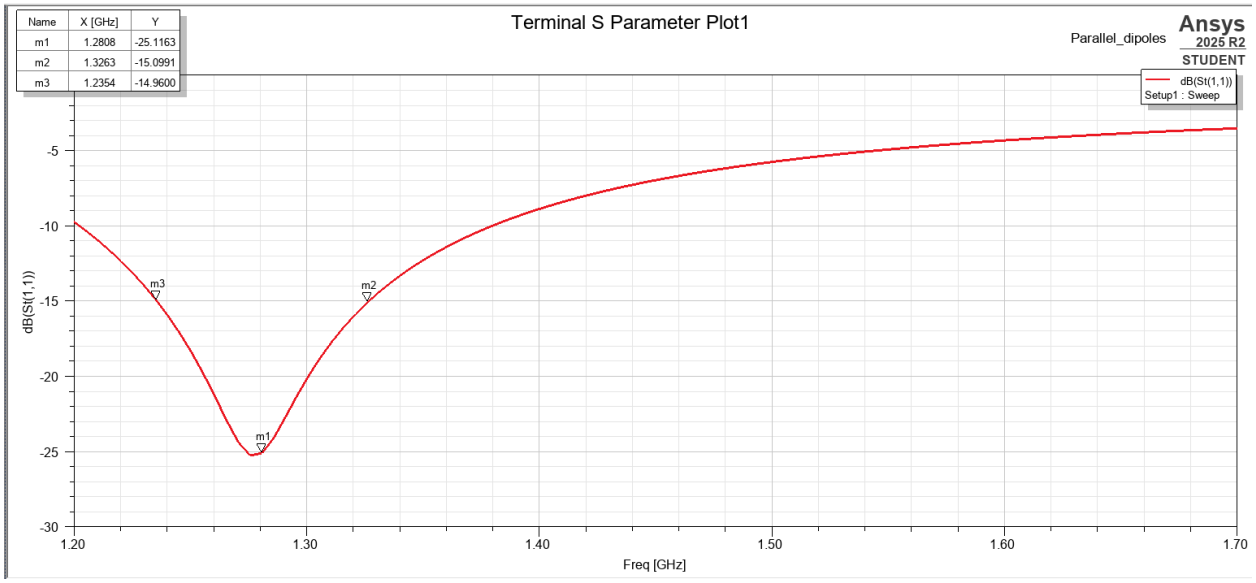


Figure 11: Parallel Dipole Antenna Bandwidth & S Parameters

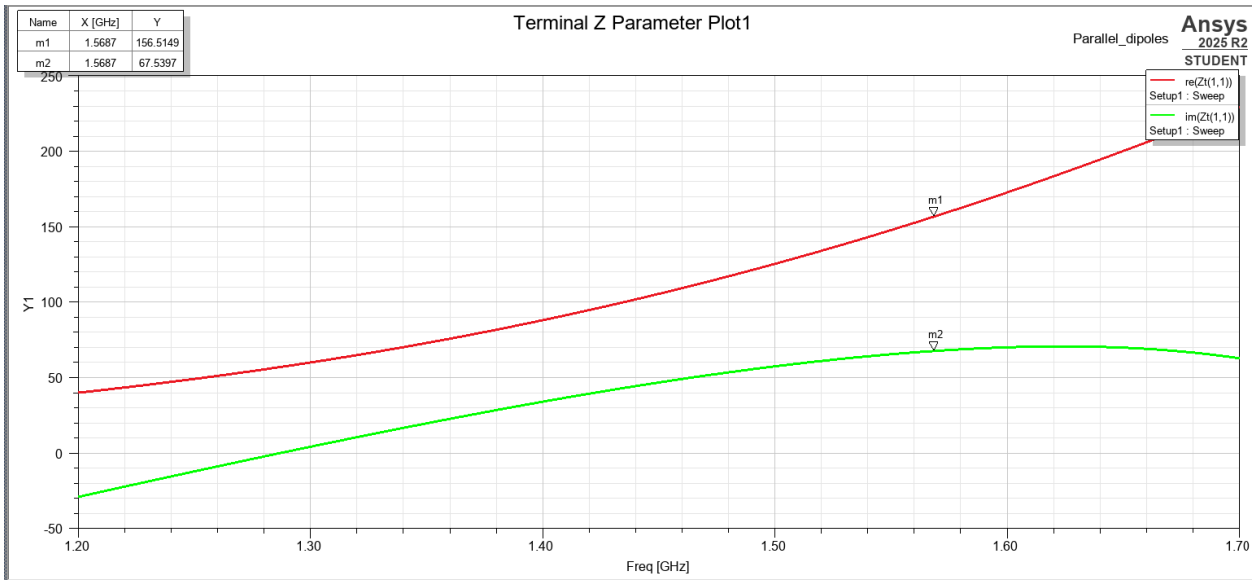


Figure 12: Parallel Dipole Antenna Impedance

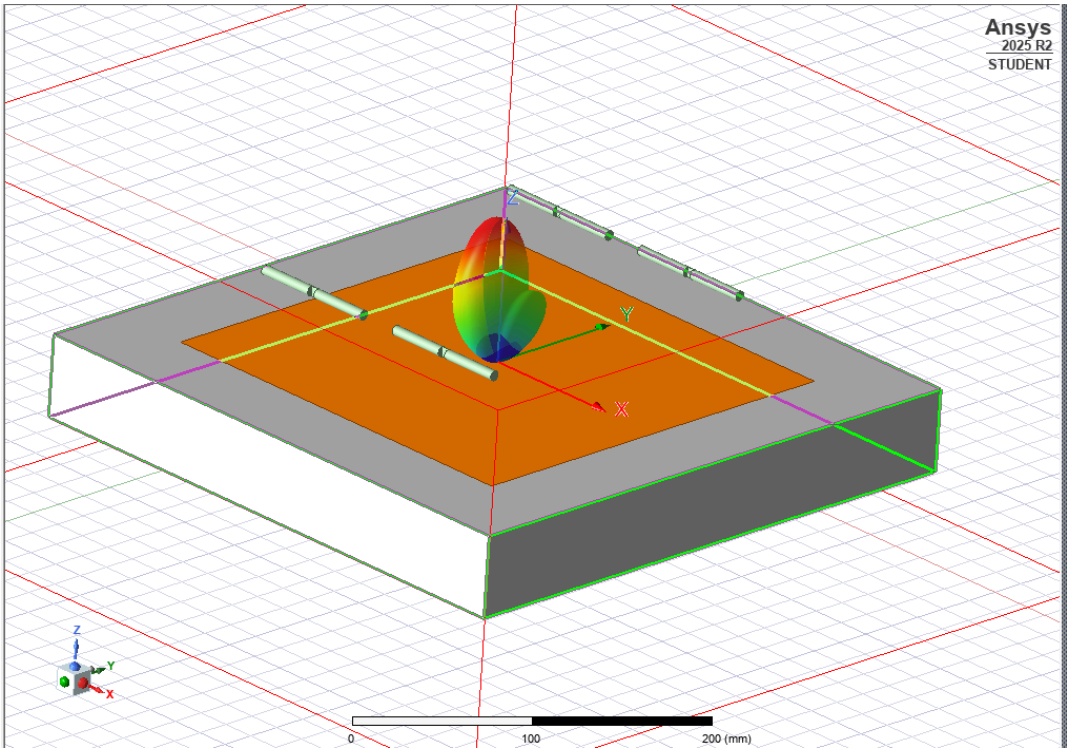


Figure 13: Parallel-Series (Quad) Dipole Configuration 3D Gain Plot

