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,
• 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

<table>
<thead>
<tr>
<th>Antenna Structure</th>
<th>Resonant Frequency</th>
<th>Return Losses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Without Slot Design</td>
<td>6.20 GHz</td>
<td>-2.5 Db</td>
</tr>
<tr>
<td></td>
<td>5.20 GHz</td>
<td>-11 Db</td>
</tr>
<tr>
<td>2. With slot Design</td>
<td>4.20 GHz</td>
<td>-21.9 Db</td>
</tr>
<tr>
<td></td>
<td>3.20 GHz</td>
<td>-0.5 Db</td>
</tr>
<tr>
<td></td>
<td>2.20 GHz</td>
<td>-0.02 Db</td>
</tr>
<tr>
<td></td>
<td>1.20 GHz</td>
<td>-0.01 Db</td>
</tr>
</tbody>
</table>

Comparison Table Of Reduction of Area Reduction

<table>
<thead>
<tr>
<th>Antenna Structure</th>
<th>Length (mm)</th>
<th>Width(mm)</th>
<th>Area(mm²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Without Slot Antenna</td>
<td>35.65</td>
<td>28.05</td>
<td>999.9825</td>
</tr>
<tr>
<td>2. With Slot Antenna</td>
<td>32</td>
<td>25</td>
<td>800</td>
</tr>
</tbody>
</table>

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

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</thead>
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<td>-11 Db</td>
</tr>
<tr>
<td>2. With Slot design</td>
<td>4.2 GHz</td>
<td>-21.9 Db</td>
</tr>
</tbody>
</table>

- 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 PROPAGATION

- 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