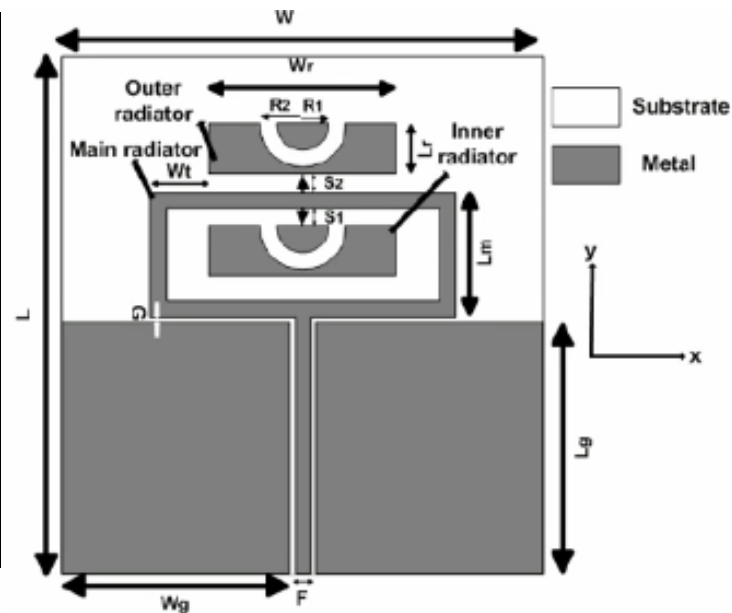# FREQUENCY RECONFIGURABLE ANTENNA

Problem Statement 1

To design a Frequency Reconfigurable Crescent shaped antenna on a Rogers RO4003C substrate. The frequency is 2 GHz to 11 GHz and the thickness is 0.508 mm, dielectric constant = 3.38,

Feeding technique: CPW.

Parameter	Value(mm)	Parameter	Value(mm)
W	28.4	wt	5.2
L	30	wr	11
Wg	13.45	lm	7.3
Lg	14.642	f	1
st	0.508	lr	3
ct	0.035	G	0.358

fl= 2 GHz fh =11 GHz

USAGE: WIMAX, LTE, WLAN

STEP1 Modelling of Substrate Plane → Brick → Esc

Xmin	Xmax	Ymin	Ymax	Zmin	Zmax
-W/2	W/2	0	L	0	st

Material: **Rogers RO4003C (lossy)**

STEP2 Modelling of Ground Plane1 → Brick → Esc

Xmin	Xmax	Ymin	Ymax	Zmin	Zmax
0.75	0.75+Wg	0	Lg	st	st+ct

Material: **Copper Annealed**

STEP3 Modelling of Ground Plane2

Select Ground Plane 1

Perform Transform Operation [**Mirror**] along X-axis (**180 degree**) and mark **Copy**.

STEP4 Modelling of Main Radiator

Modelling of Feed Line → Brick → Esc

Xmin	Xmax	Ymin	Ymax	Zmin	Zmax
-0.5	0.5	0	Lg+G	st	st+ct

Material: **Copper Annealed**

Modelling of Outer Feed Line → Brick → Esc

Xmin	Xmax	Ymin	Ymax	Zmin	Zmax
-(wt+wr/2)	(wt+wr/2)	lg+G	lg+G+lm	st	st+ct

Material: **Copper Annealed**

Modelling of Inner Feed Line → Brick → Esc

Xmin	Xmax	Ymin	Ymax	Zmin	Zmax
-(wt+wr/2)+f	(wt+wr/2)-f	lg+g+f	lg+g+lm-f	st	st+ct

Material: **Copper Annealed**

Subtract Inner Feed Line from Outer Feed Line.

Perform Boolean Addition [Outer Feed Line & Feed Line].

2

STEP5 Modelling of Inner Radiator → Brick → Esc

Xmin	Xmax	Ymin	Ymax	Zmin	Zmax
-wr/2	wr/2	lg+g+f+1.15	lg+g+f+1.15+lr	st	st+ct

Material: **Copper Annealed**

Define Cylinder

Outer Radius	Inner Radius	Xcenter	Ycenter	Zmin	Zmax
2.5	1.5	0	lg+g+f+1.15+lr	st	st+ct

Material: **Copper Annealed**

Perform Boolean **Subtract** Cylinder from **Inner Radiator**.