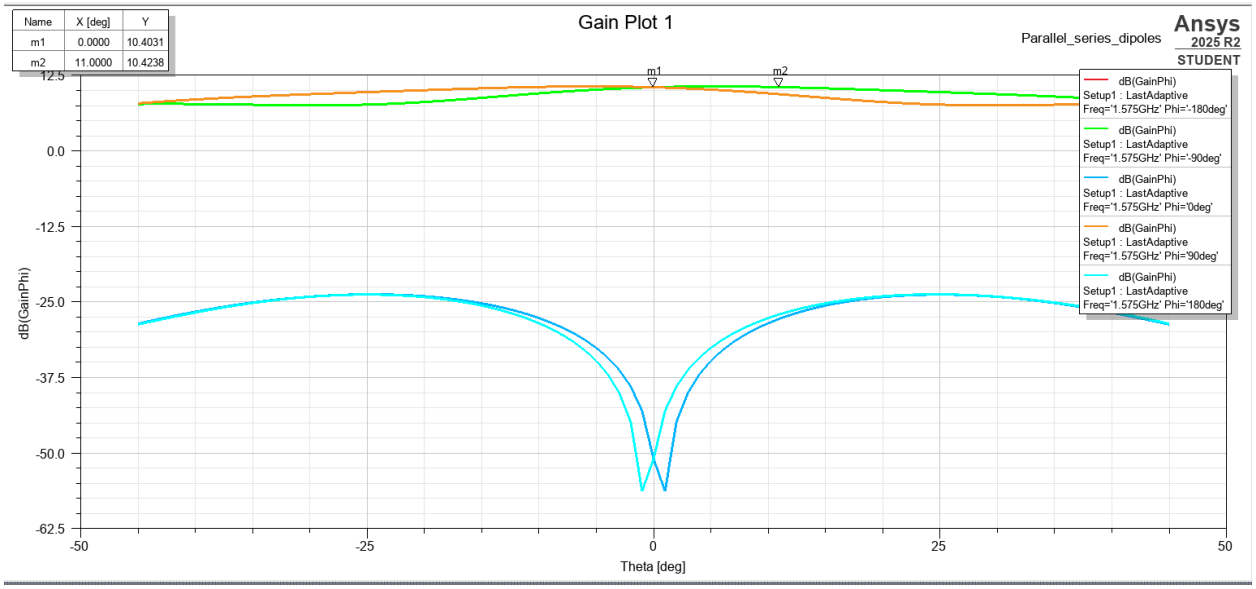


Figure 14: Quad Dipole 2D Gain Plot

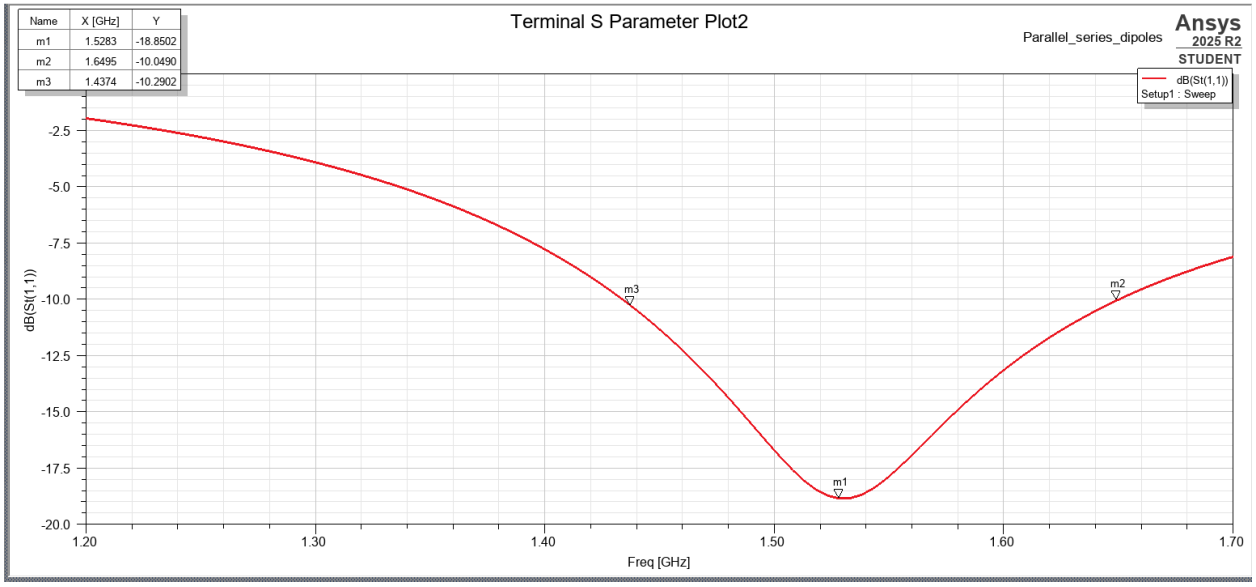


Figure 15: Quad Dipole Antenna Bandwidth & S Parameters

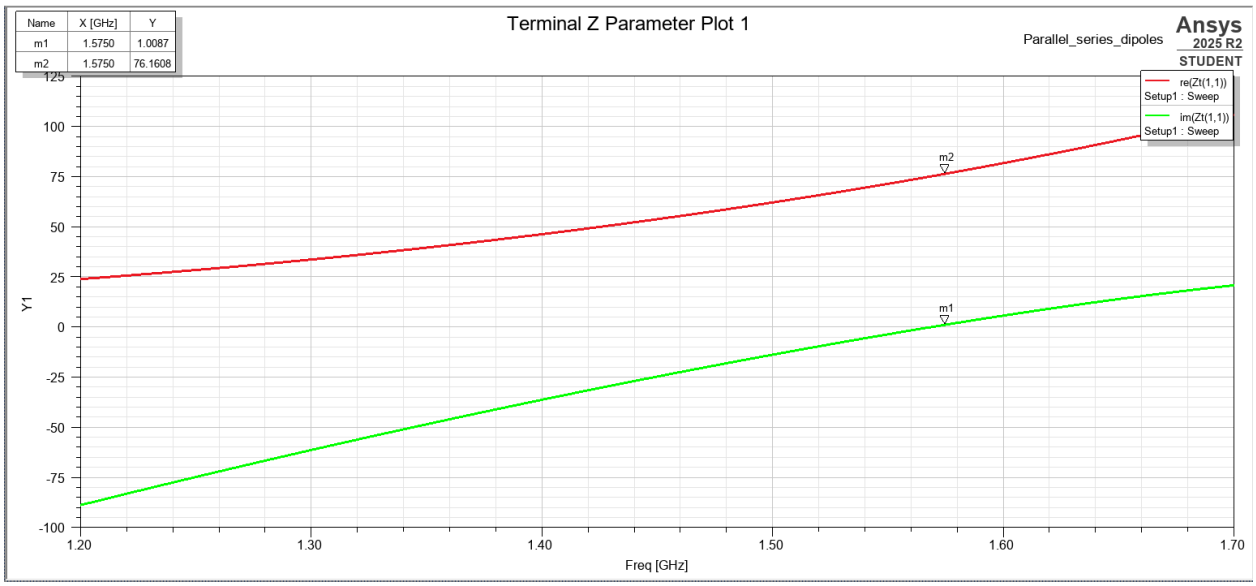


Figure 16: Quad Dipole Antenna Impedance

