

# **ANTENNAS AND WAVE PROPAGATION**

## **LAB ASSIGNMENT 10**

### **EXPERIMENT 10**

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**BATCH: 2018-2022**

**DIVISION: G2; EA 3**

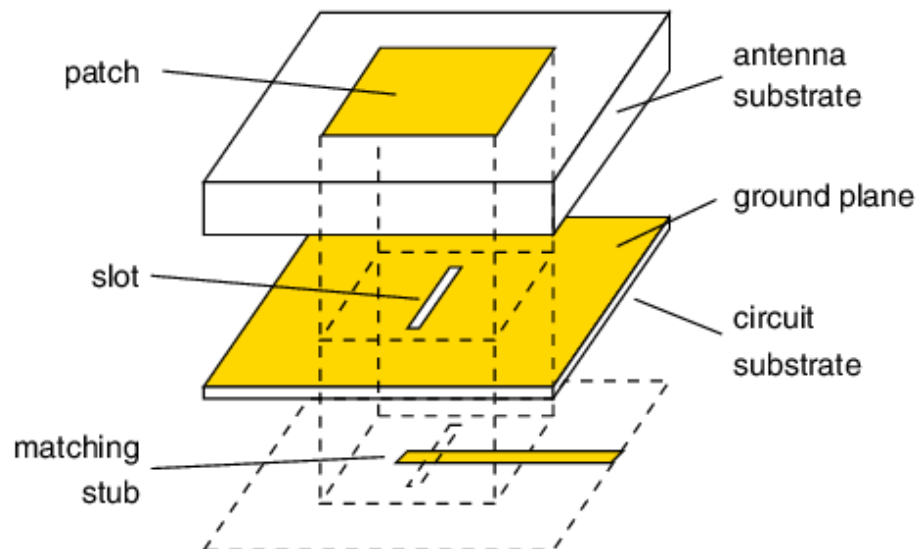
**AIM:** Design an aperture coupled antenna.

**Theory:** Microstrip patch antennas have been used extensively in applications requiring low-profile, mounting structure conforming, and low-cost wireless communications.

The aperture coupled technique exhibits reduced transmission line radiation and enhanced antenna radiation and co- to cross-pol performance relative to microstrip and probe fed configurations.

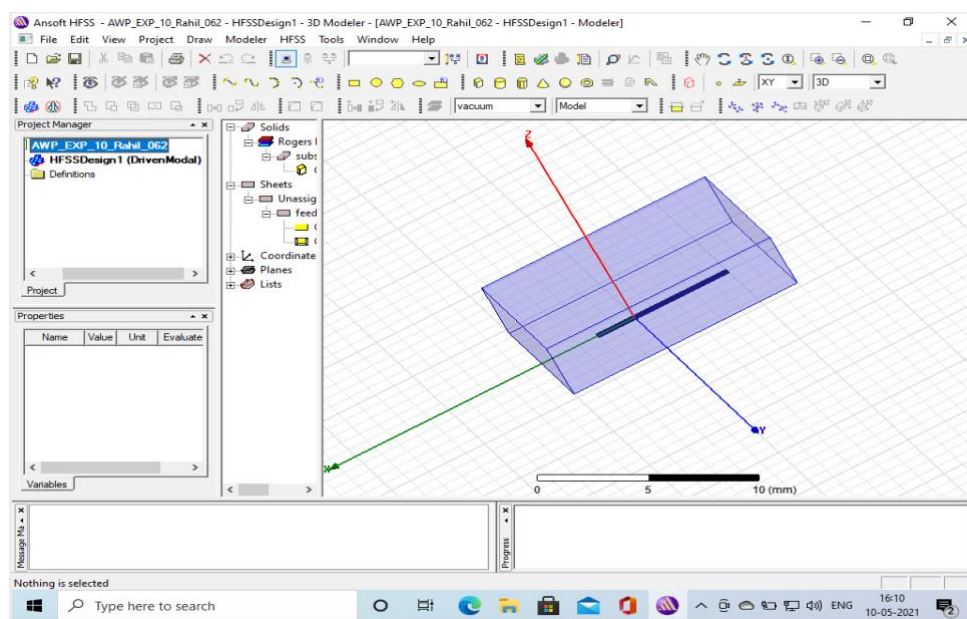
The aperture coupled microstrip patch antenna feed Technique was introduced in 1985 that includes electrically isolated microstrip transmission lines and patch conductors. These structures are electromagnetically coupled through a small aperture in the isolating ground plane. Two common feed techniques for patch antennas are directly connected microstrip transmission lines and coaxial probes

Aperture coupled patch antennas involve performance critical parameters including substrate thickness, substrate dielectric constant, microstrip feed line, ground plane slot, and patch dimensions and relative locations.

