KALINGA INSTITUTE OF INDUSTRIAL TECHNOLOGY

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Microwave and Antenna Laboratory

(5^{th} Semester)

Lab Report 4

Aim of the Experiment: To design a Horn antenna operating at 5.26 GHz and to find the directivity and half power beam width from the radiation patterns.

Software to be used: CST studio suite 2019 (Student edition)

- **Mathematical Calculation**

Design equations:

$$\boldsymbol{tan\frac{\theta}{2} = \frac{a}{2L}}$$

$$\mathbf{L = \frac{a^2}{8\delta}}$$

$$\boldsymbol{\theta = 2\tan^{-1}\frac{a}{2L} = 2\cos\frac{L}{L+\delta}}$$

Where,

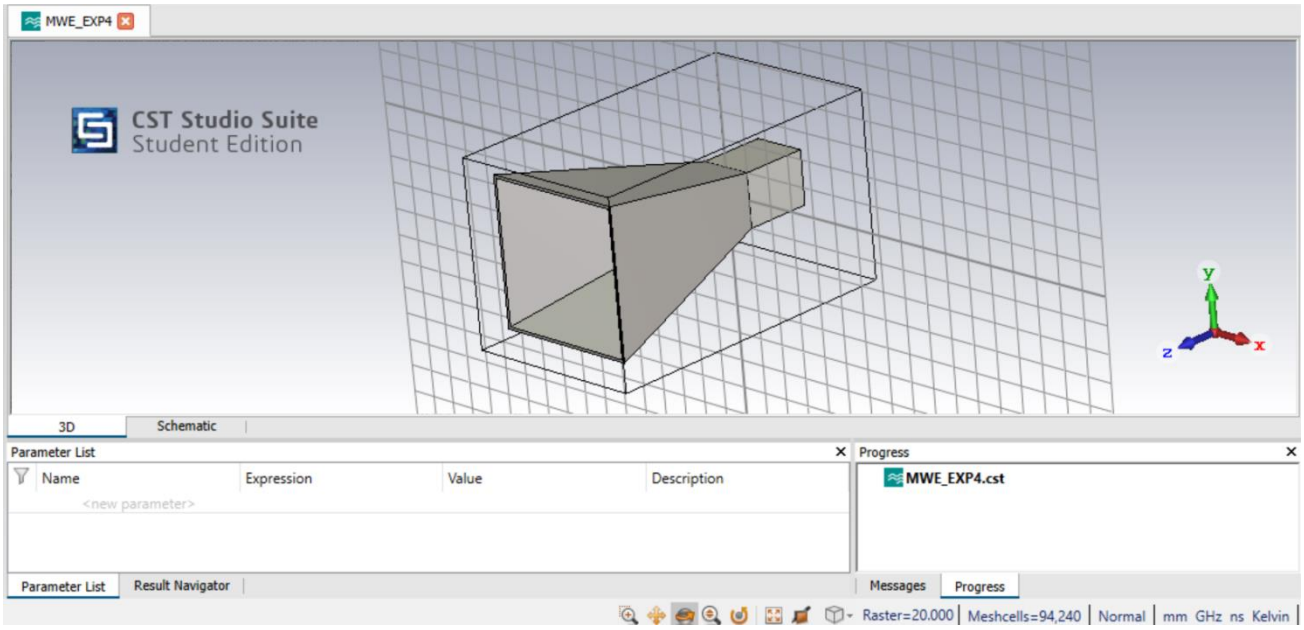
θ is the flare angle

a is the aperture

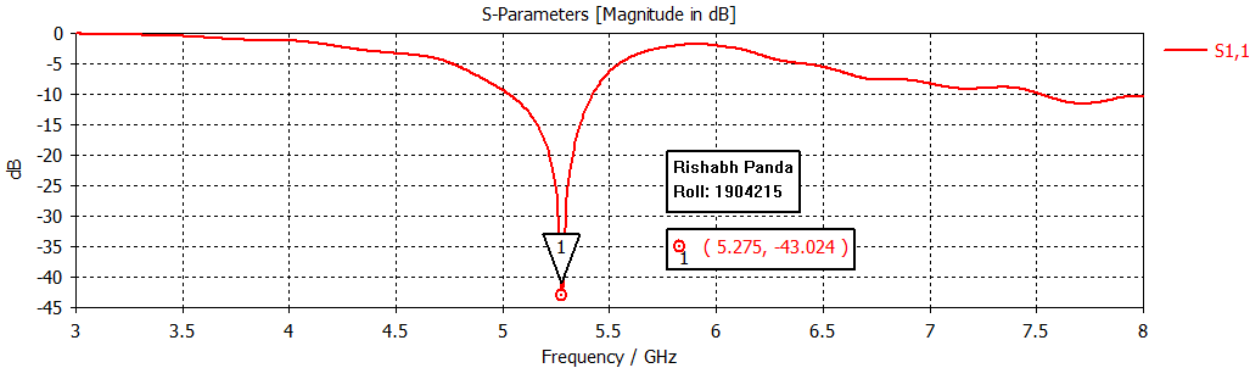