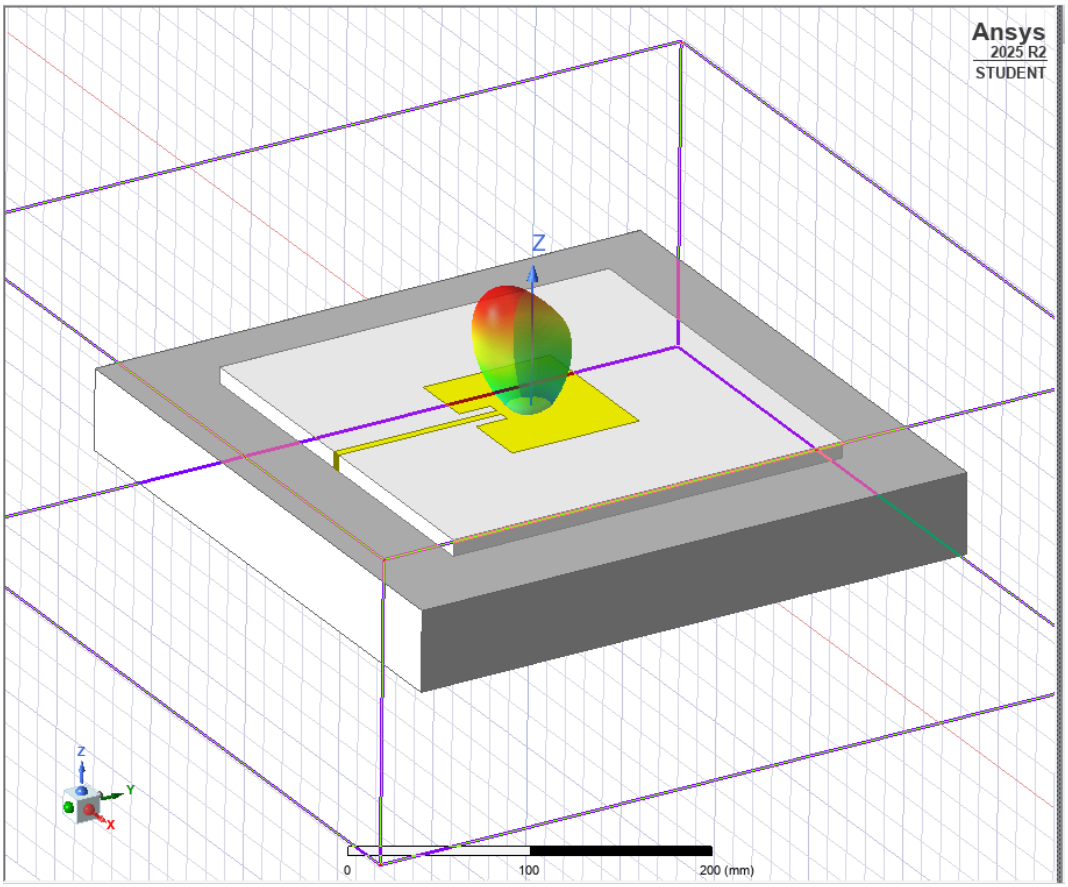


Figure 17: Microstrip Patch Antenna 3D Gain Plot

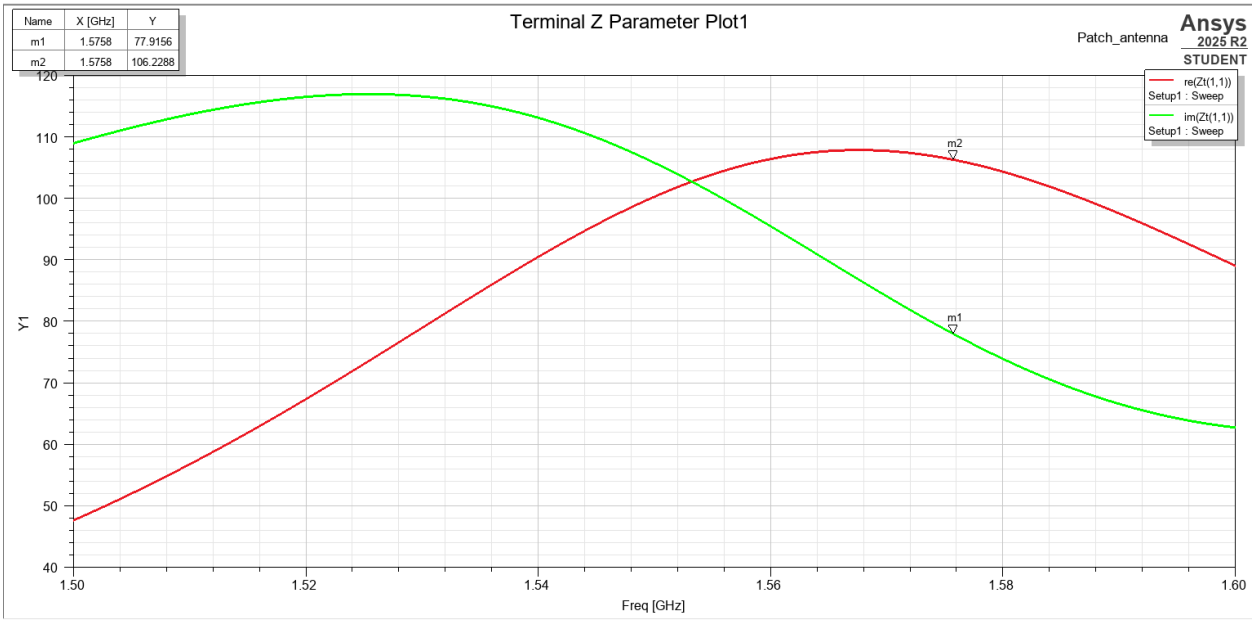


Figure 18: Microstrip Patch Antenna Impedance

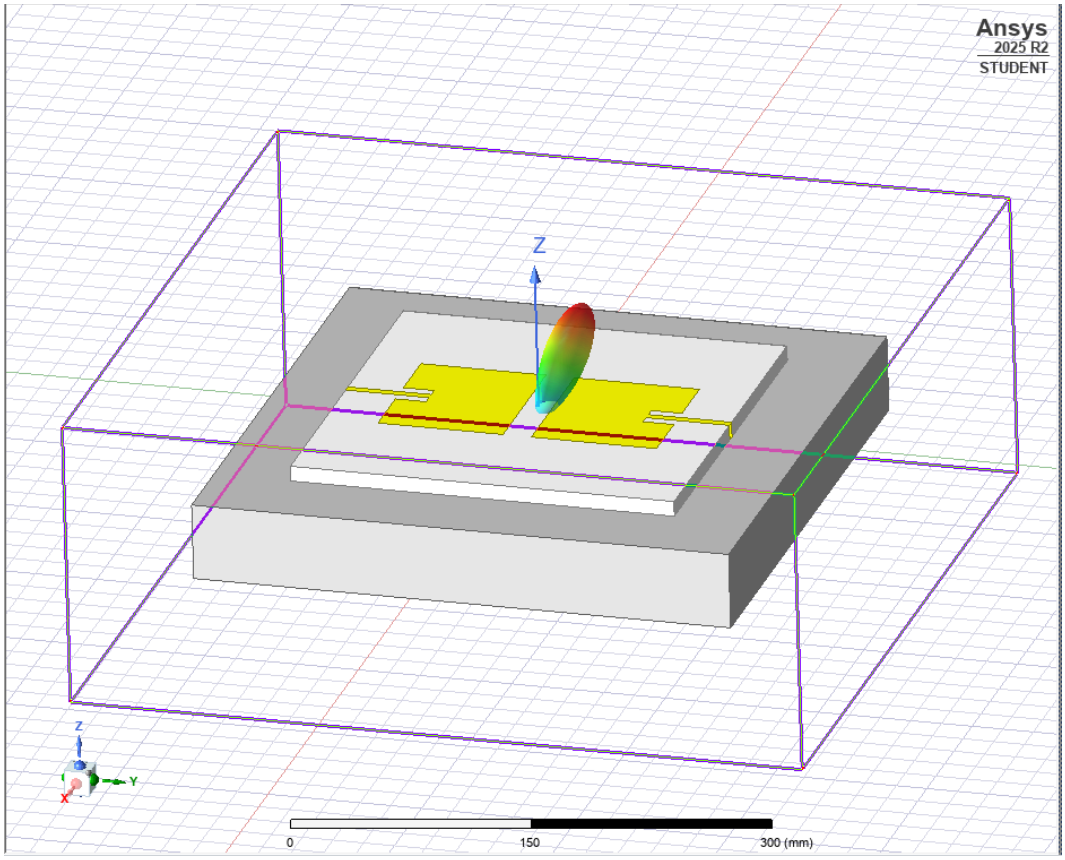


Figure 19: Parallel Microstrip Patch Antenna 3D Gain Plot

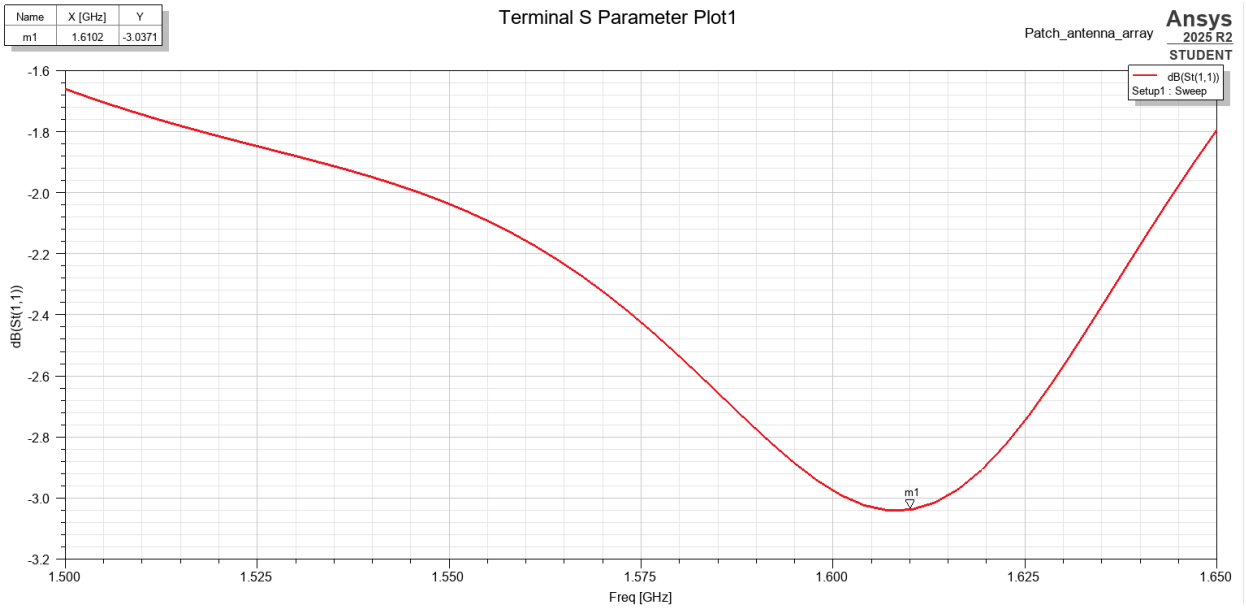


