L-Università ta' Malta

Horn Antennas for REACHES

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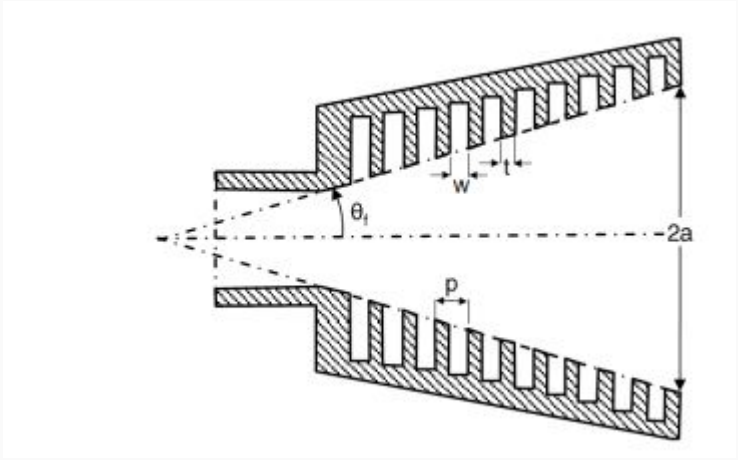
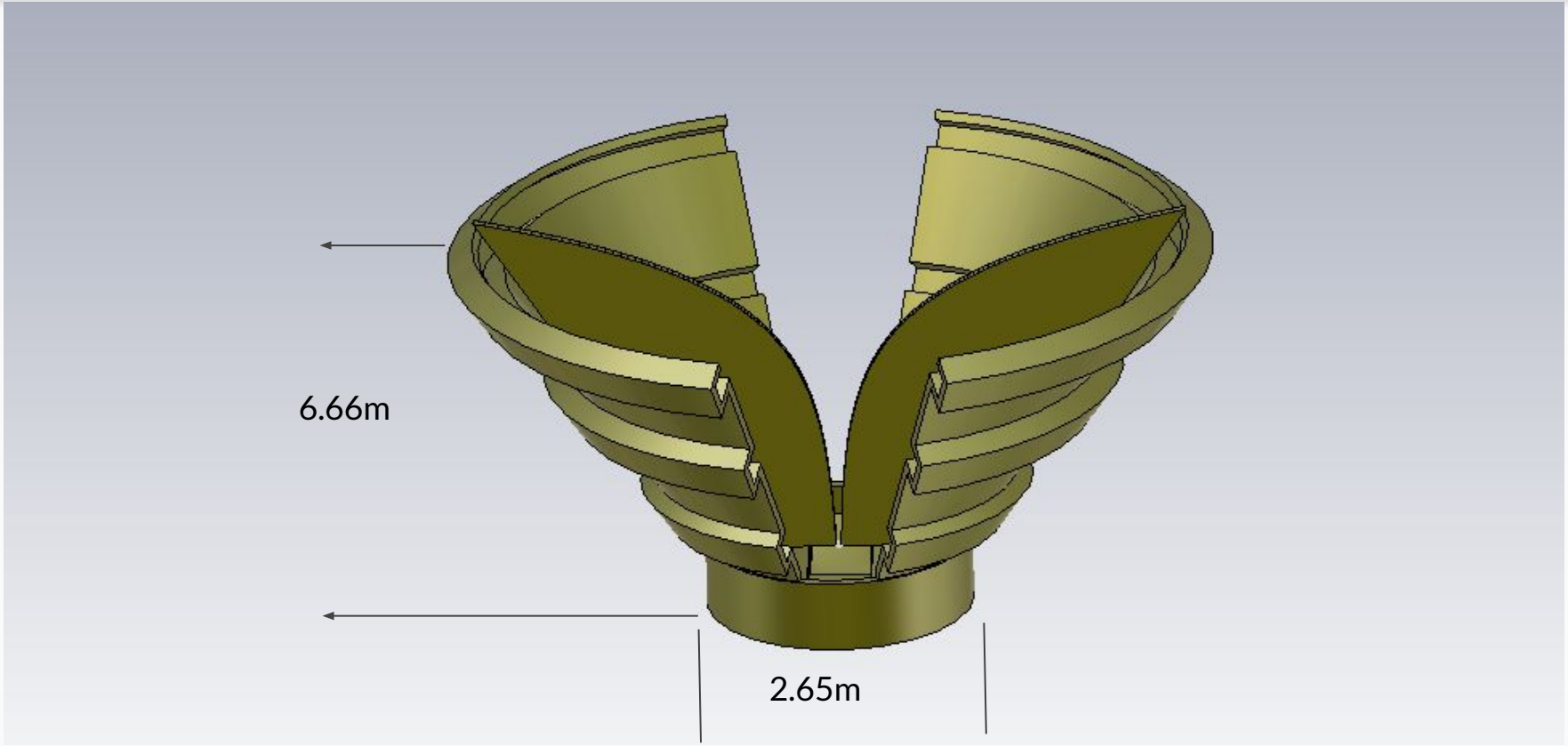
Circular Corrugated Horn Antenna.

There are three main reasons for corrugated horn antennas.

1. they exhibit radiation pattern symmetry.
2. they radiate with very low cross-polarization.
3. they offer a wide bandwidth responses.

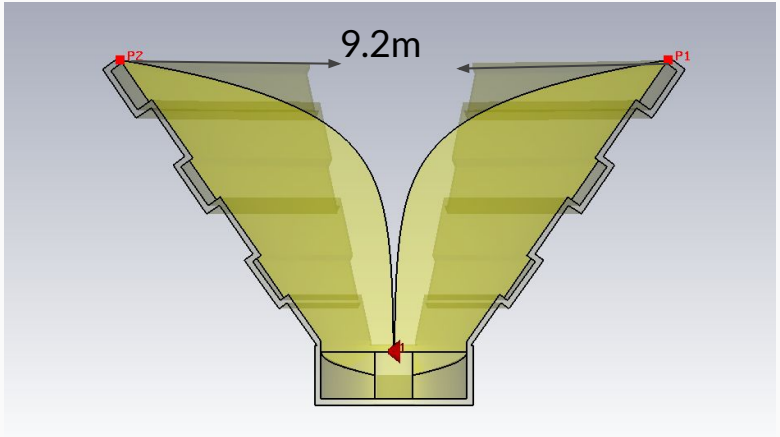


Circular Corrugated Horn Antenna- cavity-backed feed.