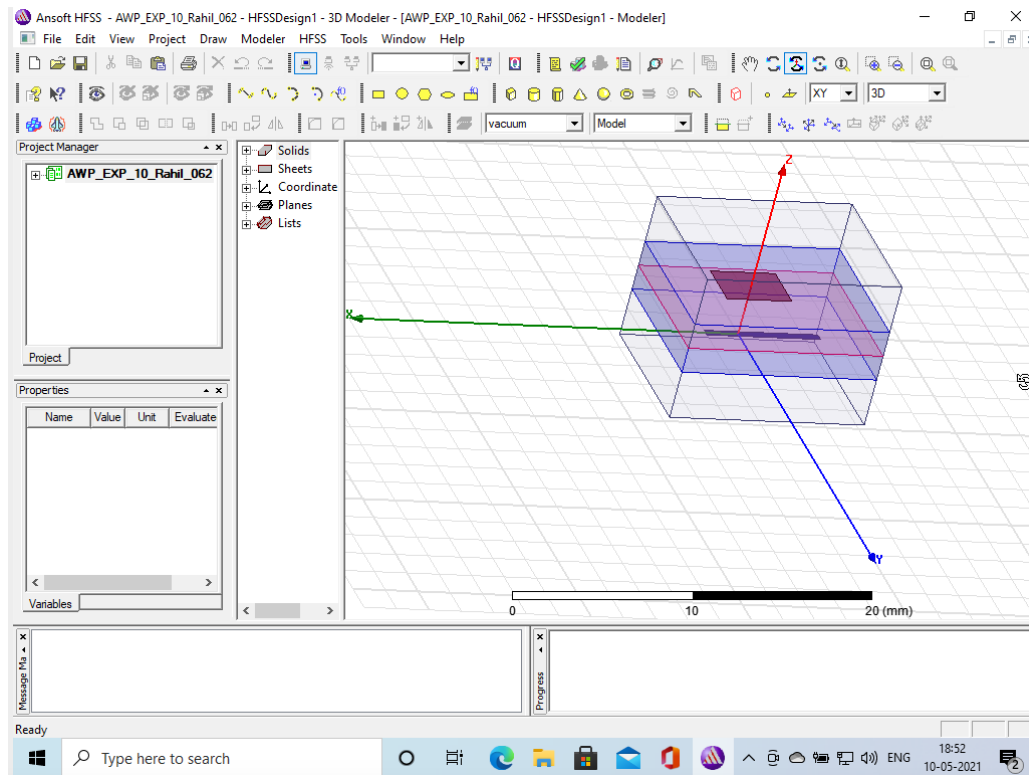


### **Procedure and Screenshots of the Design:**

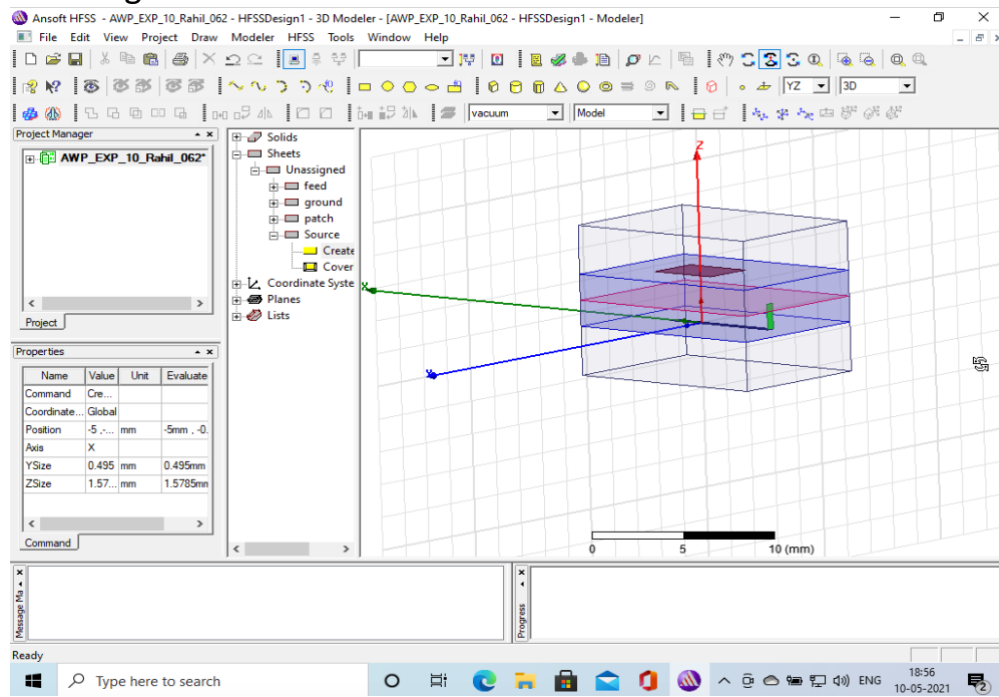
1. The antenna will be of 2.25 GHz.
2. We will first design a Substrate Box. Then we give the dimensions to it.
3. Then we design the feed of our antenna in a rectangular shape.
4. Then we design the ground layer of our antenna in a rectangular shape.
5. Then we design the feed of the Antenna.



