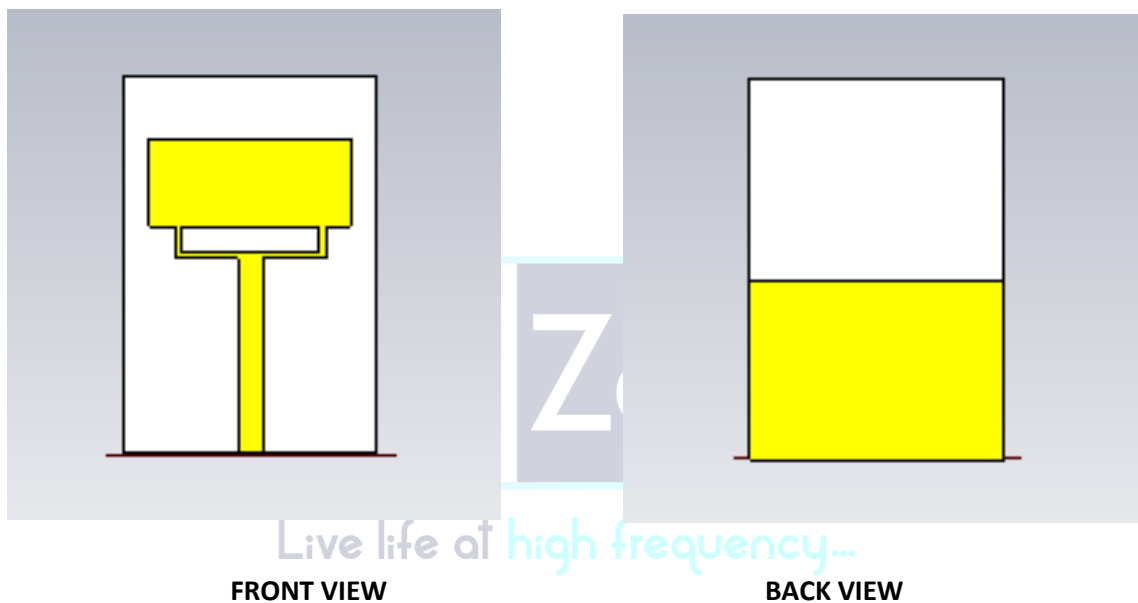


ULTRA-WIDEBAND ANTENNA

Problem Statement 1

To design a UWB Monopole antenna on a FR4 substrate. The frequency is 3.5GHz to 5.2 GHz and the thickness is 1.6mm, dielectric constant = 4.3

USAGE: WIMAX, LTE, WLAN



$f_l = 1 \text{ GHz}$ $f_h = 8 \text{ GHz}$; 3.5GHz & 5.2 GHz

H	T
1.6mm	0.035mm

STEP1 VIEW WORKING PLANE; SIZE= 100; WIDTH= 10; SNAP= 0.1

STEP2 Modelling of **Substrate** Plane → Brick → Esc

Xmin	Xmax	Ymin	Ymax	Zmin	Zmax
-10	10	-15	15	-H	0

Material: **FR-4 LOSSY**

STEP3 Modelling of Patch Plane → Brick → Esc

P1	Xmin	Xmax	Ymin	Ymax	Zmin	Zmax
	-1	1	-15	0.5	0	T
P2	Xmin	Xmax	Ymin	Ymax	Zmin	Zmax
	-6	6	0.5	3	0	T
P3	Xmin	Xmax	Ymin	Ymax	Zmin	Zmax
	-8	8	3	10	0	T
P4	Xmin	Xmax	Ymin	Ymax	Zmin	Zmax
	-5.5	5.5	1	3	0	T

Material: **COPPER ANNEALED**

Add P1, P2, P3 and Subtract P4 from it.