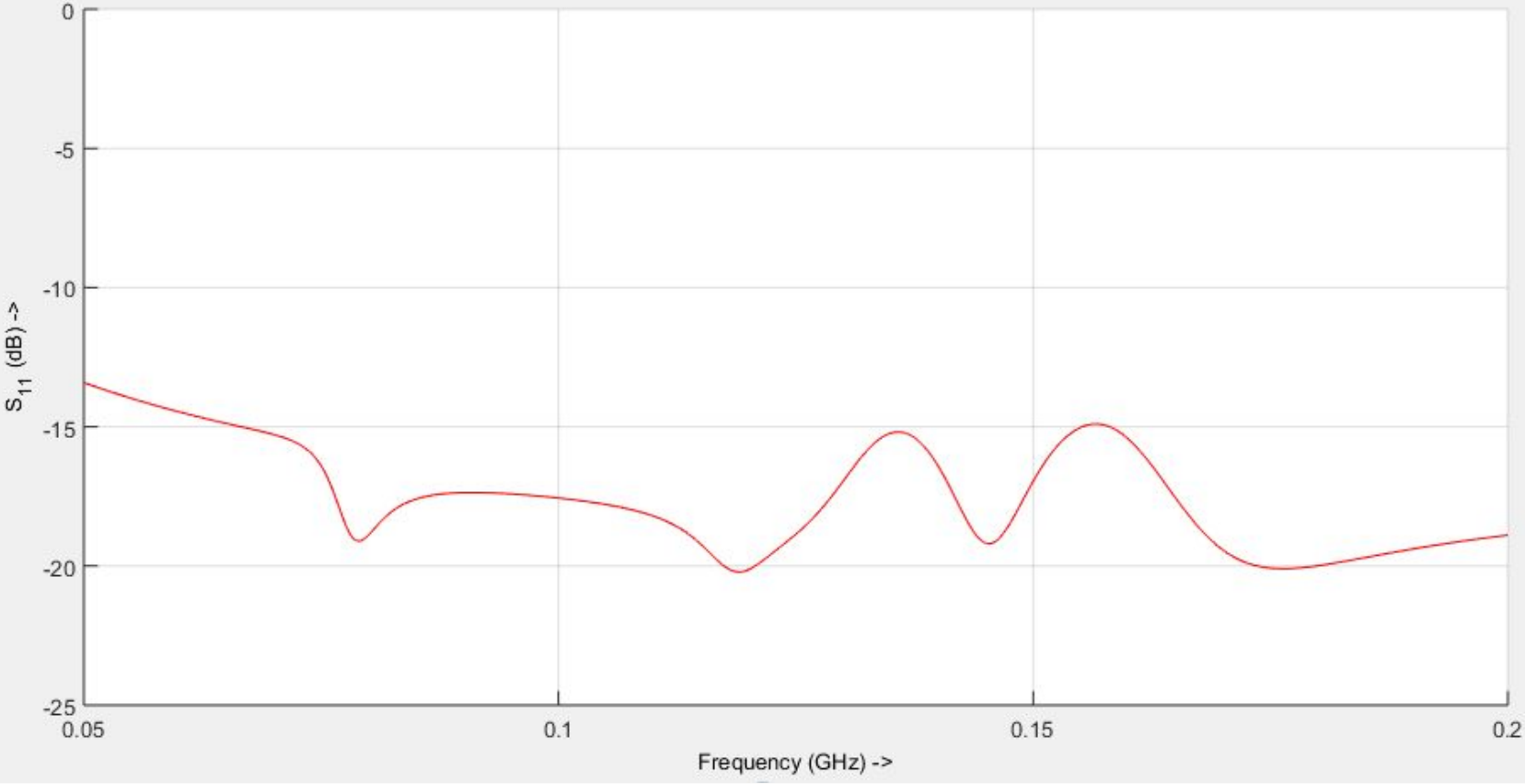


Design parameters

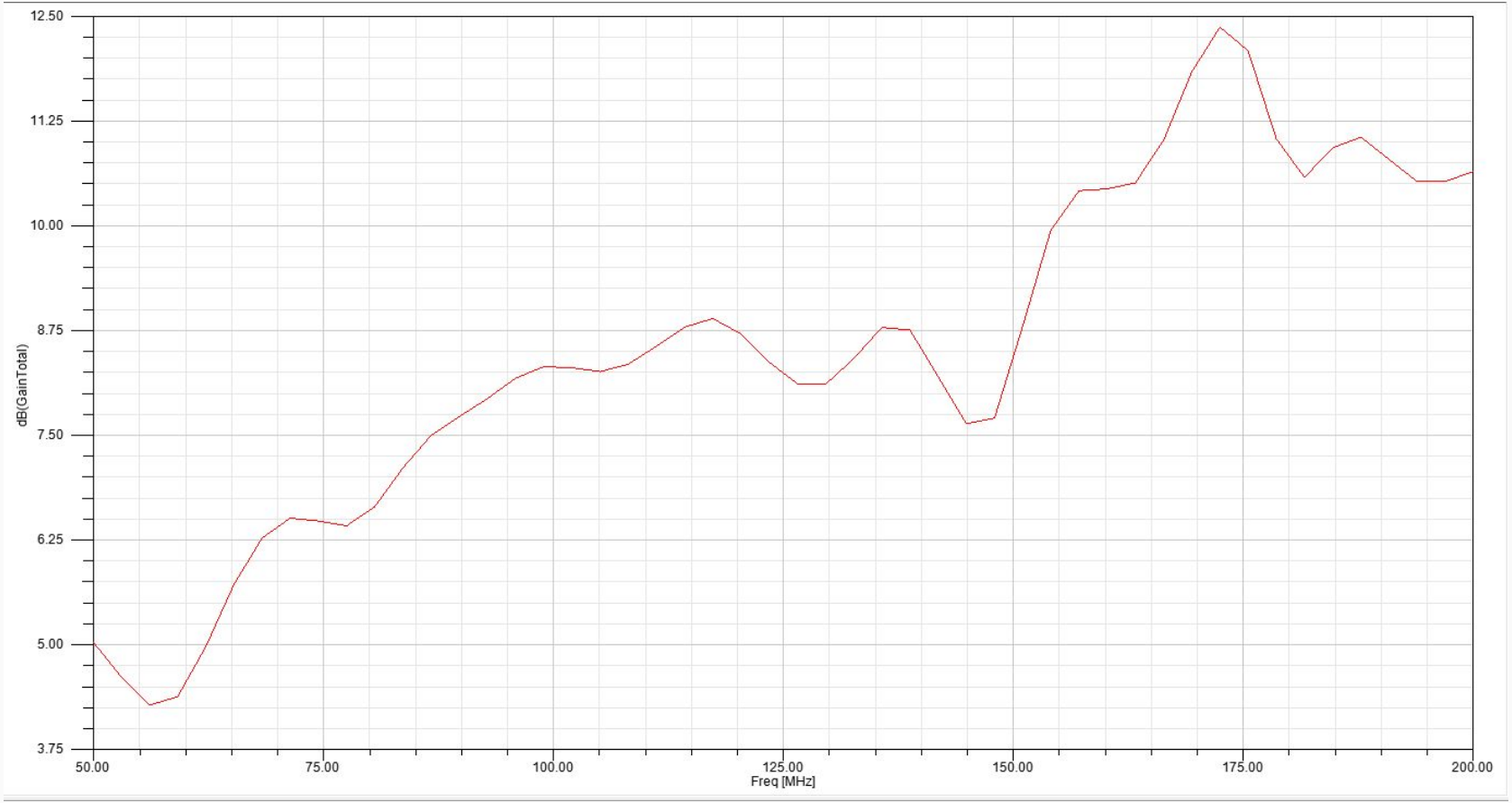
1. Frequency band 50MHz to 200MHz.
2. θf=35°
3. Height 6.6m m
4. Cavity-backed feed
5. 50 Ohm