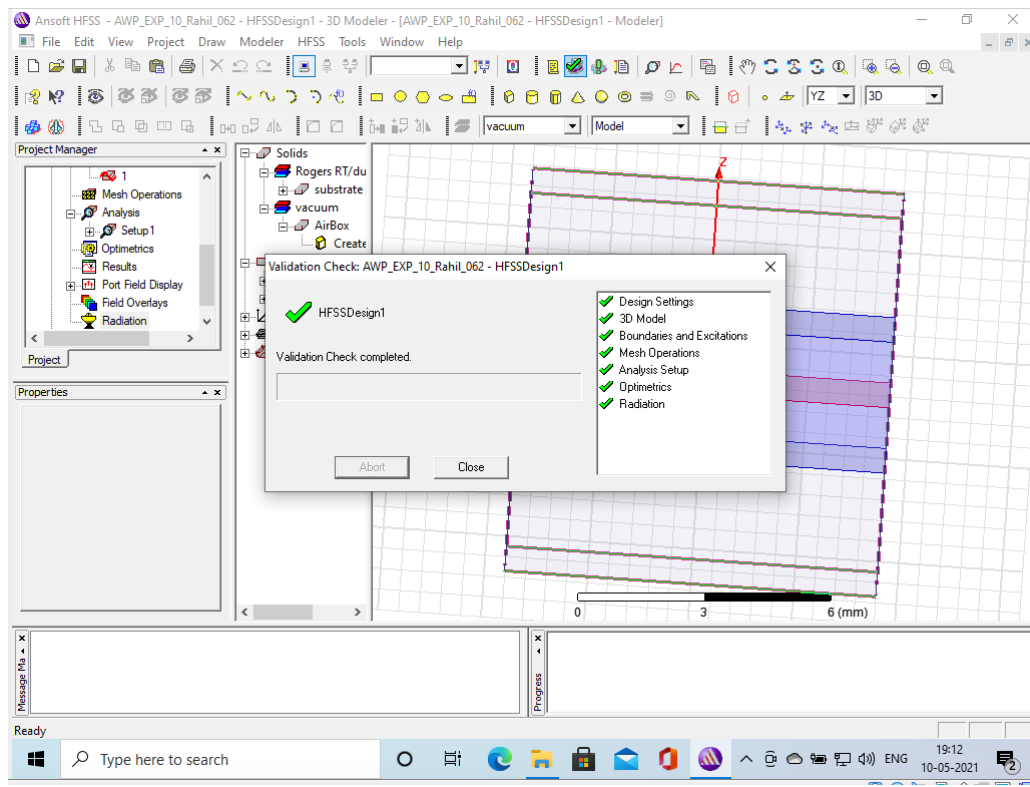
6. Then we design the slot of the Antenna.
7. Now we need to subtract the Slot layer with ground.
8. Then we design the Patch of the Antenna.



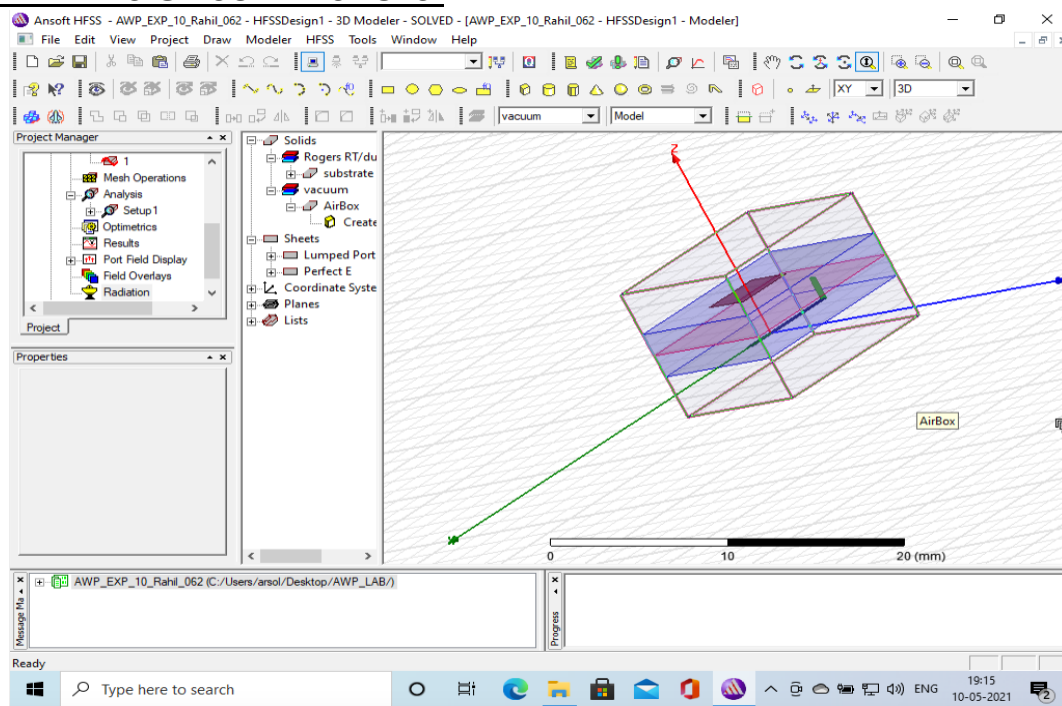
9. Now we will design the AirBox for the Antenna to enclose the design of our Antenna.
10. Now we design the source of the Antenna.