Figure 20: Parallel Microstrip Patch Antenna Bandwidth & S Parameters

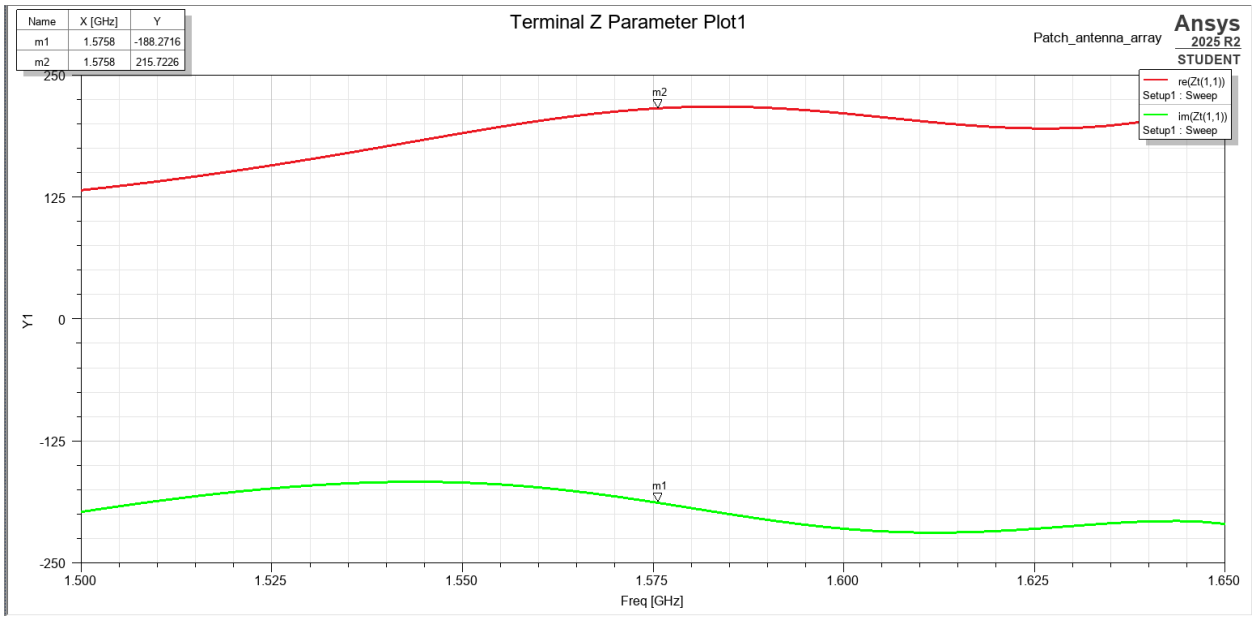
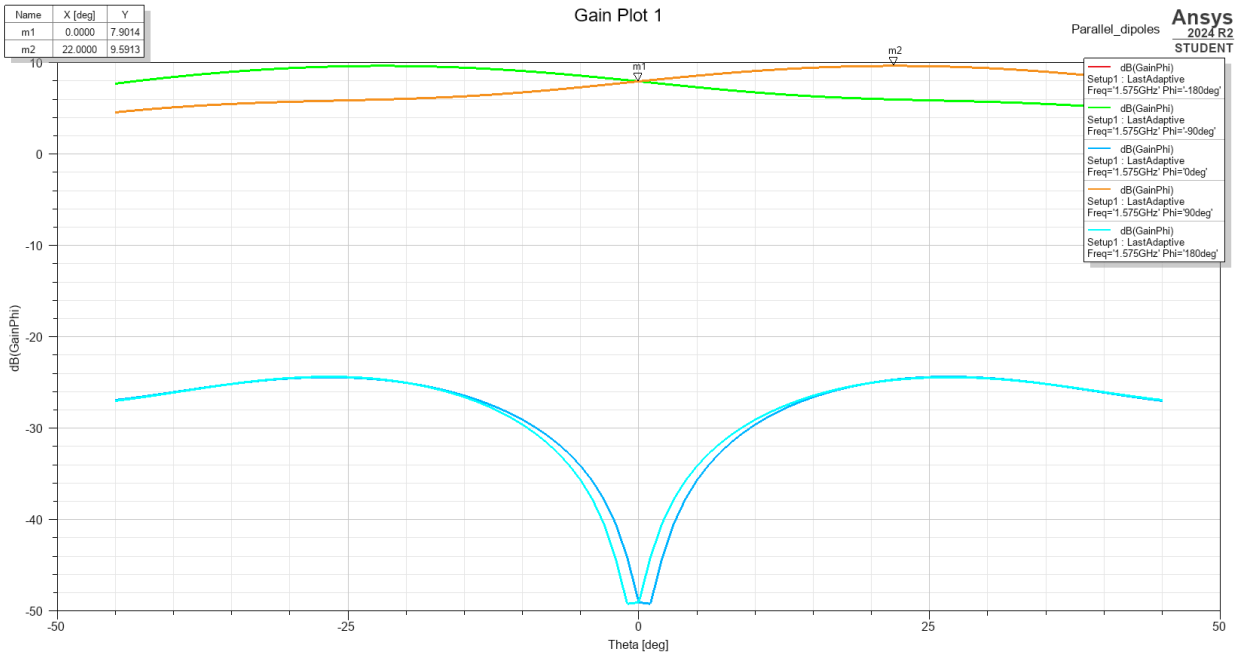
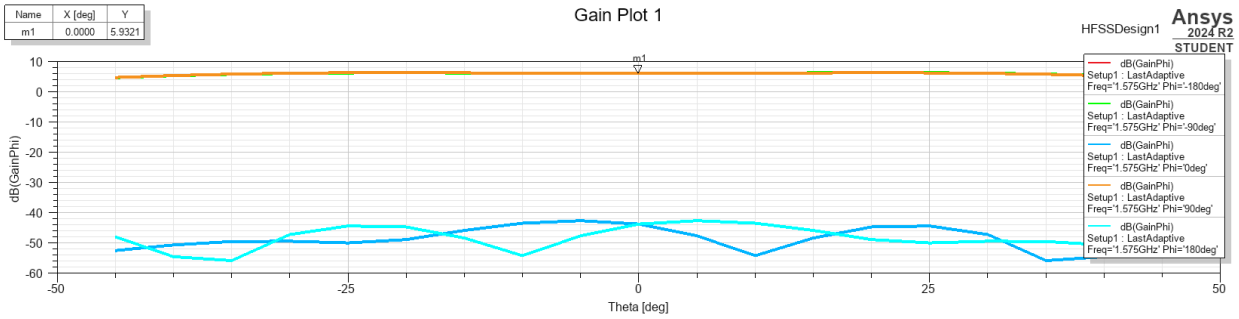
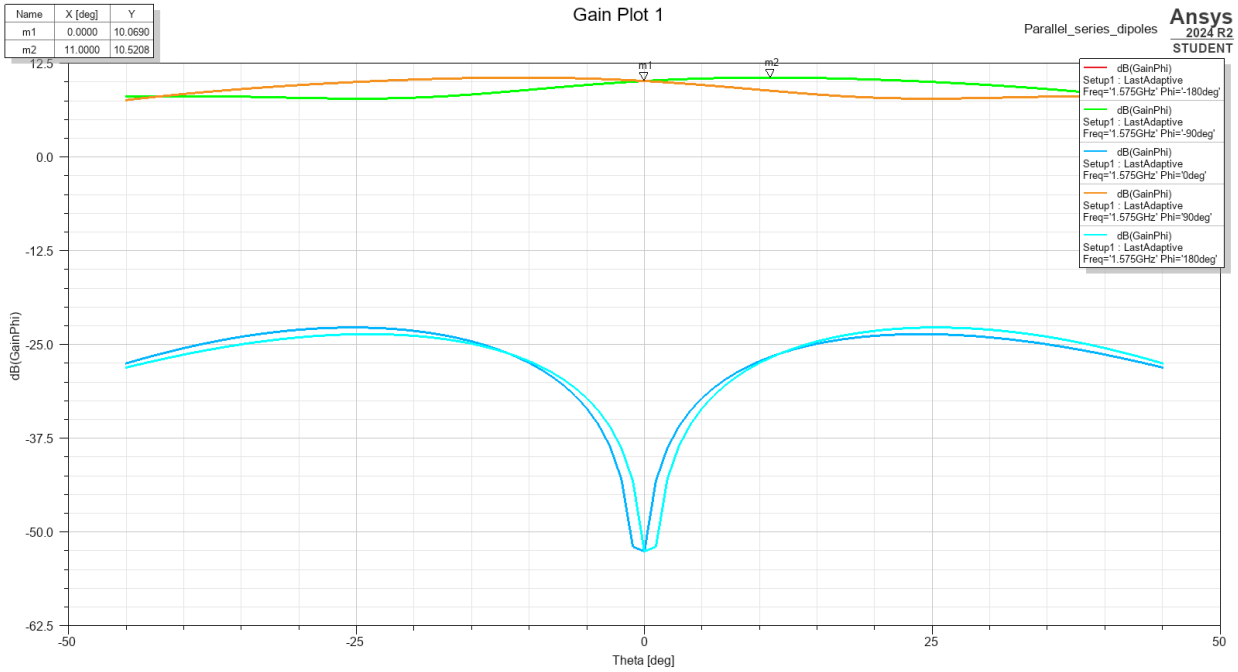
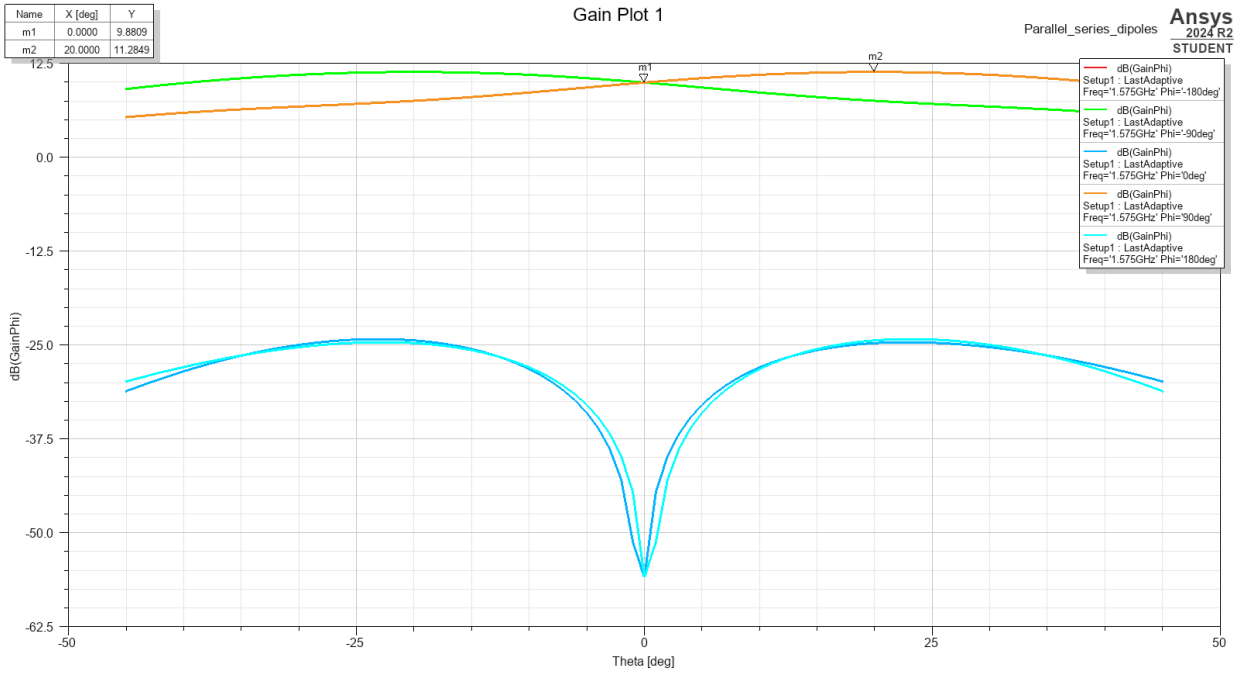