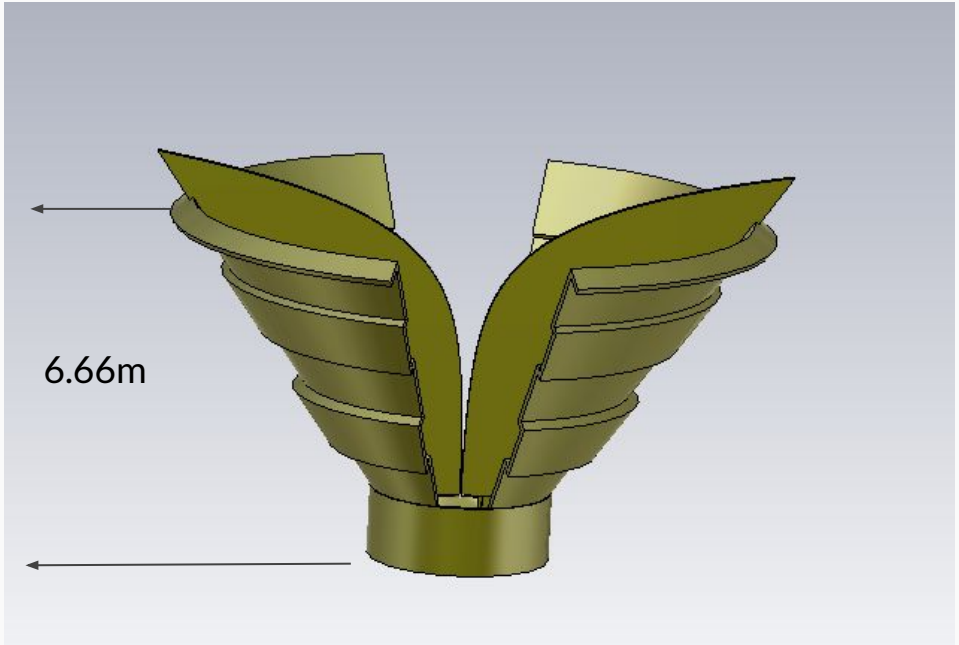
HFSS-S11 parameters results



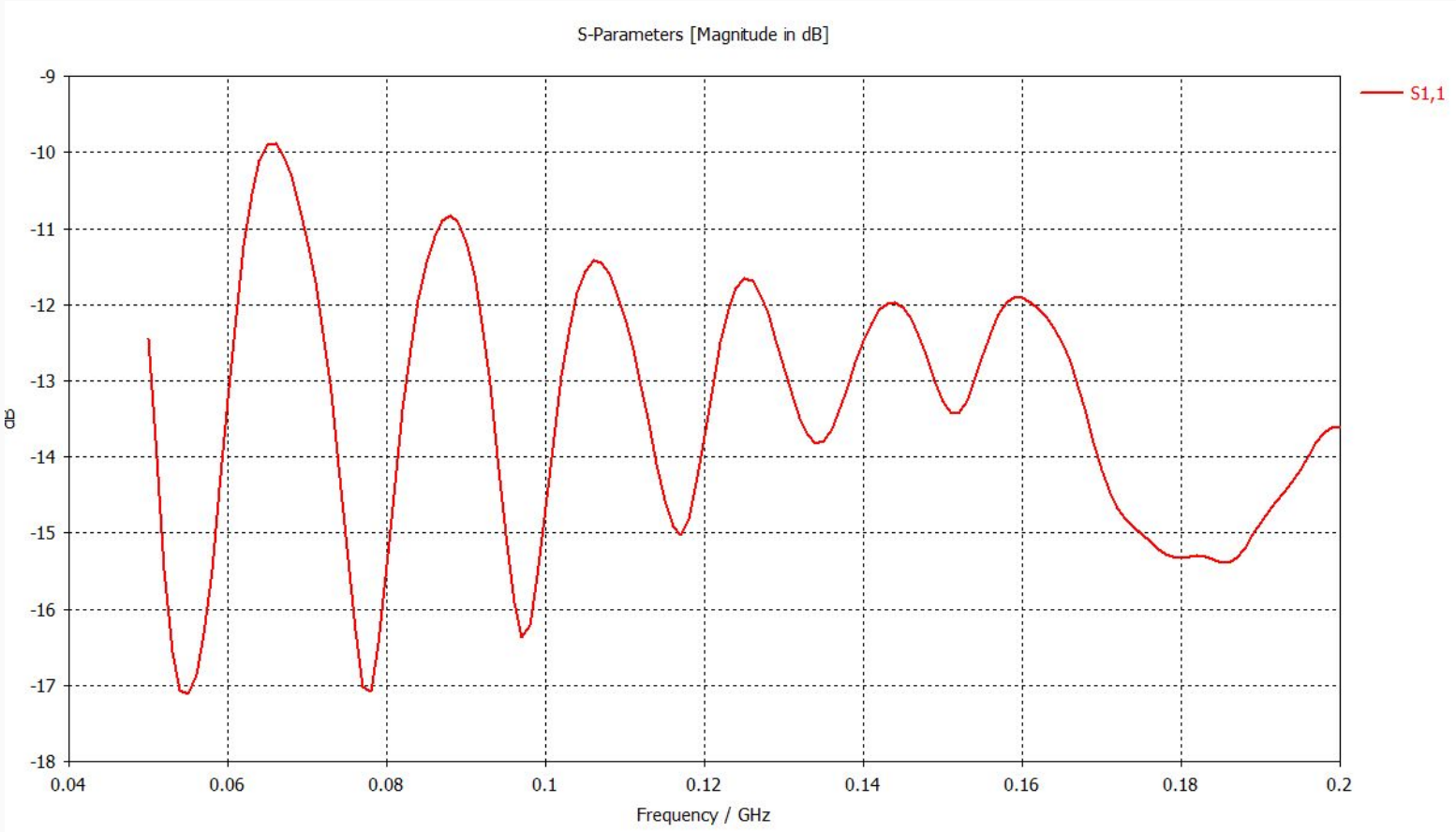
Gain Vs Frequency



Circular Corrugated Horn Antenna- cavity-backed feed.