STEP4 Modelling of Ground Plane → Brick → Esc

Xmin	Xmax	Ymin	Ymax	Zmin	Zmax
-10	10	-15	-1	-H-T	-H

Material: **COPPER ANNEALED****STEP5** EXCITATION OF UWB ANTENNA**PICK → PICK FEED****MACRO → SOLVER → PORTS → CALCULATE PORT EXTENTION COEFFICIENT**

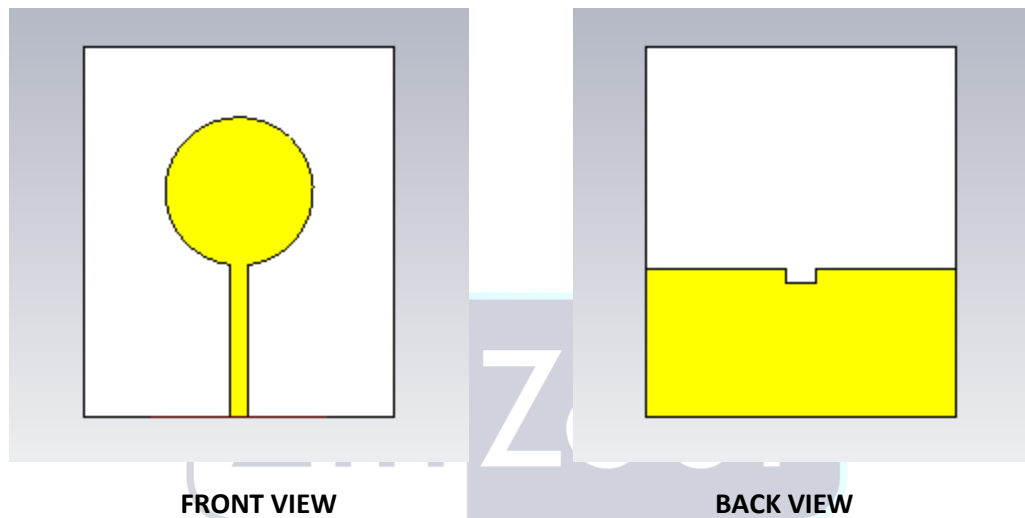
W=2; H= 1.6mm; k= 6.29; e_psr= 4.3

CALCULATE → CONSTRUCT PORT FROM PICKED FACE**STEP6** SIMULATE

Problem Statement 2

To design a Circular UWB Monopole antenna on a FR4 substrate. The frequency is 3 GHz to 10 GHz and the thickness is 1.6mm, dielectric constant = 4.3

USAGE: Power Radar; Image Sensing Application; Cognitive Radio



Parameter	Values (mm)	Parameter	Values (mm)
Lsub	50	Wf	2.6
Wsub	42	R	10
Lgnd	20	g	0.3
Lslot	2	Wslot	4

$f_l = 2 \text{ GHz}$ $f_h = 15 \text{ GHz}$

H	T
1.6mm	0.035mm

USAGE:

STEP1 Modelling of **Substrate** Plane → Brick → Esc

Xmin	Xmax	Ymin	Ymax	Zmin	Zmax
-Wsub/2	Wsub/2	-Lsub/2	Lsub/2	-H	0

Material: **FR-4 LOSSY**

STEP2 Modelling of **Circular Patch** Plane → Cylinder → Esc

P1

Outer Radius	Inner Radius	Xcenter	Ycenter	Zmin	Zmax
R	0	0	R-4	0	T

Material: **COPPER ANNEALED****STEP3** Modelling of **Feed Line** → Brick → Esc

Xmin	Xmax	Ymin	Ymax	Zmin	Zmax
-Wf/2	Wf/2	0	-Lsub/2	0	T

Material: **COPPER ANNEALED**

Adjust (Transform) and Add Patch and Feed Line

STEP4 Modelling of **Ground** Plane → Brick → Esc

Xmin	Xmax	Ymin	Ymax	Zmin	Zmax
-Wsub/2	Wsub/2	-Lsub/2+Lgnd	-Lsub/2	-H	-H-T

Material: **COPPER ANNEALED****STEP4** Modelling of Slot → Brick → Esc

Xmin	Xmax	Ymin	Ymax	Zmin	Zmax
-Wslot/2	Wslot/2	-Lgnd/4	-Lslot-Lgnd/4	-H	-H-T

Material: **COPPER ANNEALED**

Subtract Slot from Ground as mentioned in the figure.