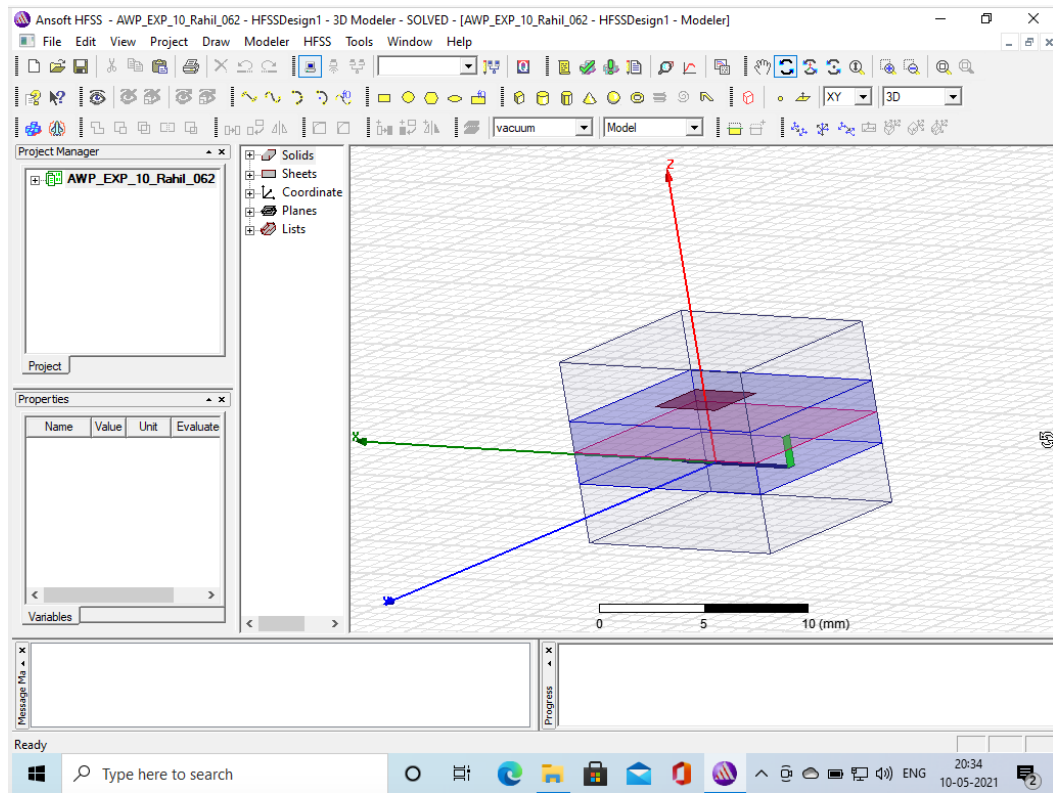
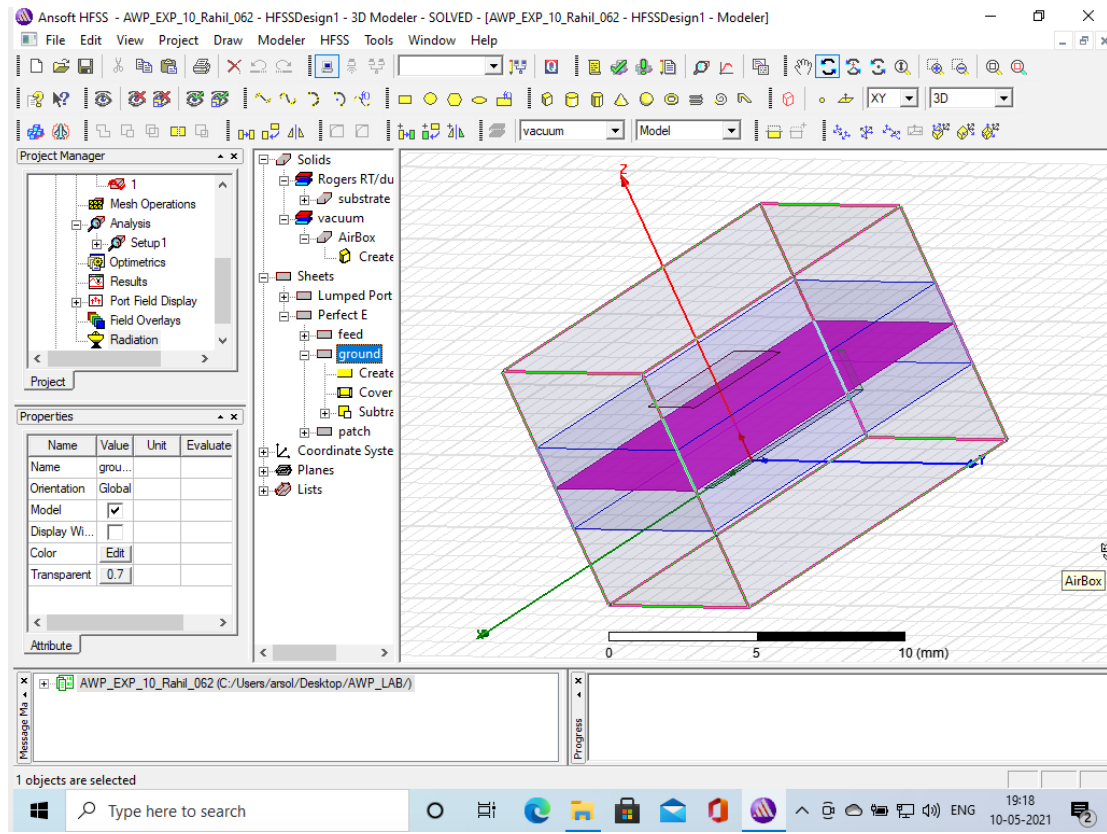