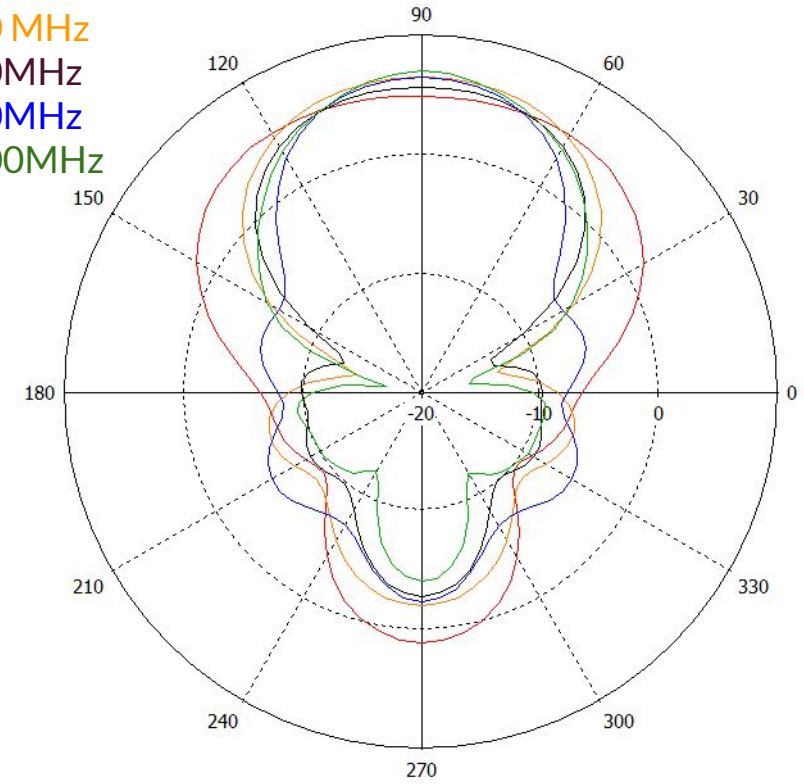


CST-S11 parameters results

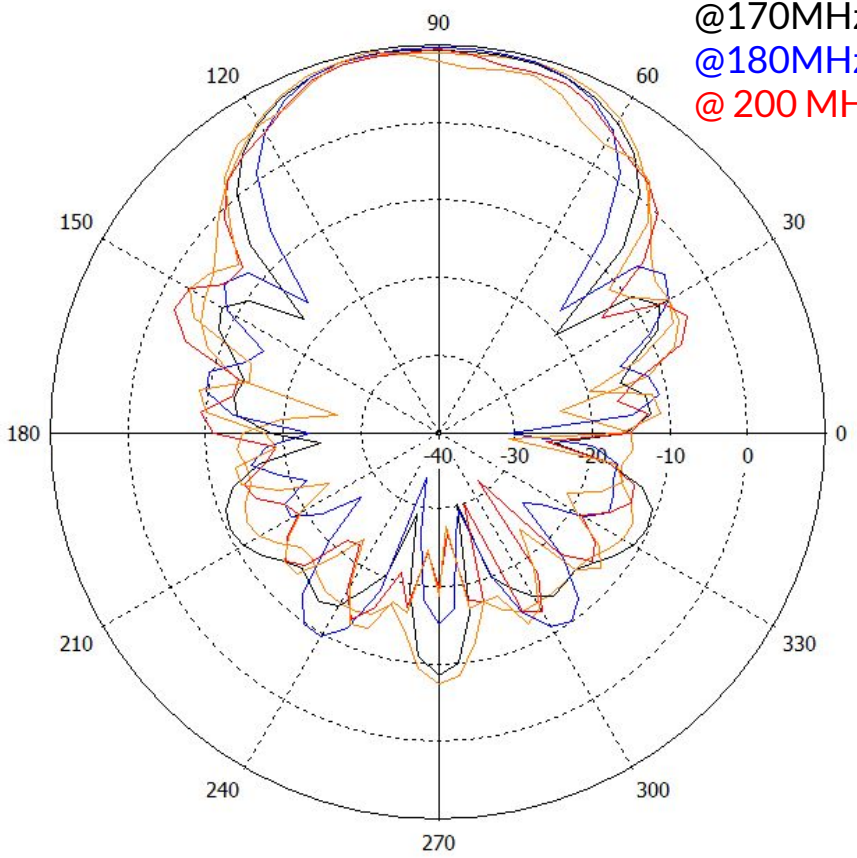


Polar adiation pattern (2D)

