SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

An Autonomous Institution

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

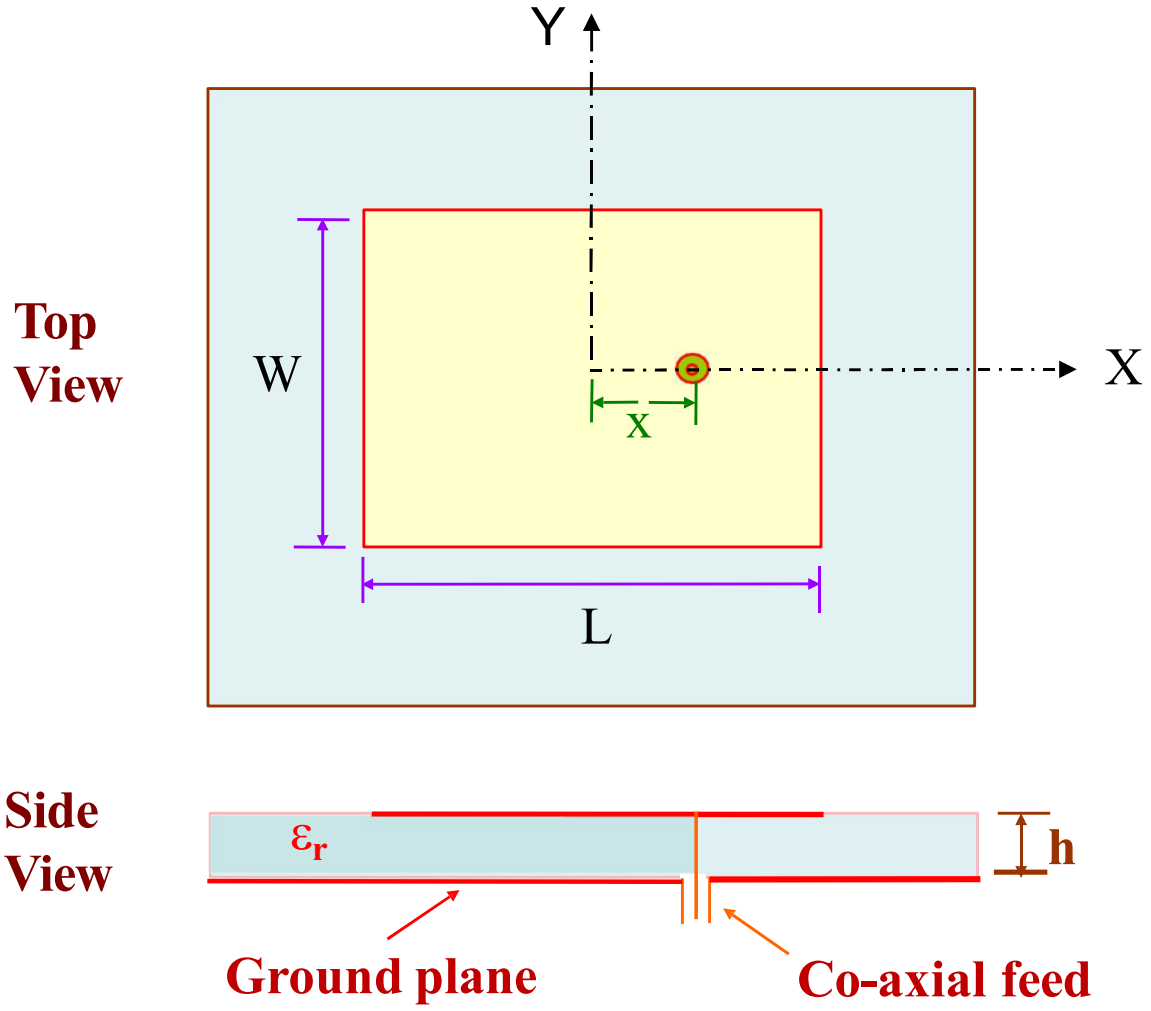
Subject Code: 19EC502

Subject: Transmission Lines and Antennas

Unit-IV

Topic: Microstrip Antennas

Rectangular Microstrip Antenna (RMSA)



Microwave Integrated Circuits (MIC) vs MSA

Parameters	MIC	MSA
Dielectric Constant (ε_r)	Large	Small
Thickness (h)	Small	Large
Width (W)	Generally Small (impedance dependent)	Generally Large
Radiation	Minimum (small fringing fields)	Maximum (large fringing fields)
Examples	Filters, power dividers, couplers, amplifiers, etc.	Antennas

Substrates for MSA

Substrate	Dielectric Constant (ε_r)	Loss tangent (tanδ)	Cost
Alumina	9.8	0.001	Very High
Glass Epoxy	4.4	0.02	Low
Duroid / Arlon	2.2	0.0009	Very High
Foam	1.05	0.0001	Low/ Medium
Air	1	0	NA

Advantages

- Light weight, low volume, low profile, planar configuration, which can be made conformal
- Low fabrication cost and ease of mass production
- Linear and circular polarizations are possible
- Dual frequency antennas can be easily realized
- Feed lines and matching network can be easily integrated with antenna structure

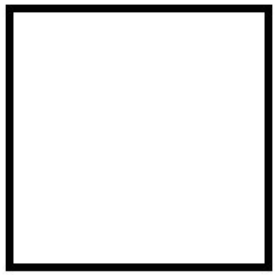
Disadvantages

- Narrow bandwidth (1 to 5%)
- Low power handling capacity
- Practical limitation on Gain (around 30 dB)
- Poor isolation between the feed and radiating elements
- Excitation of surface waves
- Tolerance problem requires good quality substrate, which are expensive
- Polarization purity is difficult to achieve
- Size is large at lower frequency

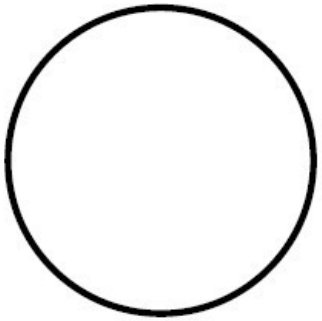
Applications

- Pagers and mobile phones
- Doppler and other radars
- Satellite communication
- Radio altimeter
- Command guidance and telemetry in missiles
- Feed elements in complex antennas
- Satellite navigation receiver
- Biomedical radiator

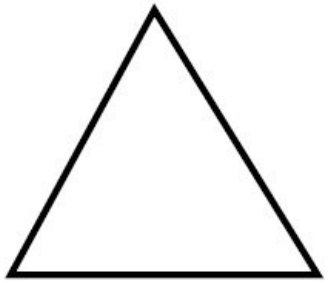
Various Microstrip Antenna Shapes



Square

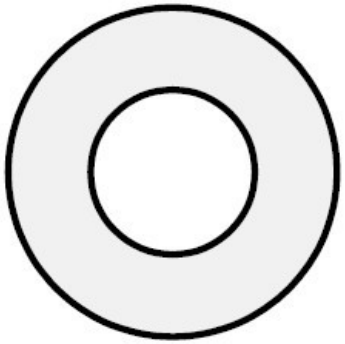


Circular

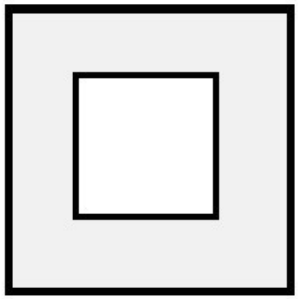


Triangular

Semicircular



Annular ring



Square ring