L is the horn length

δ is the path length difference

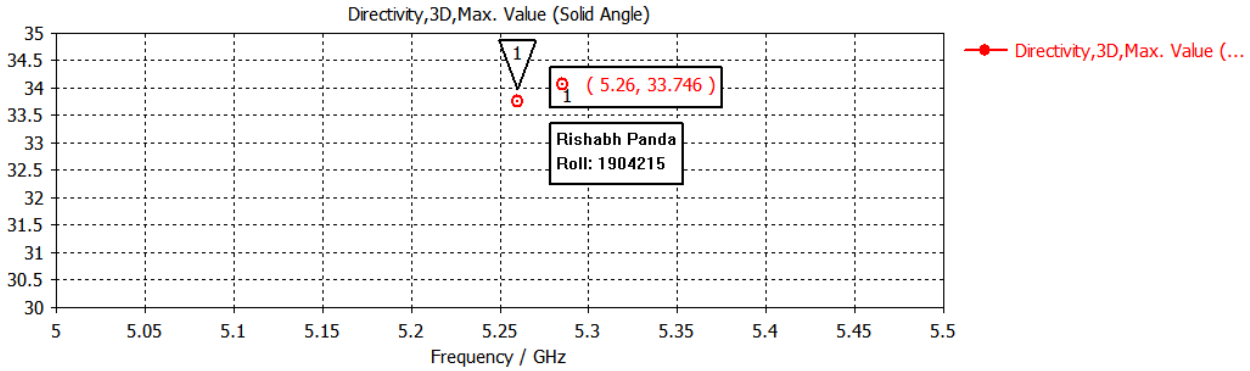
- **Design of Horn Antenna**



- **S11 Characteristics**



- **Directive Gain**



- **Radiation Pattern and Half Power Beam Width**

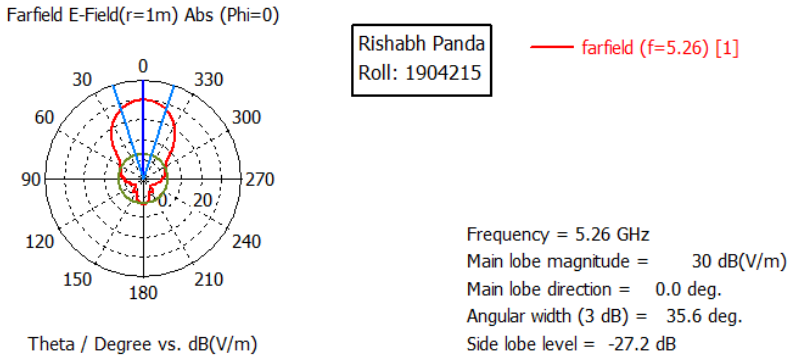


Fig 1: E-Field pattern

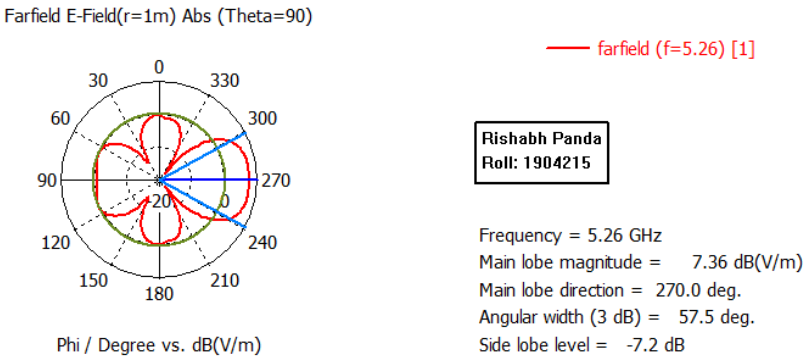


Fig 2: H-Field pattern

Conclusion

The design of a Horn Antenna operating at 5.26 GHz was done successfully. The resonance is observed at 5.275 GHz. And we get the directional radiation pattern with directivity 12.384. The angular width of the E-Field pattern and H-Field pattern at 5.26 GHz were computed to be 35.6 and 57.5 degrees.

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