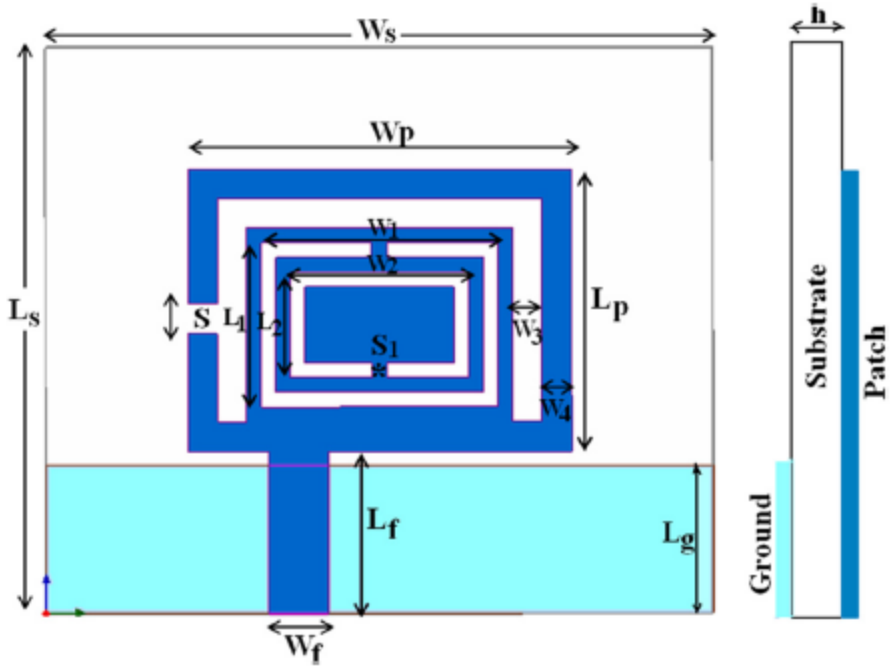
METAMATERIAL ANTENNA

Problem Statement 2

To design a Metamaterial Loaded Monopole Antenna with off-set feeding technique on a FR-4 (Lossy) substrate. The frequency is 1 GHz to 6 GHz and the thickness is 1.6 mm, dielectric constant = 4.3.



Parameter	Value(mm)	Parameter	Value(mm)	Parameter	Value(mm)
Ws	22.64	W3	1	Lf	5.51
Ls	19.18	W4	1	W1	8.04
Wp	13.04	L1	5.58	W2	6.04
Lp	9.58	L2	3.58	S1	0.5
Wf	2	S	1	Lg	5
H	1.6	T	0.035		

USAGE: UTMS 1.9 GHz, WiMAX 3.5 GHz, WLAN 5.25 GHz.

STEP1 Modelling of Substrate Plane ➡ Brick ➡ Esc

Xmin	Xmax	Ymin	Ymax	Zmin	Zmax
-Ws/2	Ws/2	-Ls/2	Ls/2	-H	0

Material: **FR-4 (Lossy)**

STEP2 Modelling of Ground ➡ Brick ➡ Esc

Xmin	Xmax	Ymin	Ymax	Zmin	Zmax
-Ws/2	Ws/2	-Ls/2	-Ls/2+Lg	-H-T	-H

Material: **Copper Annealed**

STEP3 Modelling of Patch 1 ➡ Brick ➡ Esc

Xmin	Xmax	Ymin	Ymax	Zmin	Zmax
-Wp/2	Wp/2	-Lp/2	Lp/2	0	T

Material: **Copper Annealed**

STEP4 Modelling of Slot 1 ➡ Brick ➡ Esc

Xmin	Xmax	Ymin	Ymax	Zmin	Zmax
-Wp/2+W4	Wp/2-W4	-Lp/2+W4	Lp/2-W4	0	T

Material: **Nickel**

STEP5 Modelling of Patch 2 ➡ Brick ➡ Esc

Xmin	Xmax	Ymin	Ymax	Zmin	Zmax
-(W1+2*S1)/2	(W1+2*S1)/2	-(L1+2*S1)/2	(L1+2*S1)/2	0	T

Material: **Copper Annealed**

STEP6 Modelling of Slot 2 ➡ Brick ➡ Esc

Xmin	Xmax	Ymin	Ymax	Zmin	Zmax
-W1/2	W1/2	-L1/2	L1/2	0	T

Material: **Nickel**

STEP7 Modelling of Patch 3 ➡ Brick ➡ Esc

Xmin	Xmax	Ymin	Ymax	Zmin	Zmax
-(W2+2*S1)/2	(W2+2*S1)/2	-(L2+2*S1)/2	(L2+2*S1)/2	0	T