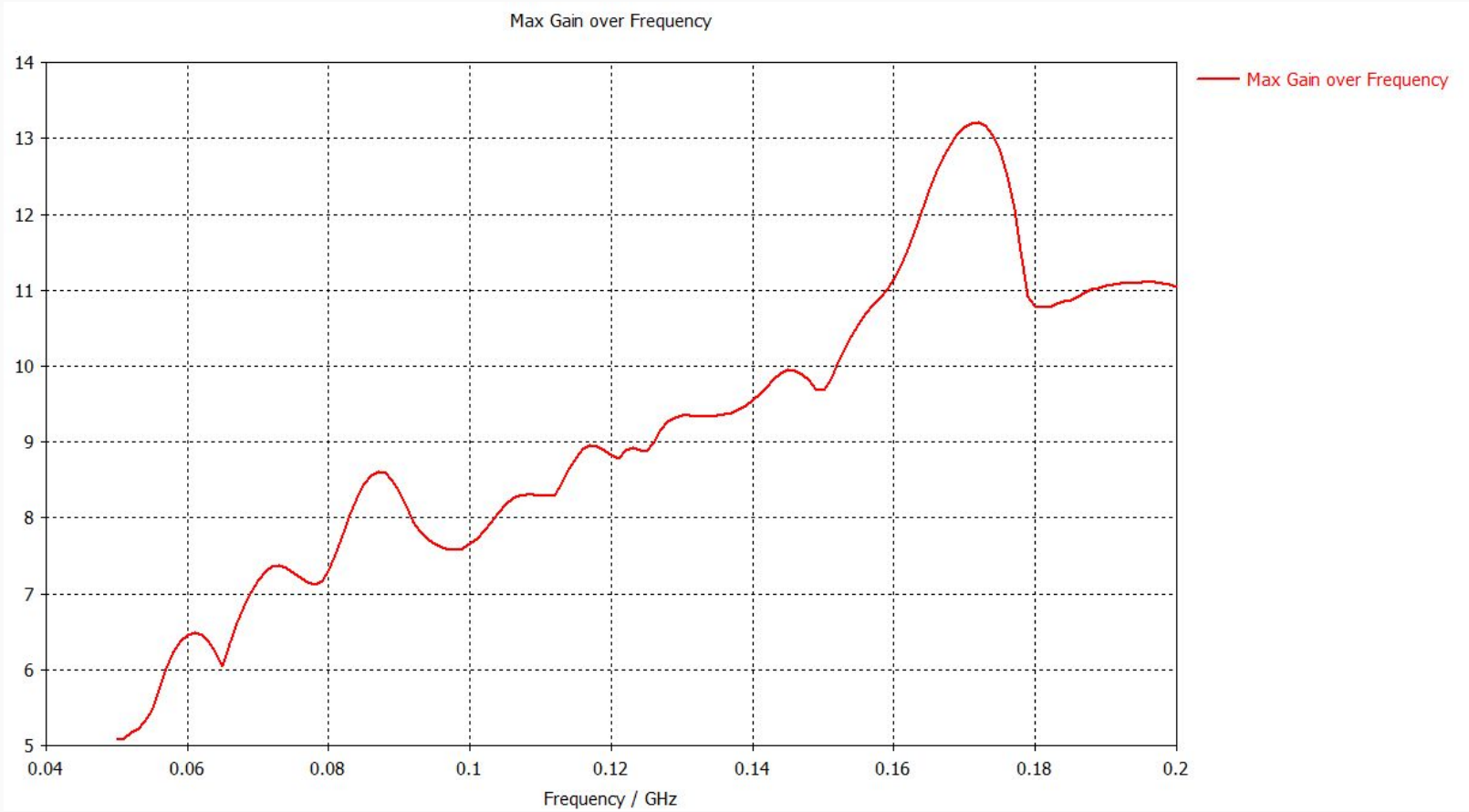
@ 50 MHz
@60 MHz
@70MHz
@80MHz
@100MHz

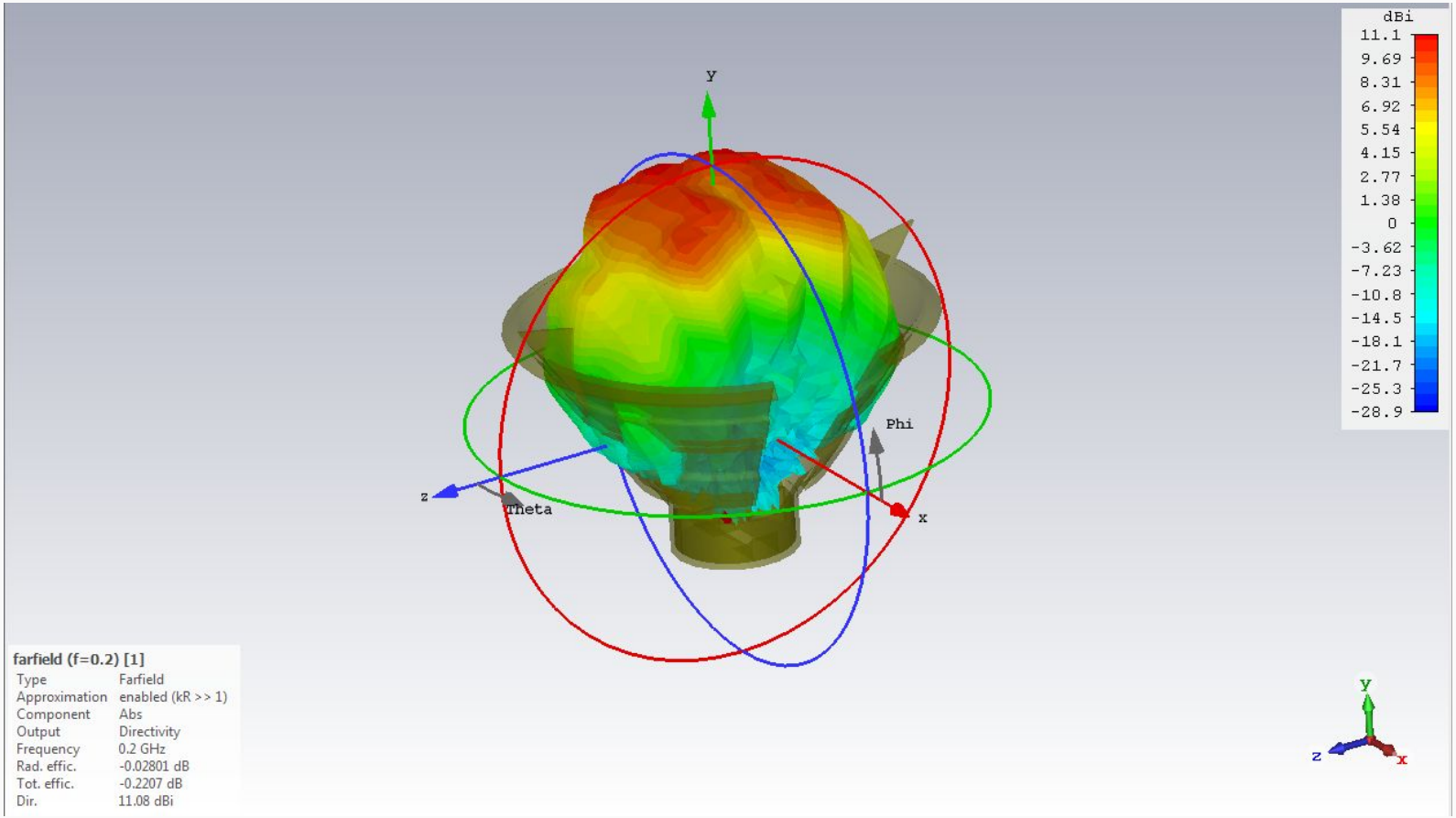


@170MHz
@180MHz
@ 200 MHz

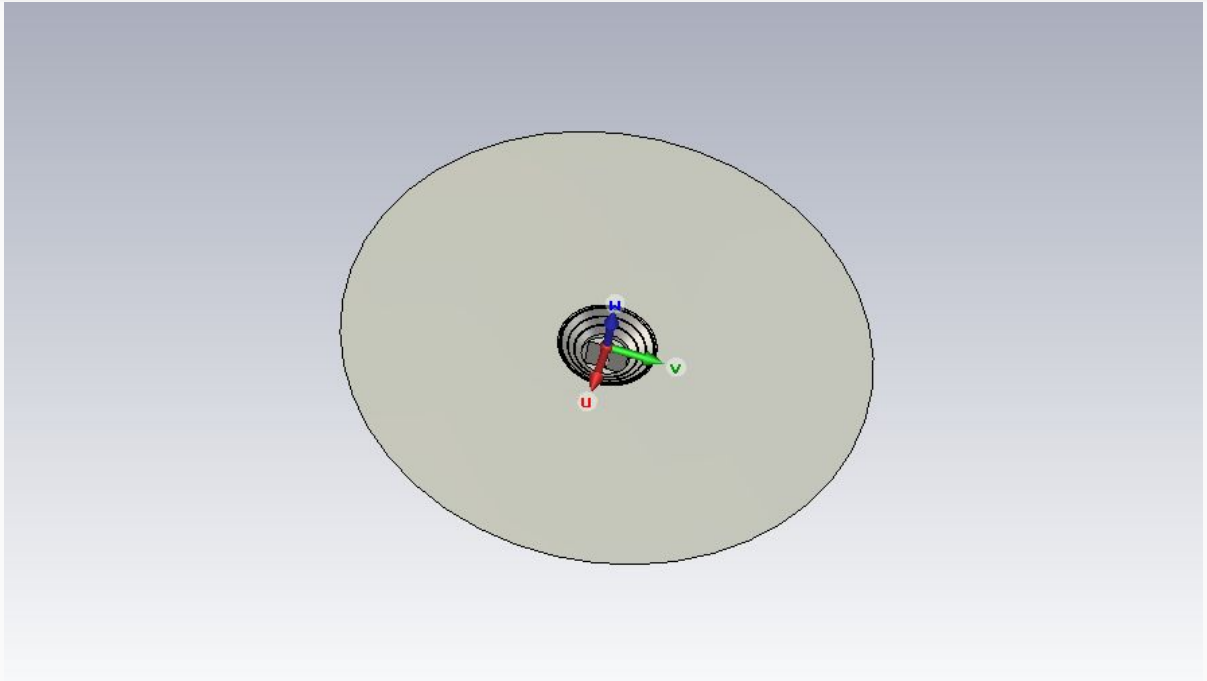


Gain Vs. Frequency




dBi
11.1
9.69
8.31
6.92
5.54
4.15
2.77
1.38
0
-3.62
-7.23
-10.8
-14.5
-18.1
-21.7
-25.3
-28.9
y
Phi
z
Theta
x
farfield (f=0.2) [1]
Type Farfield
Approximation enabled (kR >> 1)
Component Abs
Output Directivity
Frequency 0.2 GHz
Rad. effic. -0.02801 dB
Tot. effic. -0.2207 dB
Dir. 11.08 dBi
y
z
x

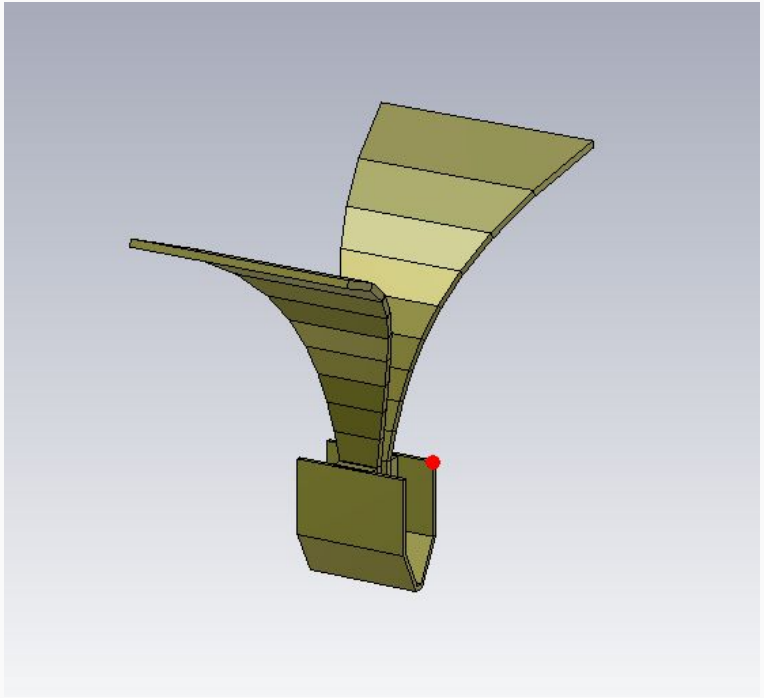
Corrugated Horn Antenna- coaxial feed (50 Ohm)