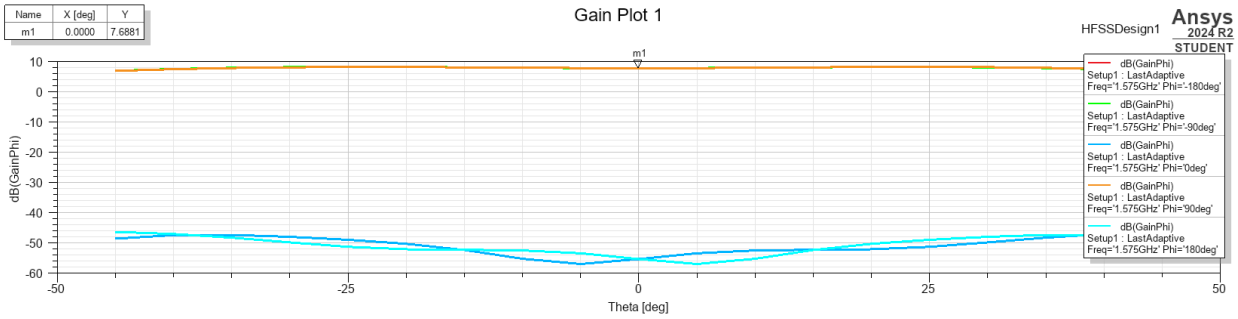
Figure 21: Parallel Microstrip Patch Antenna Impedance


Gain Plot 1
Parallel_dipoles
Ansys
2024 R2
STUDENT
Name | X [deg] | Y
m1 | 0.0000 | 7.9014
m2 | 22.0000 | 9.5913
dB(GainPhi)
Setup1 : LastAdaptive
Freq='1.575GHz' Phi='-180deg'
dB(GainPhi)
Setup1 : LastAdaptive
Freq='1.575GHz' Phi='-90deg'
dB(GainPhi)
Setup1 : LastAdaptive
Freq='1.575GHz' Phi='0deg'
dB(GainPhi)
Setup1 : LastAdaptive
Freq='1.575GHz' Phi='90deg'
dB(GainPhi)
Setup1 : LastAdaptive
Freq='1.575GHz' Phi='180deg'
dB(GainPhi)
Theta [deg]


Gain Plot 1
HFSSDesign1
Ansys
2024 R2
STUDENT
Name | X [deg] | Y
m1 | 0.0000 | 5.9321
dB(GainPhi)
Setup1 : LastAdaptive
Freq='1.575GHz' Phi='-180deg'
dB(GainPhi)
Setup1 : LastAdaptive
Freq='1.575GHz' Phi='-90deg'
dB(GainPhi)
Setup1 : LastAdaptive
Freq='1.575GHz' Phi='0deg'
dB(GainPhi)
Setup1 : LastAdaptive
Freq='1.575GHz' Phi='90deg'
dB(GainPhi)
Setup1 : LastAdaptive
Freq='1.575GHz' Phi='180deg'
dB(GainPhi)
Theta [deg]


Gain Plot 1
Parallel_series_dipoles
Ansys
2024 R2
STUDENT
Name | X [deg] | Y
m1 | 0.0000 | 10.0690
m2 | 11.0000 | 10.5208
dB(GainPhi)
Setup1 : LastAdaptive
Freq='1.575GHz' Phi='-180deg'
Freq='1.575GHz' Phi='-90deg'
Freq='1.575GHz' Phi='0deg'
Freq='1.575GHz' Phi='90deg'
Freq='1.575GHz' Phi='180deg'
dB(GainPhi)
Theta [deg]


Gain Plot 1
Parallel_series_dipoles
Ansys
2024 R2
STUDENT
Name | X [deg] | Y
m1 | 0.0000 | 9.8809
m2 | 20.0000 | 11.2849
dB(GainPhi)
Setup1 : LastAdaptive
Freq='1.575GHz' Phi='-180deg'
Freq='1.575GHz' Phi='-90deg'
Freq='1.575GHz' Phi='0deg'
Freq='1.575GHz' Phi='90deg'
Freq='1.575GHz' Phi='180deg'
dB(GainPhi)
Theta [deg]