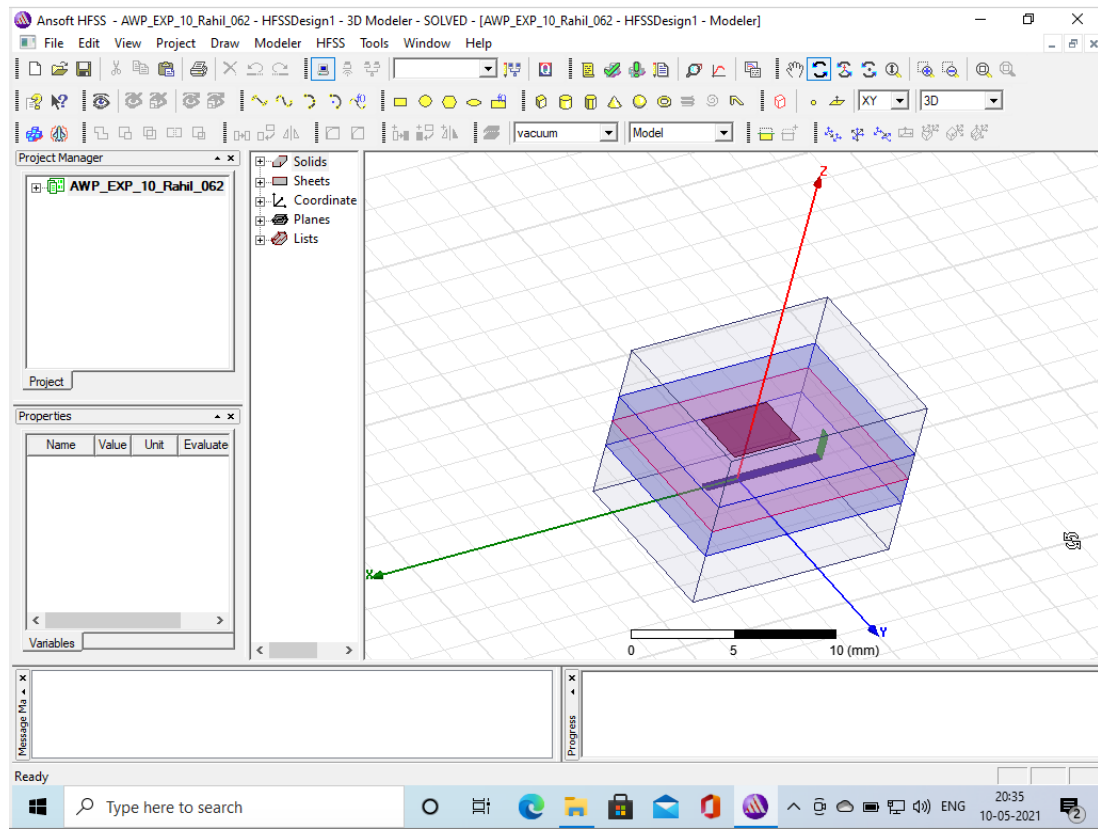
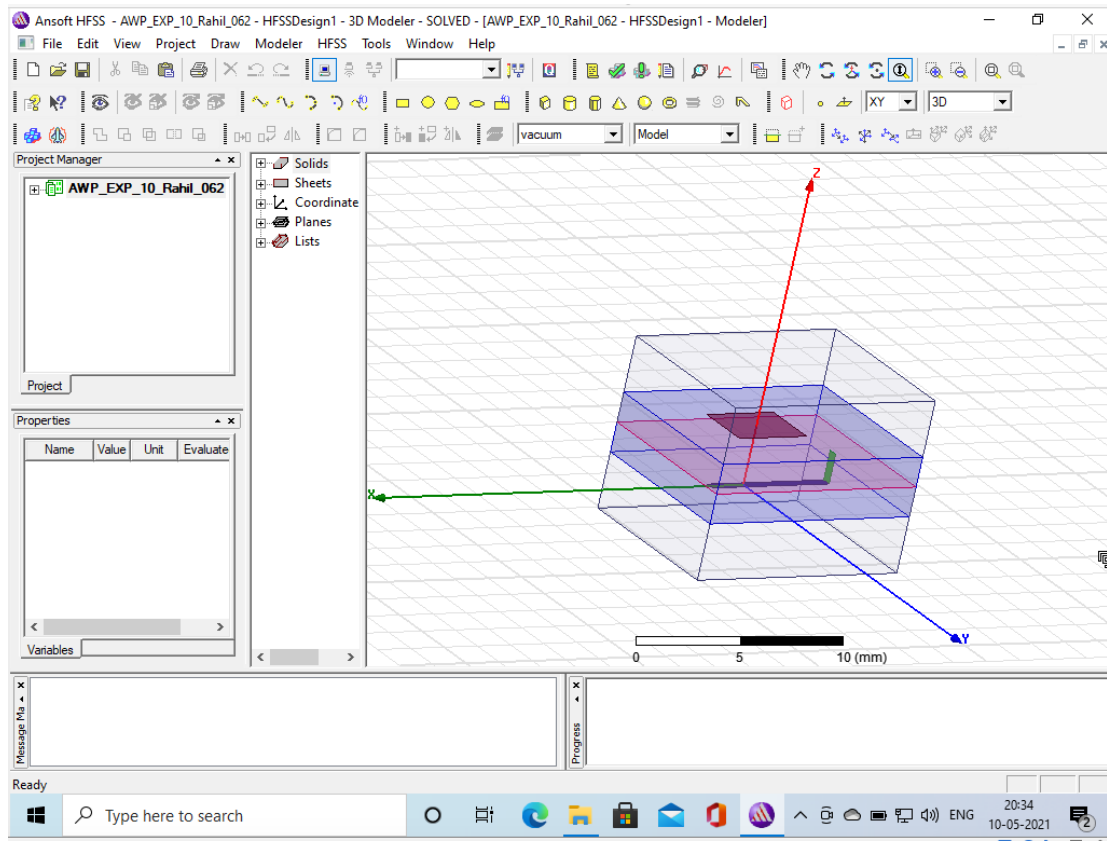
11. Assign a Perfect E boundary to ground, patch and Feed.
12. Then we Apply Radiation Lumped Port to the Source.
13. Then we setup a solution analysis for our design along with the frequency sweep.
14. Validate and Analyse the design.