STEP6 EXCITATION OF CIRCULAR UWB ANTENNA**PICK → PICK FEED****MACRO → SOLVER → PORTS → CALCULATE PORT EXTENTION COEFFICIENT**

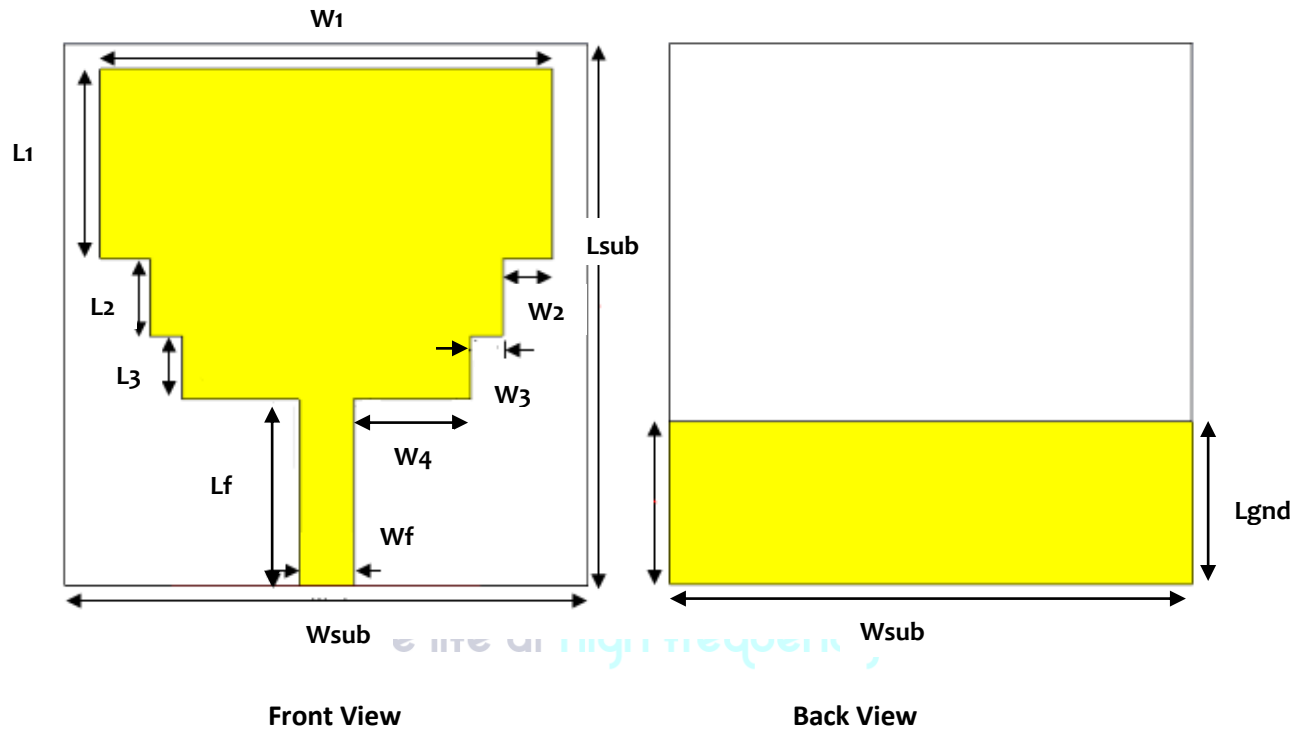
W=2.6; H= 1.6mm; e_psr= 4.3

CALCULATE → CONSTRUCT PORT FROM PICKED FACE**STEP6** SIMULATE

Home Assignment: Problem Statement 3

To design a Staircase shaped UWB Monopole antenna on a FR4 substrate. The frequency is 3 GHz to 10 GHz and the thickness is 0.8 mm, dielectric constant = 4.3

USAGE: Image Sensing Application; IoT Applications



Parameter	Value (mm)	Parameter	Value (mm)
L_{sub}	30	L_2	4.3
L_{gnd}	9.0	L_3	3.5
W_{sub}	29	W_1	25
W_f	3.0	W_2	2.75
L_f	10.3	W_3	1.75
L_1	10.5	W_4	6.5