Gain Plot 1
HFSSDesign1
Ansys
2024 R2
STUDENT
Name | X [deg] | Y
m1 | 0.0000 | 7.6881
dB(GainPhi)
Setup1 : LastAdaptive
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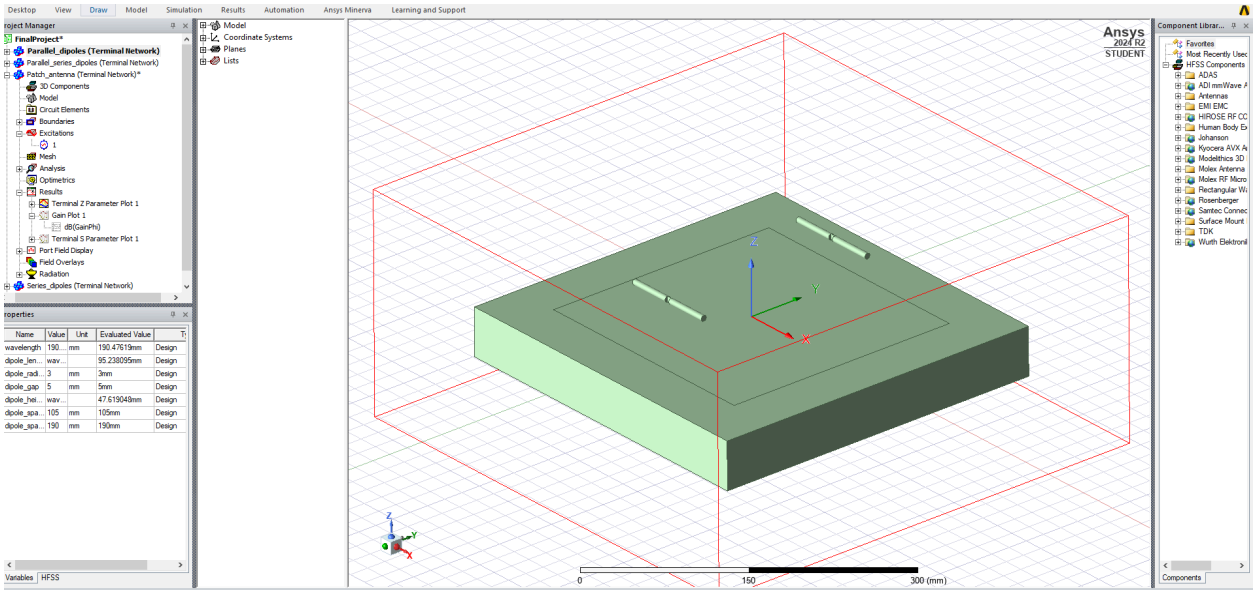
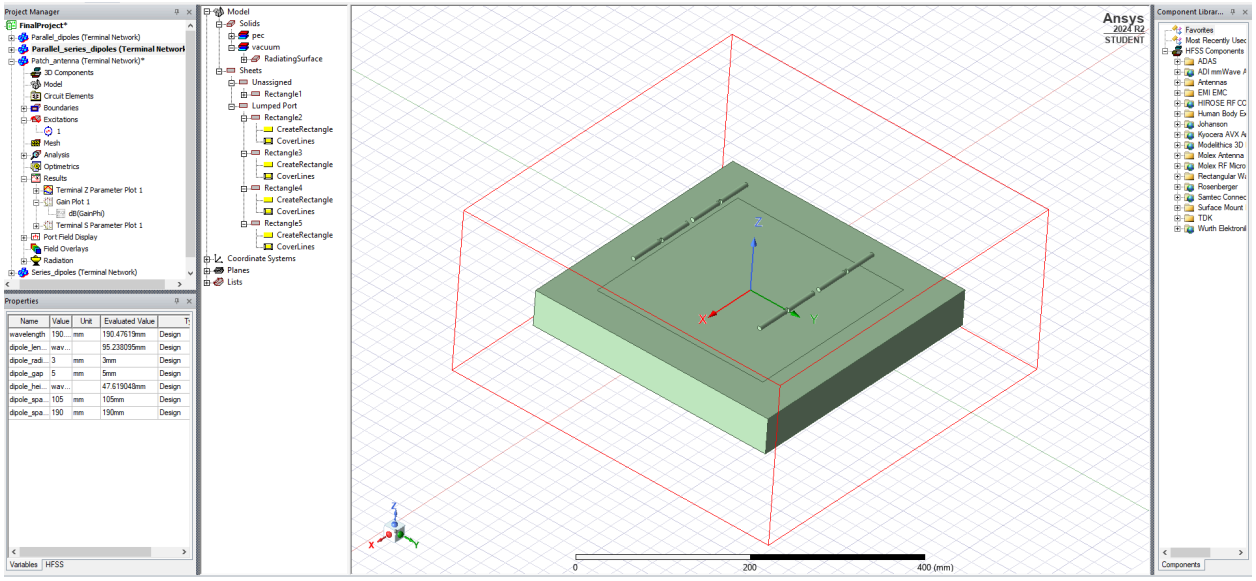
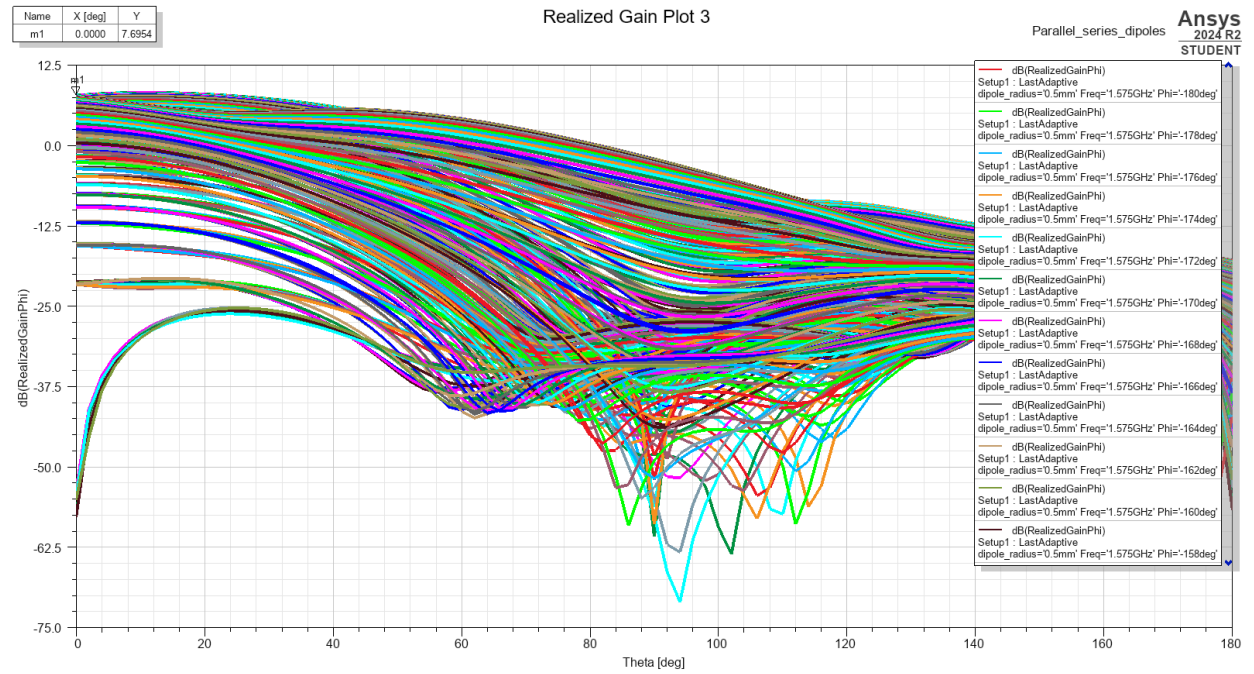
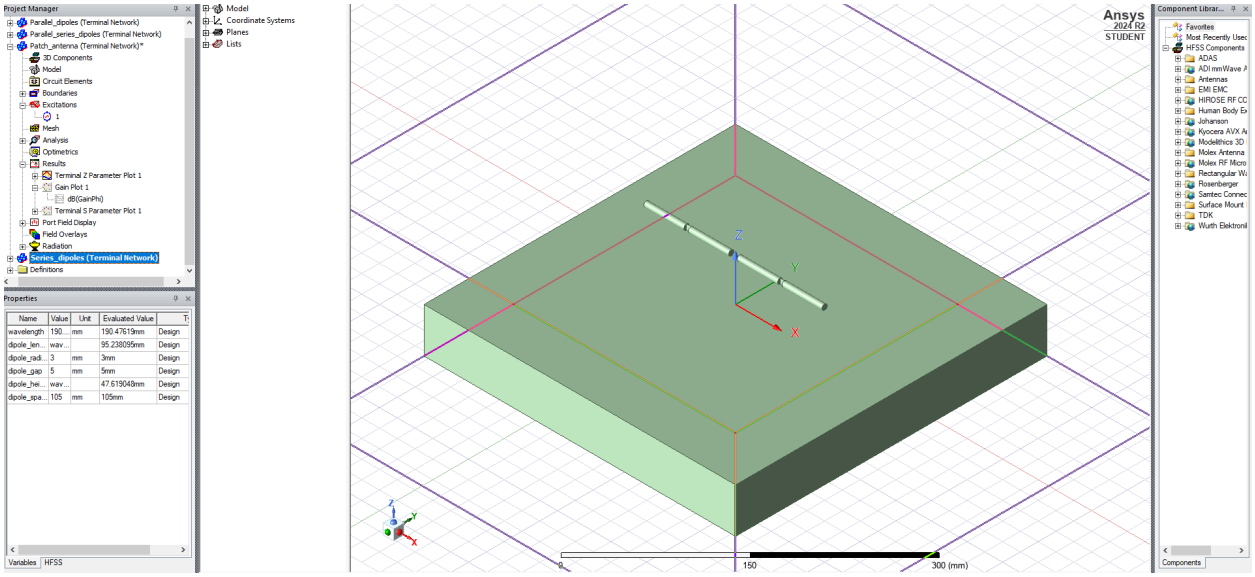
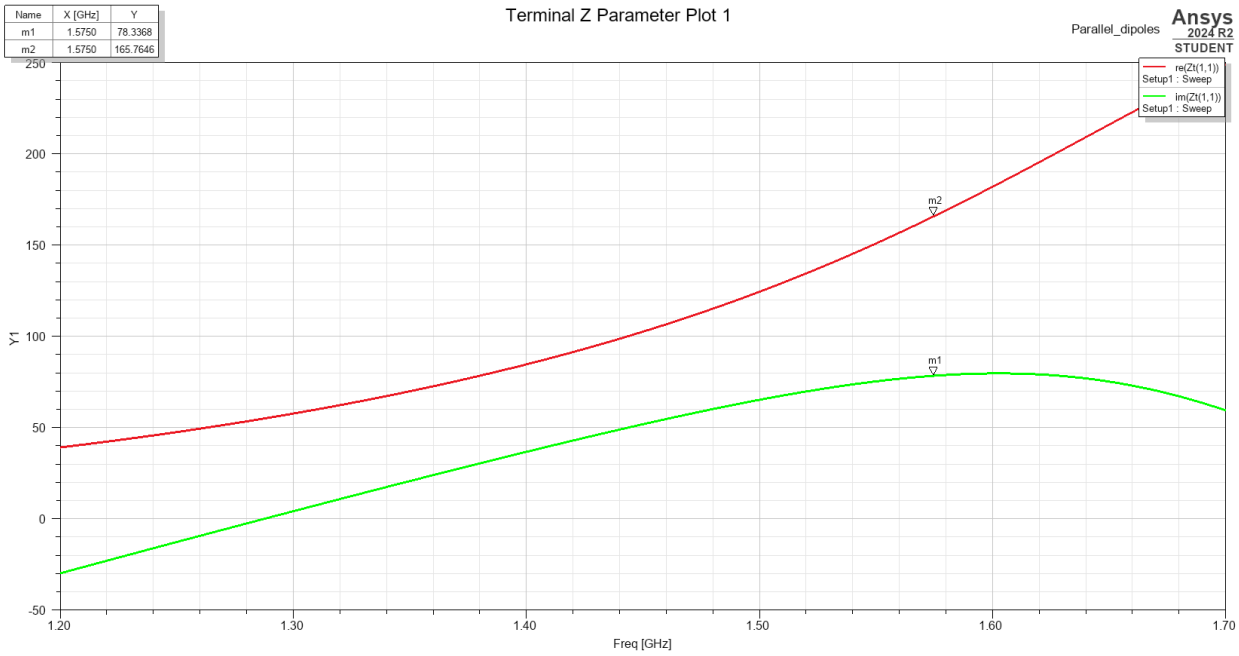
Freq='1.575GHz' Phi='-90deg'
Freq='1.575GHz' Phi='0deg'
Freq='1.575GHz' Phi='90deg'
Freq='1.575GHz' Phi='180deg'
dB(GainPhi)
Theta [deg]