Material: **Copper Annealed**

STEP8 Modelling of Slot 3 ➡ Brick ➡ Esc

Xmin	Xmax	Ymin	Ymax	Zmin	Zmax
-W2/2	W2/2	-L2/2	L2/2	0	T

Material: **Nickel**

STEP9 Modelling of Patch 4 ➡ Brick ➡ Esc

Xmin	Xmax	Ymin	Ymax	Zmin	Zmax
-(W2-2*S1)/2	(W2-2*S1)/2	-(L2-2*S1)/2	(L2-2*S1)/2	0	T

Material: **Copper Annealed**

STEP10 Modelling of Connector ➡ Brick ➡ Esc

Xmin	Xmax	Ymin	Ymax	Zmin	Zmax
S1	0	S1	0	0	T

Material: **Copper Annealed**

STEP11 *Transform: Translate Connector by **[X = -0.25 ; Y = -1.79]** to form Connector 1*

*Transform: Translate Connector 1 by **[Y = 4.08]** & Mark Copy to form Connector 2*

STEP12 Modelling of Connecting Line ➡ Brick ➡ Esc

Xmin	Xmax	Ymin	Ymax	Zmin	Zmax
-W1/2-S1	W1/2+S1	-3.29	-S1-3.29	0	T

Material: **Copper Annealed**

Add all Patch Components by Boolean Addition

STEP13 Modelling of Notch ➡ Brick ➡ Esc

Xmin	Xmax	Ymin	Ymax	Zmin	Zmax
0	W4	-S/2	S/2	0	T

Material: **Copper Annealed**

*Transform: Translate Notch by **[X = - 6.52]** to form slot on the edge to form Patch*

STEP14 Modelling of Feed Line ➡ Brick ➡ Esc

Xmin	Xmax	Ymin	Ymax	Zmin	Zmax
0	Wf	0	-Lf	0	T

Material: **Copper Annealed**

Transform: Translate Feed Line by ***[X = -4.2 ; Y = - 4.81]***

Boolean Addition Patch & Feed to form Patch Plane

Transform: Translate Patch Plane by ***[Y = 0.71]***

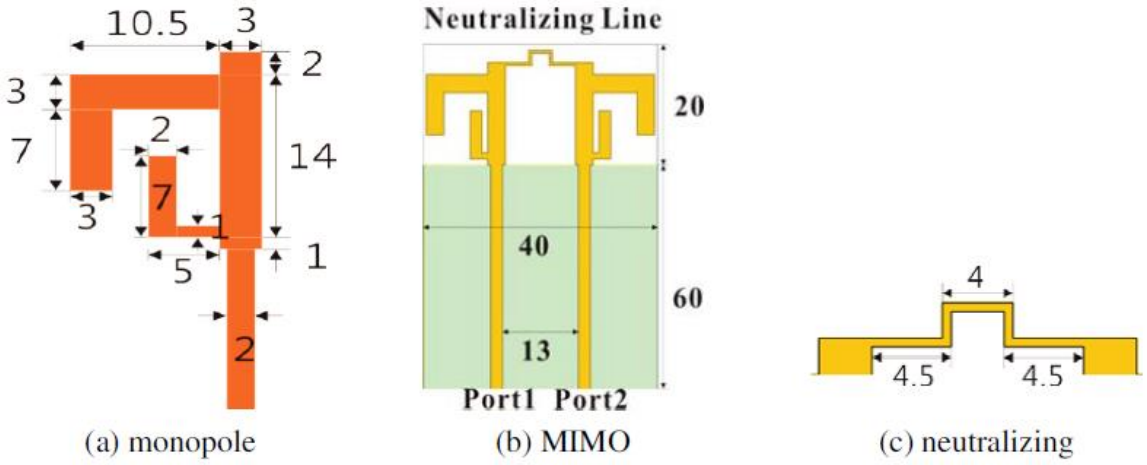
STEP15 Create Port & Simulate

MIMO MC REDUCTION: HOME ASSIGNMENT

To design a Dual Band MIMO Antenna with High Isolation using Neutralizing Line on FR-4 Substrate. The frequency is 2 GHz to 6 GHz and the thickness is 0.25 mm, dielectric constant = 4.3

Use below Design and Dimensions.

USAGE: IEEE 801.11 b/g/n/a/c. Wireless Standard



(a) monopole (b) MIMO (c) neutralizing