## FINAL DESIGN SCREENSHOTS:

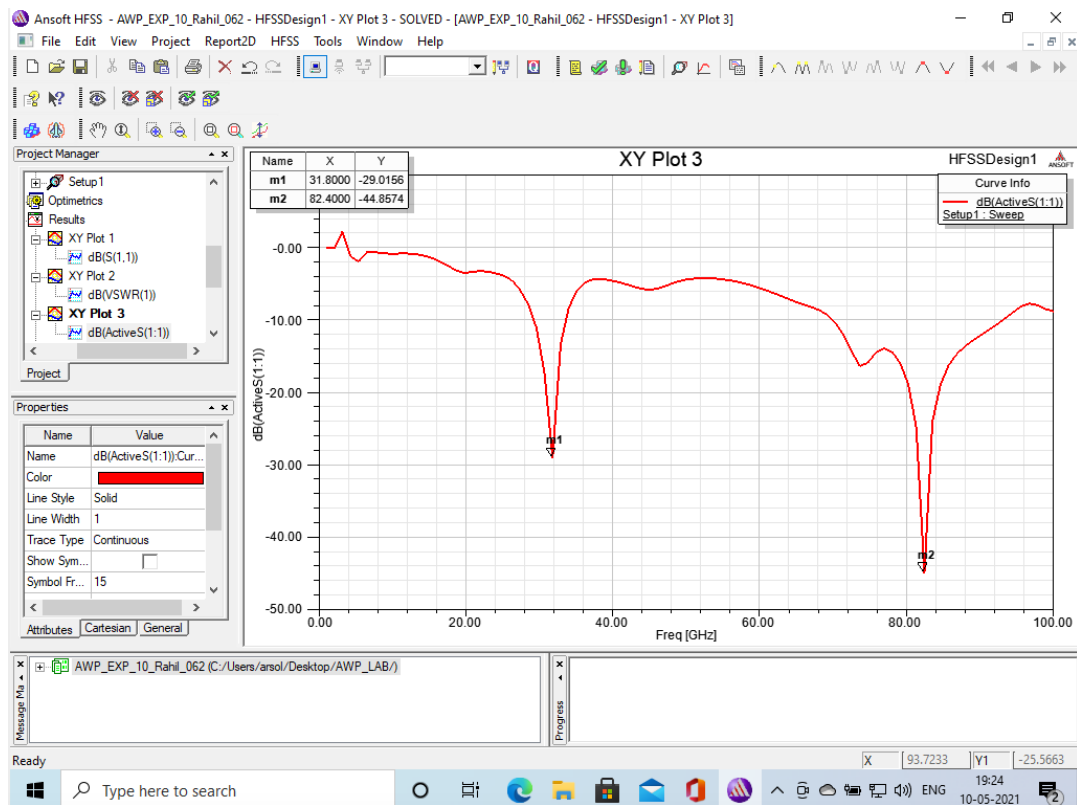
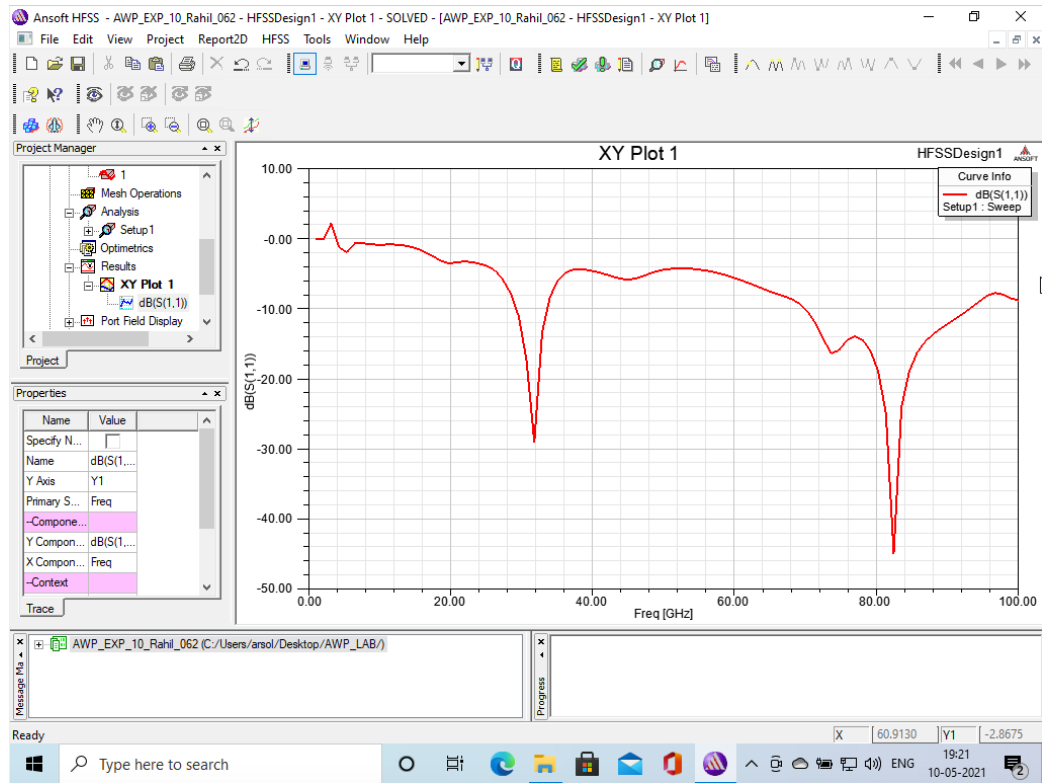