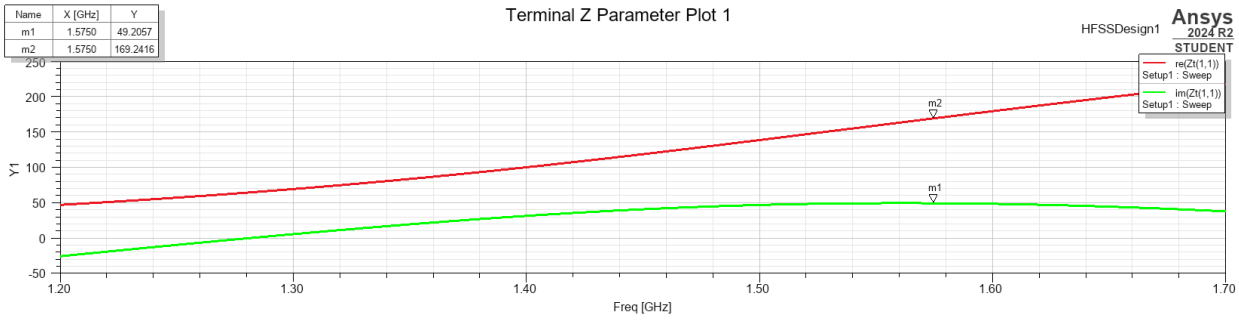

Desktop
View
Draw
Model
Simulation
Results
Automation
Ansys Minerva
Learning and Support
roject Manager
FinalProject*
Parallel_dipoles (Terminal Network)
Parallel_series_dipoles (Terminal Network)
Patch_antenna (Terminal Network)*
3D Components
Model
Circuit Elements
Boundaries
Excitations
1
Mesh
Analysis
Optimetrics
Results
Terminal Z Parameter Plot 1
Gain Plot 1
dB(GainPhi)
Terminal S Parameter Plot 1
Port Field Display
Field Overlays
Radiation
Series_dipoles (Terminal Network)
roperties
Name
Value
Unit
Evaluated Value
wavelength
dipole_len...
dipole_radi...
dipole_gap
dipole_hei...
dipole_spa...
dipole_spa...
Variables
HFSS
Model
Coordinate Systems
Planes
Lists
Ansys
2024 R2
STUDENT
Component Librar...
Favorites
Most Recently Usec
HFSS Components
ADAS
Antennas
EMI EMC
Johanson
Modelithics 3D
Molex Antenna
Molex RF Micro
Rectangular Wa
Rosenberger
Surface Mount
TDK
Components
0
150
300 (mm)

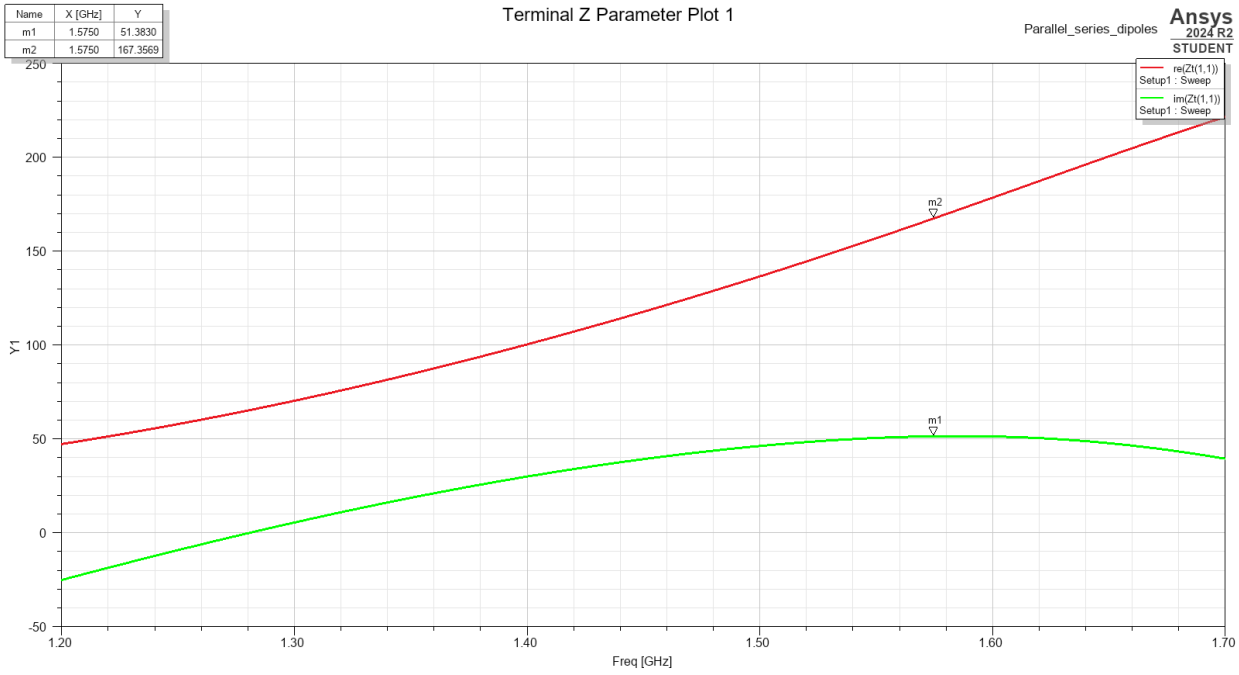

Project Manager
FinalProject*
Parallel_dipoles (Terminal Network)
Parallel_series_dipoles (Terminal Network
Patch_antenna (Terminal Network)*
3D Components
Model
Circuit Elements
Boundaries
Excitations
1
Mesh
Analysis
Optimetrics
Results
Terminal Z Parameter Plot 1
Gain Plot 1
dB(GainPhi)
Terminal S Parameter Plot 1
Port Field Display
Field Overlays
Radiation
Series_dipoles (Terminal Network)
Properties
Name
Value
Unit
Evaluated Value
wavelength
dipole_len...
dipole_radi...
dipole_gap
dipole_hei...
dipole_spa...
dipole_spa...
Variables
HFSS
Model
Solids
pec
vacuum
RadiatingSurface
Sheets
Unassigned
Rectangle1
Lumped Port
Rectangle2
CreateRectangle
CoverLines
Rectangle3
CreateRectangle
CoverLines
Rectangle4
CreateRectangle
CoverLines
Rectangle5
CreateRectangle
CoverLines
Coordinate Systems
Planes
Lists
Ansys
2024 R2
STUDENT
Component Librar...
Favorites
Most Recently Usec
HFSS Components
ADAS
Antennas
EMI EMC
Johanson
Modelithics 3D
Molex Antenna
Molex RF Micro
Rectangular Wa
Rosenberger
Surface Mount
TDK
Components
0
200
400 (mm)