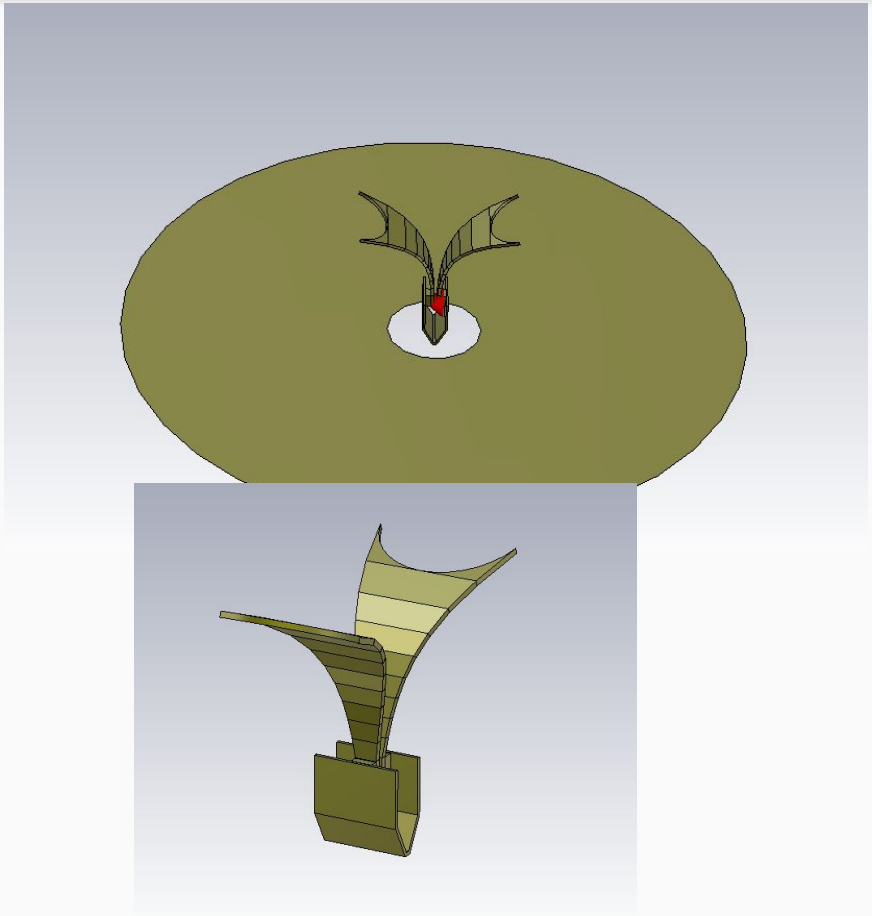


The effect of a ground plane below the conical corrugated horn

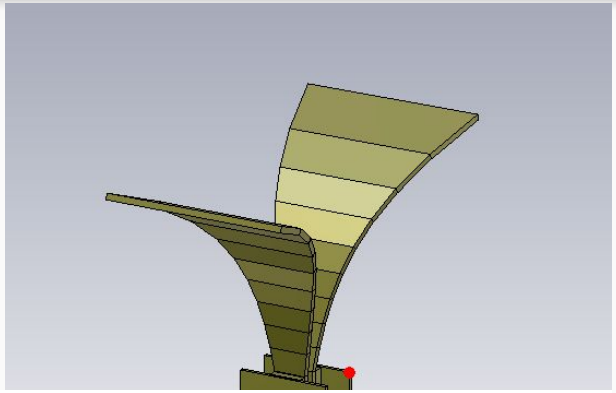
1. Does not modify the matching impedance of the antenna
2. The larger it is the better effective to reduce the back lobes of the radiation pattern.

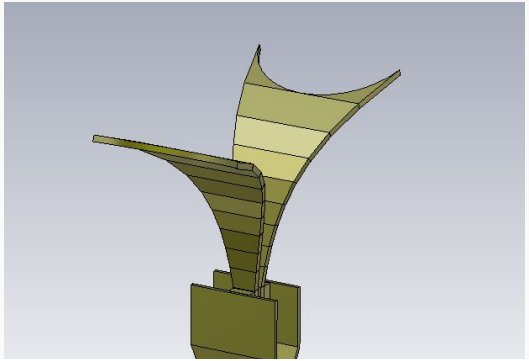
TEM-horn antenna (for a simple prototype)