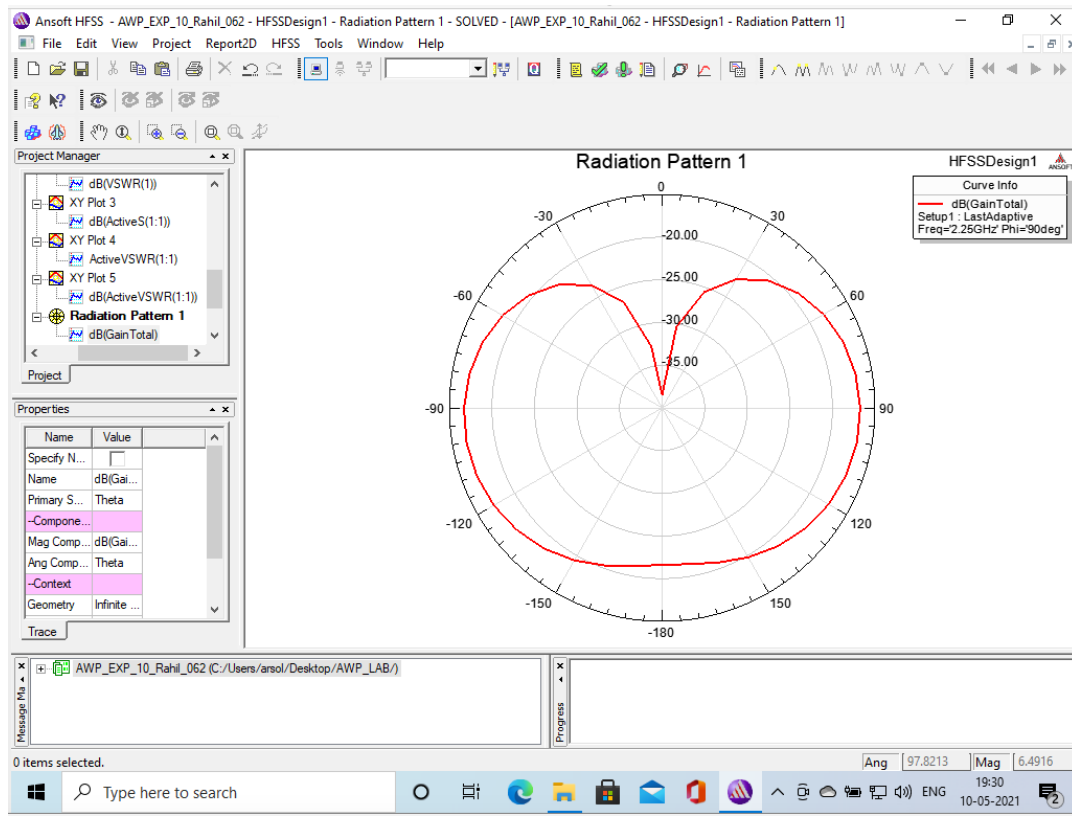
# FINAL GRAPH OUTPUTS:

## 1. S PARAMETERS:

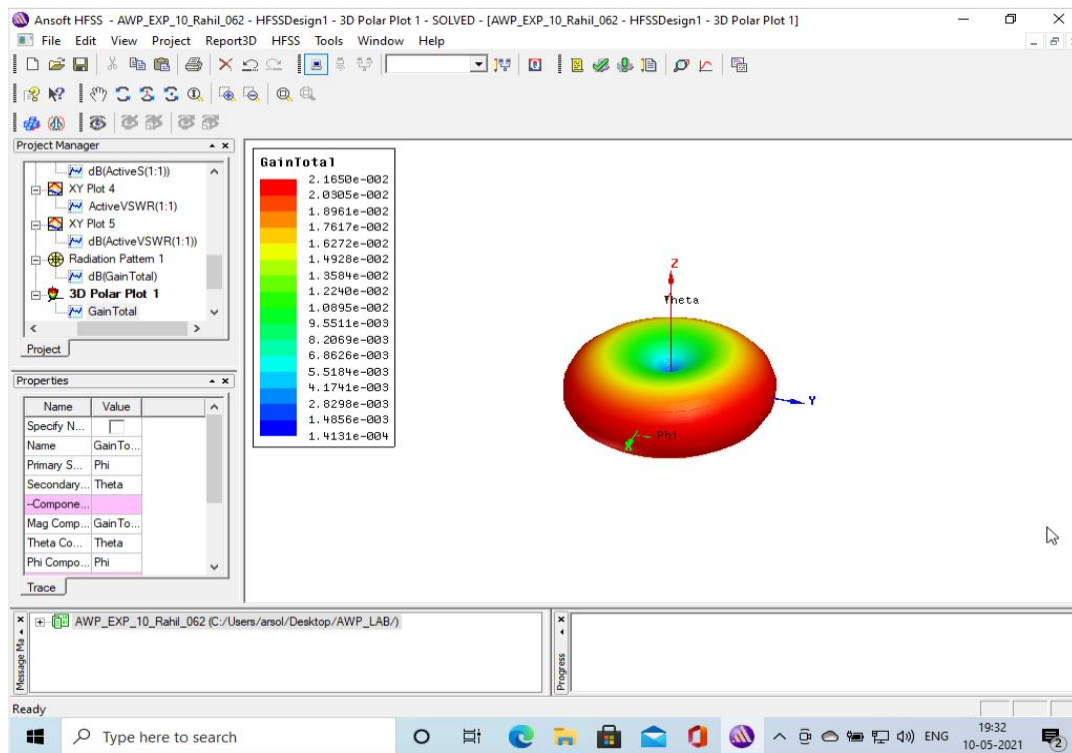




## 2. RADIATION PATTERN:



## 3. GAIN PLOT:





**Conclusion:** from this experiment we have learnt how to design the aperture coupled antenna on HFSS software.