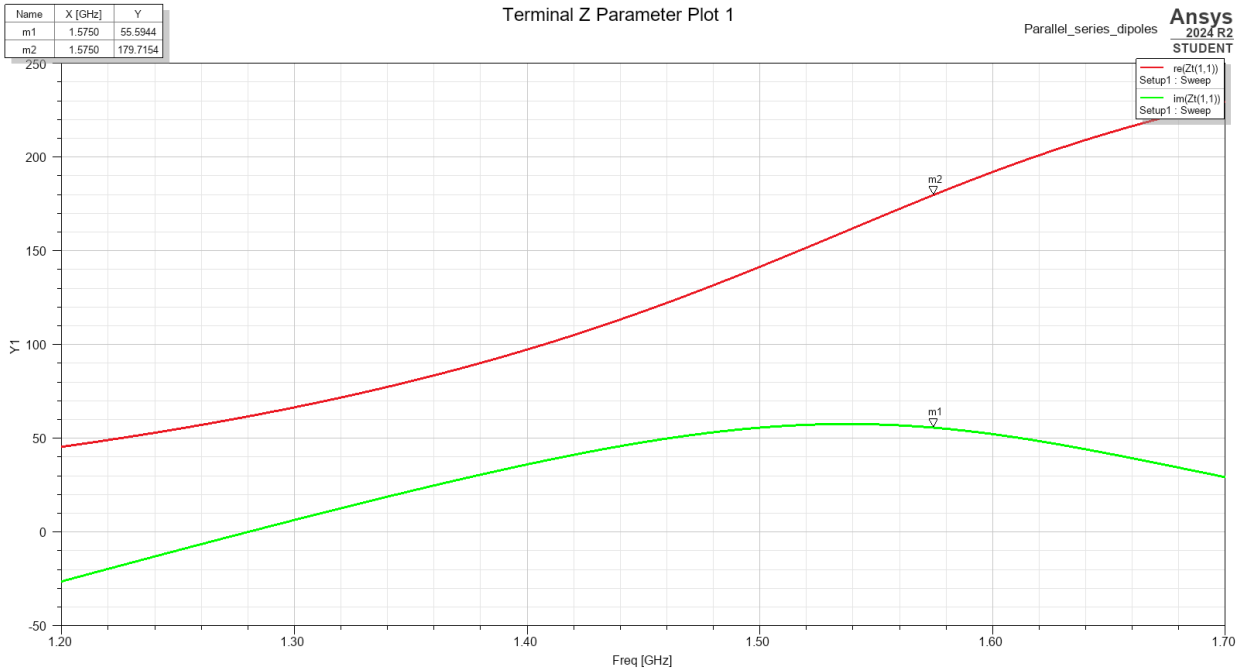

Realized Gain Plot 3
Parallel_series_dipoles
Ansys
2024 R2
STUDENT
Name | X [deg] | Y
m1 | 0.0000 | 7.6954
dB(RealizedGainPhi)
Theta [deg]
12.5
0.0
-12.5
-25.0
-37.5
-50.0
-62.5
-75.0
0
20
40
60
80
100
120
140
160
180
dB(RealizedGainPhi)
Setup1 : LastAdaptive
dipole_radius='0.5mm' Freq='1.575GHz' Phi='-180deg'
dB(RealizedGainPhi)
Setup1 : LastAdaptive
dipole_radius='0.5mm' Freq='1.575GHz' Phi='-178deg'
dB(RealizedGainPhi)
Setup1 : LastAdaptive
dipole_radius='0.5mm' Freq='1.575GHz' Phi='-176deg'
dB(RealizedGainPhi)
Setup1 : LastAdaptive
dipole_radius='0.5mm' Freq='1.575GHz' Phi='-174deg'
dB(RealizedGainPhi)
Setup1 : LastAdaptive
dipole_radius='0.5mm' Freq='1.575GHz' Phi='-172deg'
dB(RealizedGainPhi)
Setup1 : LastAdaptive
dipole_radius='0.5mm' Freq='1.575GHz' Phi='-170deg'
dB(RealizedGainPhi)
Setup1 : LastAdaptive
dipole_radius='0.5mm' Freq='1.575GHz' Phi='-168deg'
dB(RealizedGainPhi)
Setup1 : LastAdaptive
dipole_radius='0.5mm' Freq='1.575GHz' Phi='-166deg'
dB(RealizedGainPhi)
Setup1 : LastAdaptive
dipole_radius='0.5mm' Freq='1.575GHz' Phi='-164deg'
dB(RealizedGainPhi)
Setup1 : LastAdaptive
dipole_radius='0.5mm' Freq='1.575GHz' Phi='-162deg'
dB(RealizedGainPhi)
Setup1 : LastAdaptive
dipole_radius='0.5mm' Freq='1.575GHz' Phi='-160deg'
dB(RealizedGainPhi)
Setup1 : LastAdaptive
dipole_radius='0.5mm' Freq='1.575GHz' Phi='-158deg'

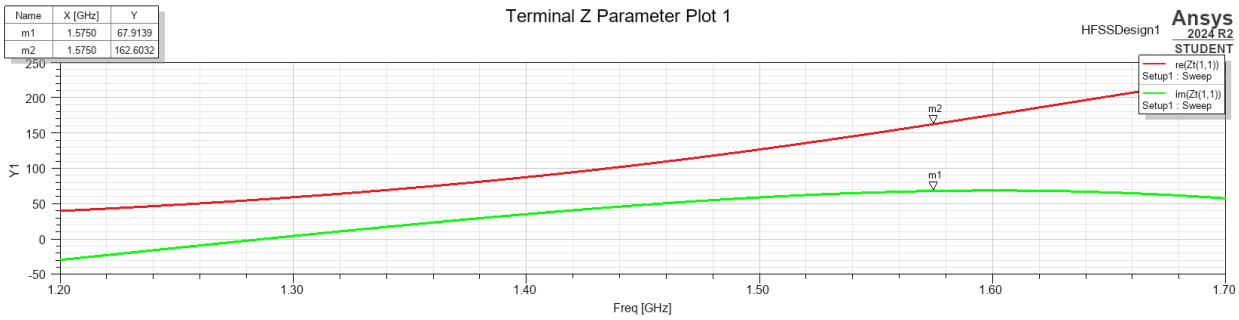

Project Manager
Parallel_dipoles (Terminal Network)
Parallel_series_dipoles (Terminal Network)
Patch_antenna (Terminal Network)*
3D Components
Model
Circuit Elements
Boundaries
Excitations
1
Mesh
Analysis
Optimetrics
Results
Terminal Z Parameter Plot 1
Gain Plot 1
dB(GainPhi)
Terminal S Parameter Plot 1
Port Field Display
Field Overlays
Radiation
Series_dipoles (Terminal Network)
Definitions
Model
Coordinate Systems
Planes
Lists
Properties
Name | Value | Unit | Evaluated Value | T
wavelength | 190... | mm | 190.4761 9mm | Design
dipole_len... | wav... | | 95.238095mm | Design
dipole_radi... | 3 | mm | 3mm | Design
dipole_gap | 5 | mm | 5mm | Design
dipole_hei... | wav... | | 47.619048mm | Design
dipole_spa... | 105 | mm | 105mm | Design
Variables
HFSS
Ansys
2024 R2
STUDENT
Component Librar...
Favorites
Most Recently Usec
HFSS Components
ADAS
AEI mmWave A
Antennas
EMI EMC
HIROSE RF CC
Human Body Ex
Johanson
Kyocera AVX A
Modelithics 3D
Molex Antenna
Molex RF Micro
Rectangular W
Rosenberger
Samtec Connec
Surface Mount
TDK
Wurth Elektroni
Components
Z
Y
X
0
150
300 (mm)


Terminal Z Parameter Plot 1
Name | X [GHz] | Y
m1 | 1.5750 | 78.3368
m2 | 1.5750 | 165.7646
Parallel_dipoles
Ansys
2024 R2
STUDENT
re(Zt(1,1)) Setup1 : Sweep
im(Zt(1,1)) Setup1 : Sweep
m2
m1
Y1
Freq [GHz]
250
200
150
100
50
0
-50
1.20
1.30
1.40
1.50
1.60
1.70


Terminal Z Parameter Plot 1
Name | X [GHz] | Y
m1 | 1.5750 | 49.2057
m2 | 1.5750 | 169.2416
HFSSDesign1
Ansys
2024 R2
STUDENT
re(Zt(1,1)) Setup1 : Sweep
im(Zt(1,1)) Setup1 : Sweep
m2
m1
Y1
Freq [GHz]
250
200
150
100
50
0
-50
1.20
1.30
1.40
1.50
1.60
1.70


Terminal Z Parameter Plot 1
Name | X [GHz] | Y
m1 | 1.5750 | 51.3830
m2 | 1.5750 | 167.3569
Parallel_series_dipoles
Ansys
2024 R2
STUDENT
re(Zt(1,1)) Setup1 : Sweep
im(Zt(1,1)) Setup1 : Sweep
m2
m1
Y1
Freq [GHz]
250
200
150
100
50
0
-50
1.20
1.30
1.40
1.50
1.60
1.70


Terminal Z Parameter Plot 1
Parallel_series_dipoles
Ansys
2024 R2
STUDENT
Name | X [GHz] | Y
m1 | 1.5750 | 55.5944
m2 | 1.5750 | 179.7154
re(Zt(1,1)) Setup1 : Sweep
im(Zt(1,1)) Setup1 : Sweep
m2
m1
Y1
Freq [GHz]
250
200
150
100
50
0
-50
1.20
1.30
1.40
1.50
1.60
1.70


Terminal Z Parameter Plot 1
HFSSDesign1
Ansys
2024 R2
STUDENT
Name | X [GHz] | Y
m1 | 1.5750 | 67.9139
m2 | 1.5750 | 162.6032
re(Zt(1,1)) Setup1 : Sweep
im(Zt(1,1)) Setup1 : Sweep
m2
m1
Y1
Freq [GHz]
250
200
150
100
50
0
-50
1.20
1.30
1.40
1.50
1.60
1.70