STEP6 Modelling of Outer Radiator

Transform [**Inner Radiator**] and mark **Copy**.

STEP7 EXCITATION

PICK →   PICK FEED → MACRO → SOLVER →   PORTS →   CALCULATE PORT EXTENTION C

W=1mm ; H= 0.508mm; k = 5.88; e_psr= 3.38

CALCULATE →   CONSTRUCT PORT FROM PICKED FACE

STEP8 Construct SWITCH **S1 & S2**

STEP9 SIMULATE

Cells per Wavelength [**5.5**]

Mesh Cells: **29,604**

Problem Statement 2

To design a Frequency Reconfigurable Microstrip patch antenna with 3 switches as shown in figure below on a FR-4 substrate. The frequency is 1 GHz to 7 GHz and the thickness is 0.8 mm, dielectric constant = 4.3

FRONT VIEW   BACK VIEW
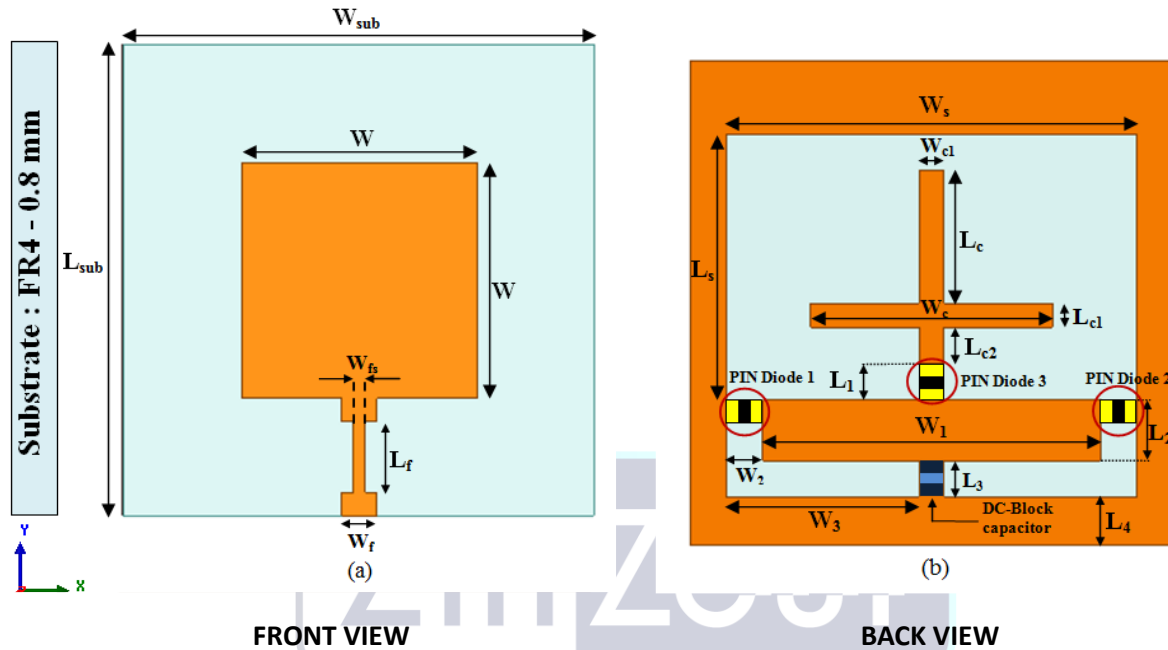
PARAMETER	VALUE (mm)	PARAMETER	VALUE (mm)	PARAMETER	VALUE (mm)
WSub	20	W1	14	Lc1	1
W	10	W2	1.5	Lc2	1.5
Wf	1.5	W3	8	L1	1.5
Wfs	0.5	LSub	20	L2	2.5
Ws	17	Lf	3	L3	1.5
Wc	10	Ls	11	L4	2
Wc1	1	Lc	5.5		