BEC704-ANTENNA AND WAVE PROPAGATION

UNIT I BASIC ANTENNA CONCEPTS

- Radiation Patterns, Beam solid angle, radiation intensity, Directivity, effective aperture, Antenna field zones, Polarization, impedance, cross field, Poynting vector.
- Friis Transmission formula, Duality of Antennas, Antenna and Transmission line, Radiation from a dipole antenna, Antenna temperature
- System temperature.

UNIT II POINT SOURCES

- Definition, Power patterns, Array of two point sources
- Pattern multiplication, Broad side array, End fire array, n-isotropic array, Evaluation of null directions and maxima, Amplitude distributions.
- Concept of Phased arrays, Adaptive array, Basic principle of antenna Synthesis-Binomial array

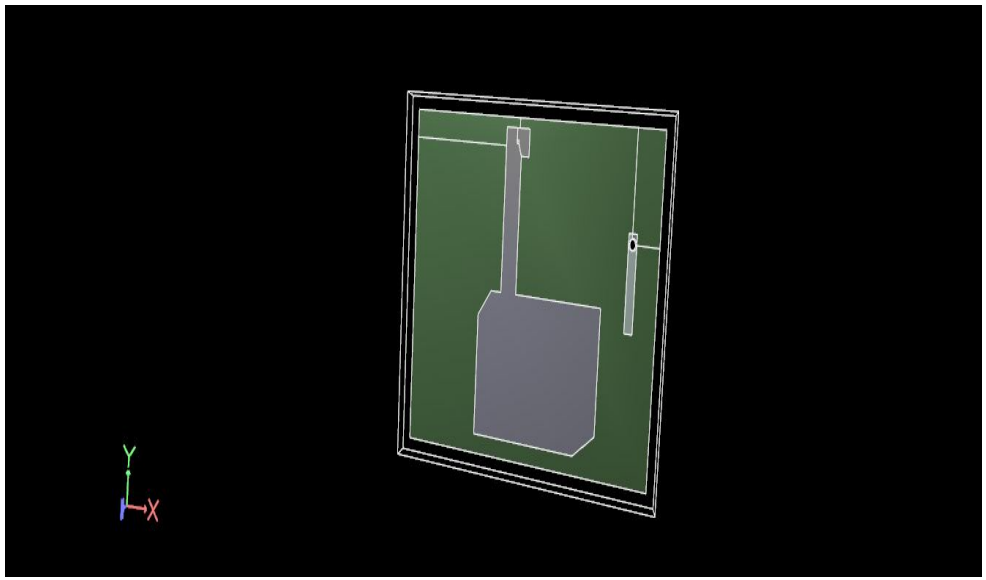
UNIT III SMALL ANTENNAS

- Halfwave dipole antenna radiated fields of short dipole,
- small loop and helical Antenna, monofilar-multifilar helix.
- Radiation resistance, Directivity and Design Feature. Half wave dipole: radiated fields and other feature.
- Numerical tool for antenna analysis

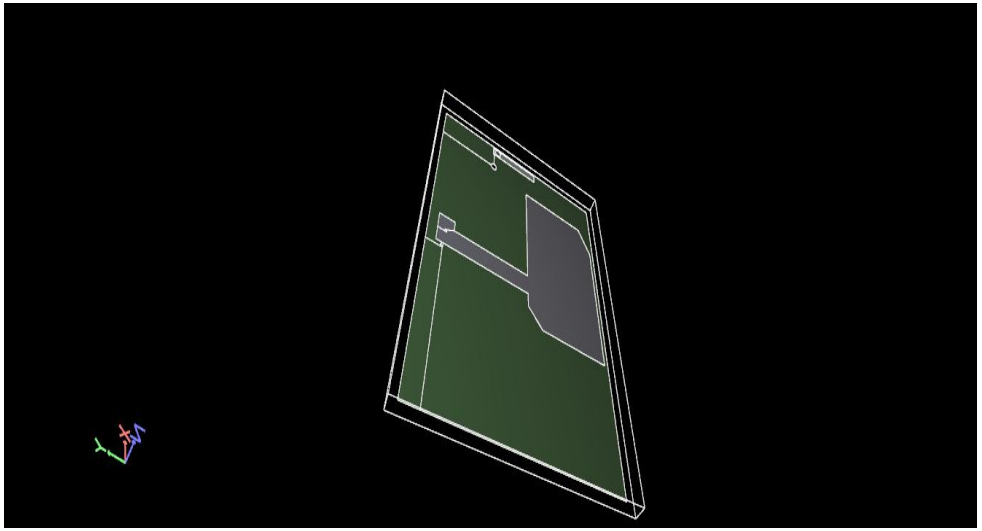
UNIT IV SPECIAL ANTENNA

- Yagi uda Antenna, Turnstile antenna,
- Principle of frequency independent antennas – Spiral antenna, Helical antenna, Log periodic. Modern antennas- Reconfigurable antenna, Active antenna, Dielectric antennas, rhombic antenna.
- Horn antenna, Reflector antennas and their feed systems,
- Micro strip antenna, Impedance and antenna measurements

Antenna View



Front view of Antenna



Side view of Antenna

Result of the Experiment

Antenna Structure	Resonant Frequency	Return Losses
1. Without Slot Design	6.20 GHz	-2.5 Db
	5.20 GHz	-11 Db
2. With slot Design	4.20 GHz	-21.9 Db
	3.20 GHz	-0.5 Db
	2.20 GHz	-0.02 Db
	1.20 GHz	-0.01 Db

Comparison Table Of Reduction of Area Reduction

Antenna Structure	Length (mm)	Width(mm)	Area(mm2)
1. Without Slot Antenna	35.65	28.05	999.9825
2. With Slot Antenna	32	25	800
Reduction	3.65	3.05	199.9825

Area of Reduction= 199.9 mm2

Percentage of Reduction= 19.9%

Based on slandered simulation the execution successfully completed with the return loss mention on the chart.

CONCLUSION

In the Experiment work of Microstrip Patch Antenna observed Antenna Parameter Are listed bellow

Antenna Structure	Resonant Frequency	Return Losses
1. Without Slot design	5.20 GHz	-11 Db
2. With Slot design	4.2 GHz	-21.9 Db

- In this data sheet without slot Return Losses -11 Db at 5.20 GHz Resonant frequency
- Also from the data sheet with slot Return Losses -21.9 Db at 4.2 GHz Resonant Frequency.
- In the Microstrip Patch Antenna Design we get the 20% size reduction.
- It uses in the S-Band and the C-Band frequency.

Microstrip Patch Antenna Advantage & Disadvantage

Advantage

1. Low profile
2. Conformable to non-planner surface
3. Simple and inexpensive
4. Mechanically robust
5. Compatible with MMIC design

Disadvantages

1. Low power
2. Narrow bandwidth
3. Extra radiation occurs from its feeds and junctions.

CASE Study

UNIT V WAVE PROPOGATION

- Ground wave propagation, Troposphere wave, wave- tilt of the surface wave
- Ionosphere propagation – effective permittivity and Conductivity of ionized gas, Reflection – Refraction of waves from ionosphere, regular – irregular variation of Ionosphere
- earth magnetic field, Faraday rotation, wave propagation in the Ionosphere.
- Duct propagation, Critical frequency and Space propagation