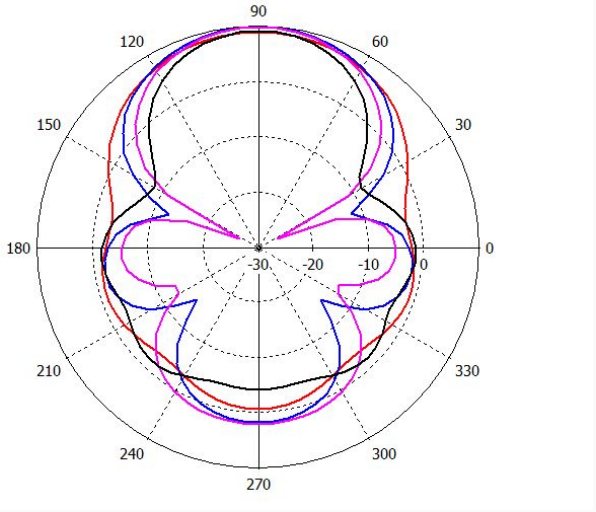




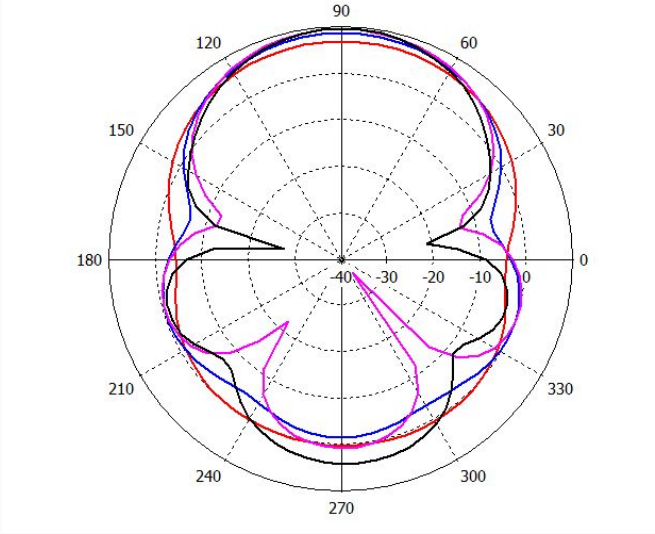
TEM-horn antenna

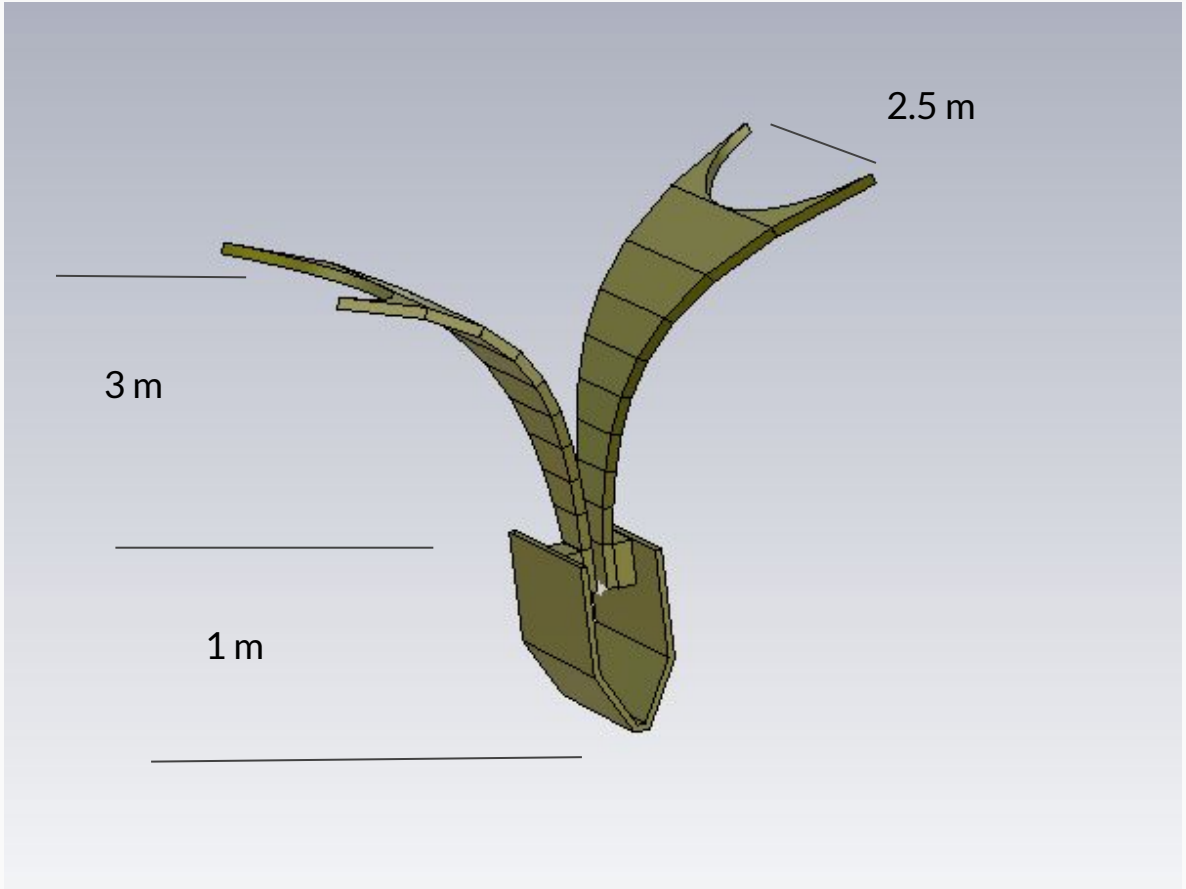




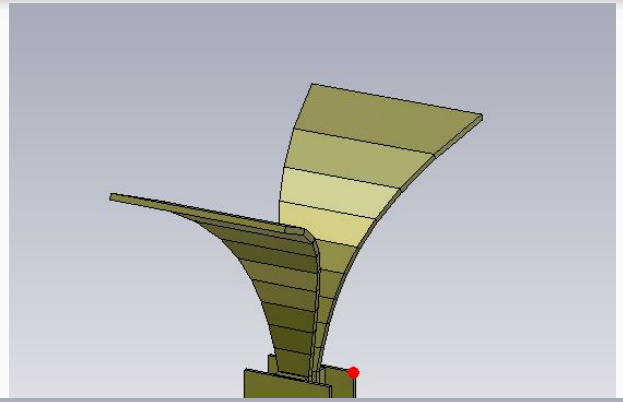


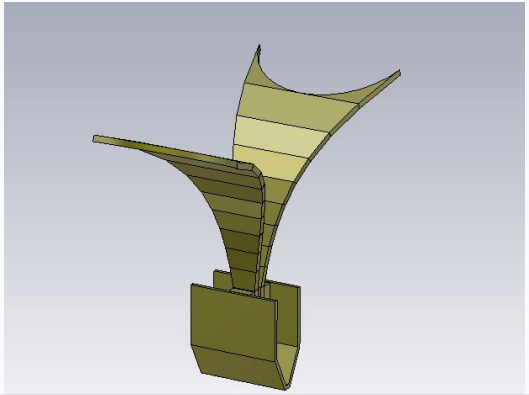
@ 50 MHz
@60 MHz
@70MHz
@80MHz

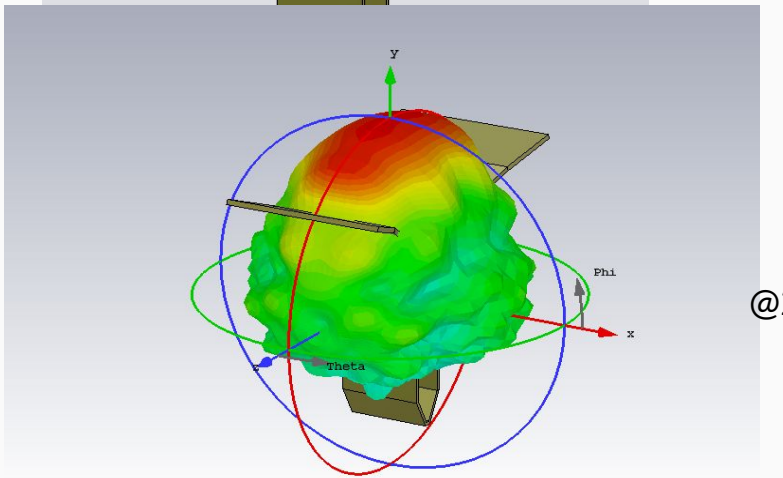



2.5 m
3 m
1 m

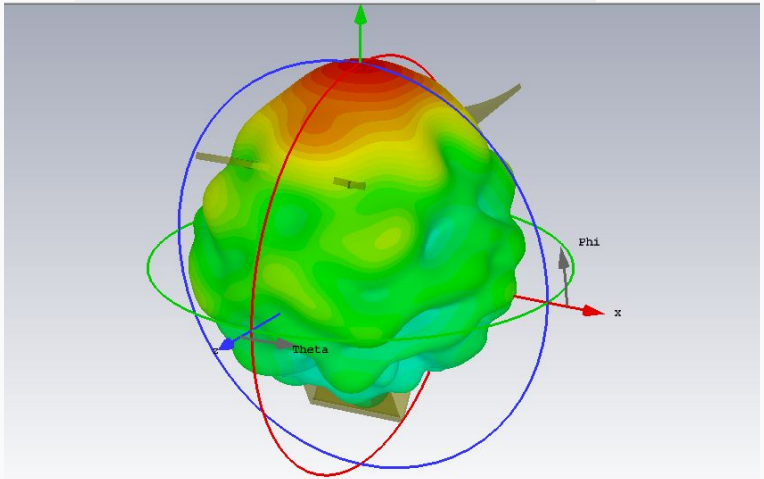
TEM-horn antenna



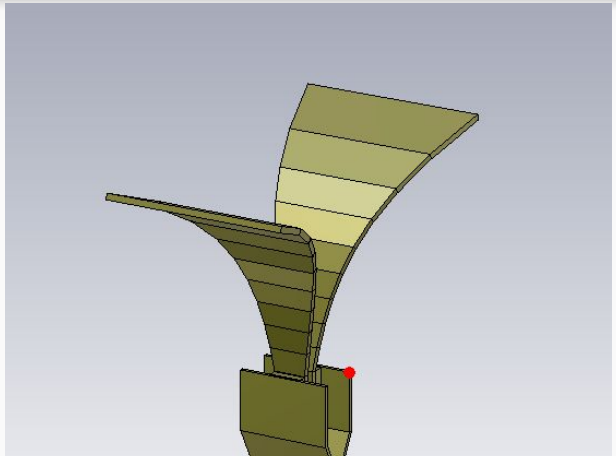


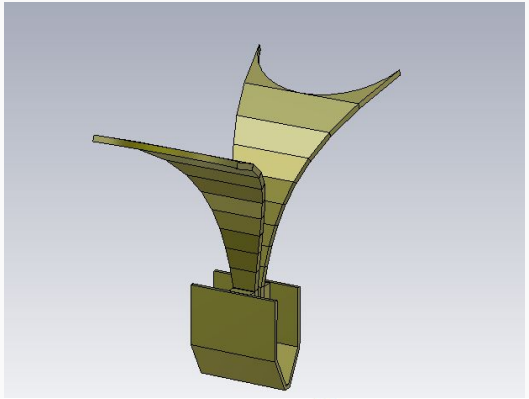


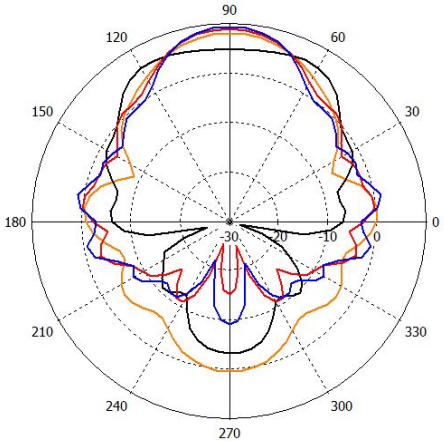
@200 MHz



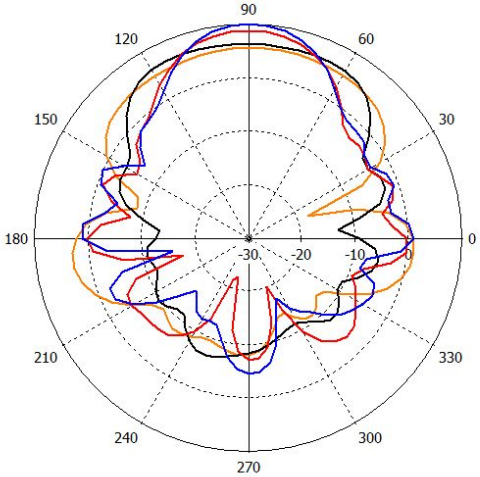
TEM-horn antenna



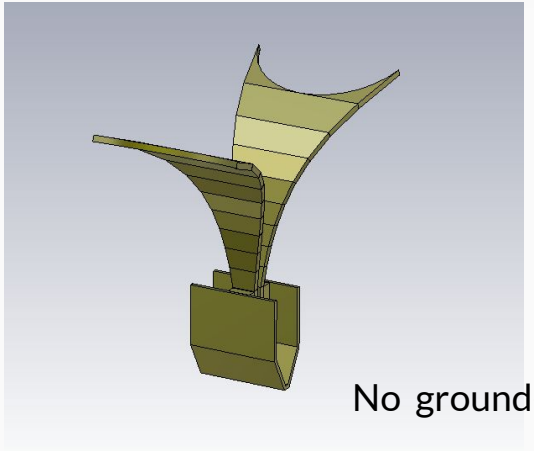




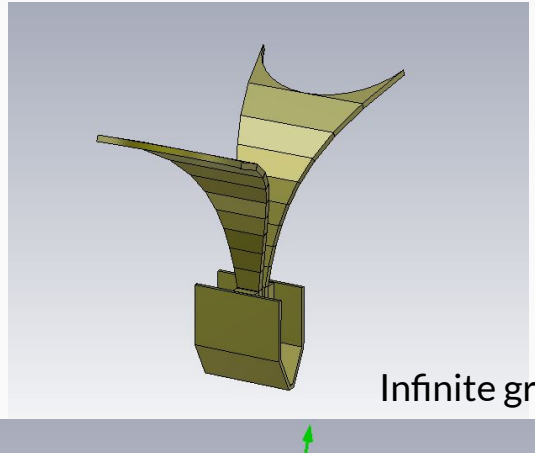
@ 100 MHz
@150MHz
@190MHz
@200MHz



TEM-horn antenna

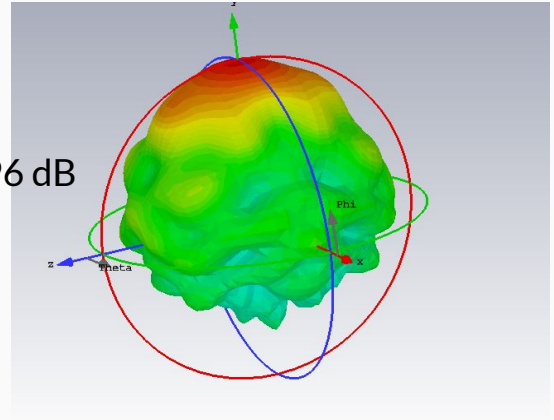


No ground-plane

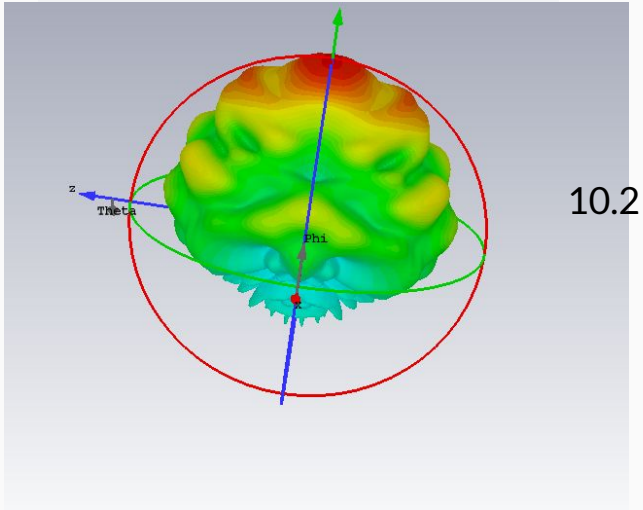


Infinite ground-plane

9.96 dB

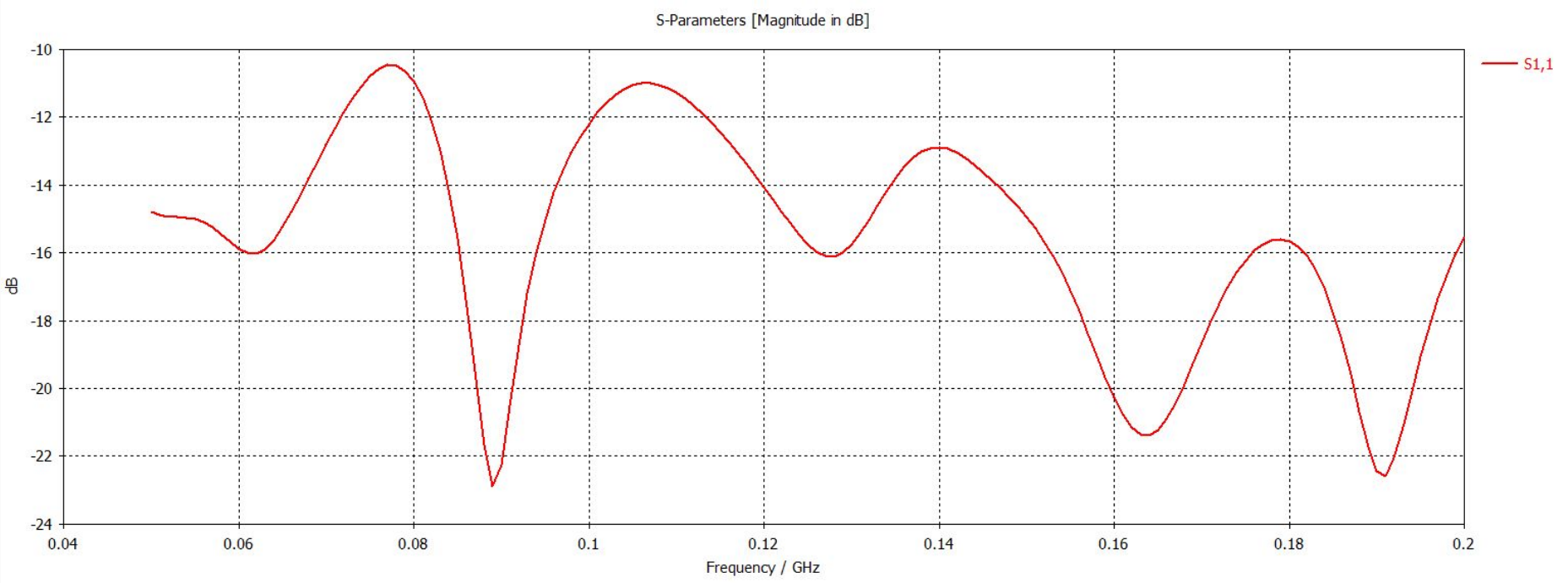


@200MHz



10.2 dB

S11- parameters



Gain Vs Frequency