TEES

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TEES

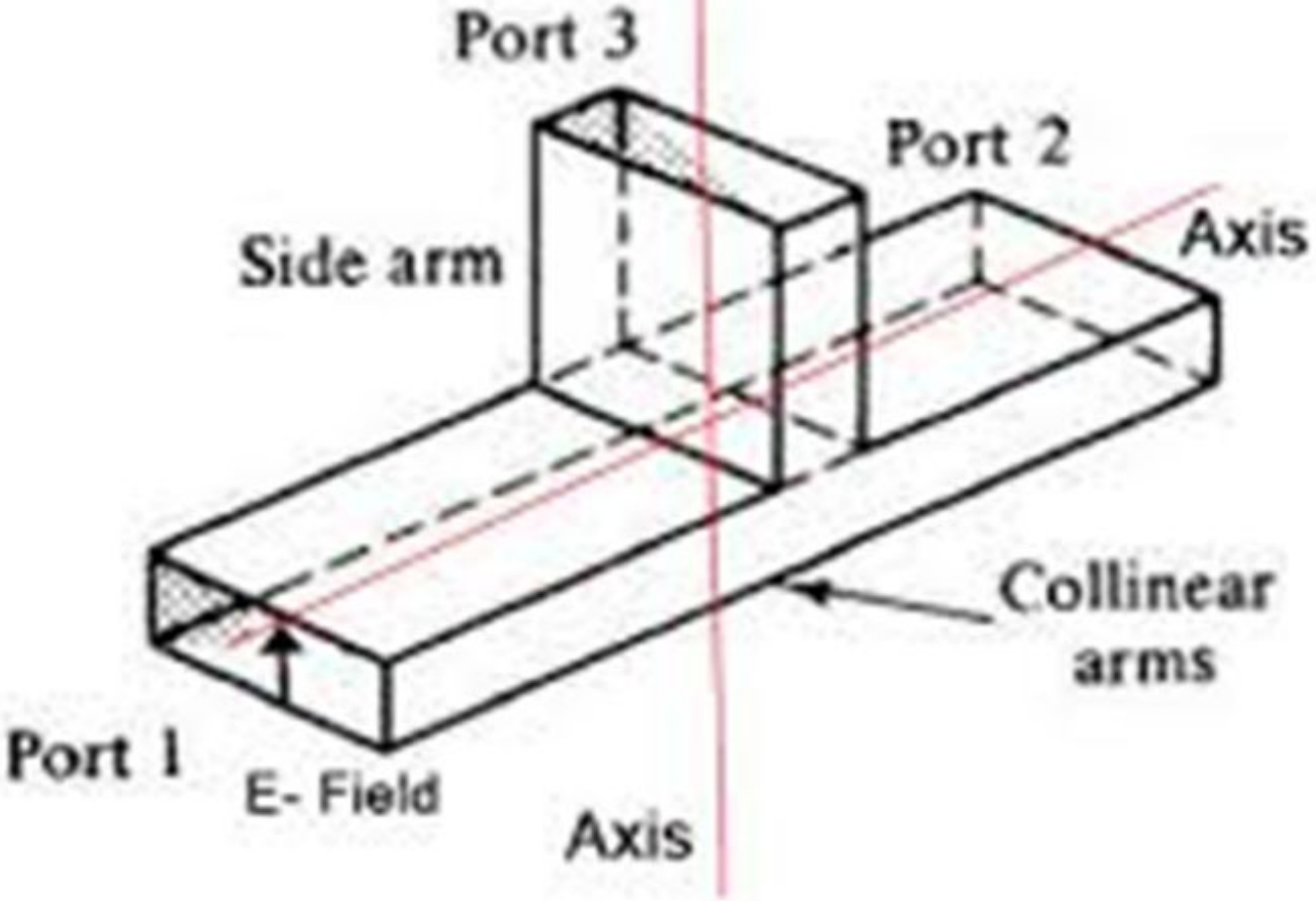
definition: Tees are junctions or network having three or more ports, it divides the power.

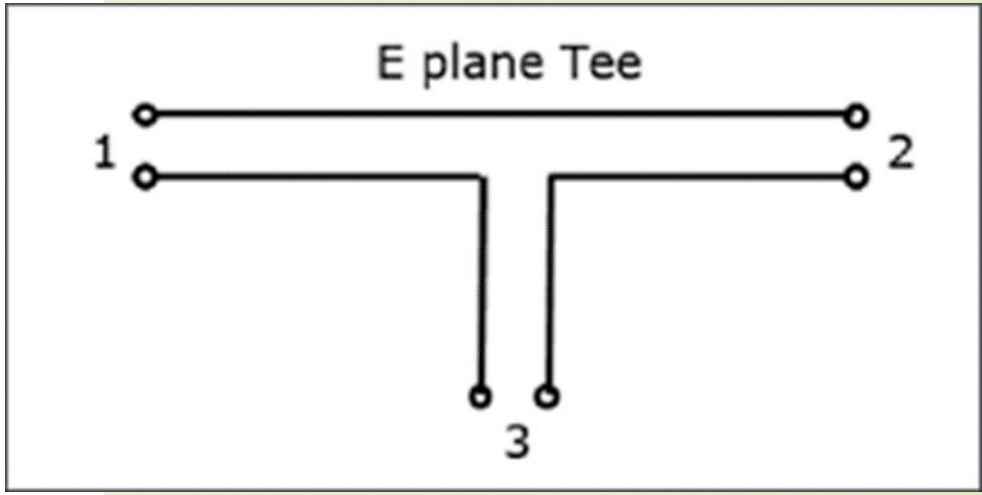
Types:

- E-plane Tee
- H-plane Tee
- EH, Magic Tee

E-plane Tee

An E-plane Tee is a waveguide Tee in which the axis of its side arm is parallel to electric field of the main guide.


Port 3
Port 2
Side arm
Axis
Collinear
arms
Port 1
E- Field
Axis


E plane Tee
1
2
3

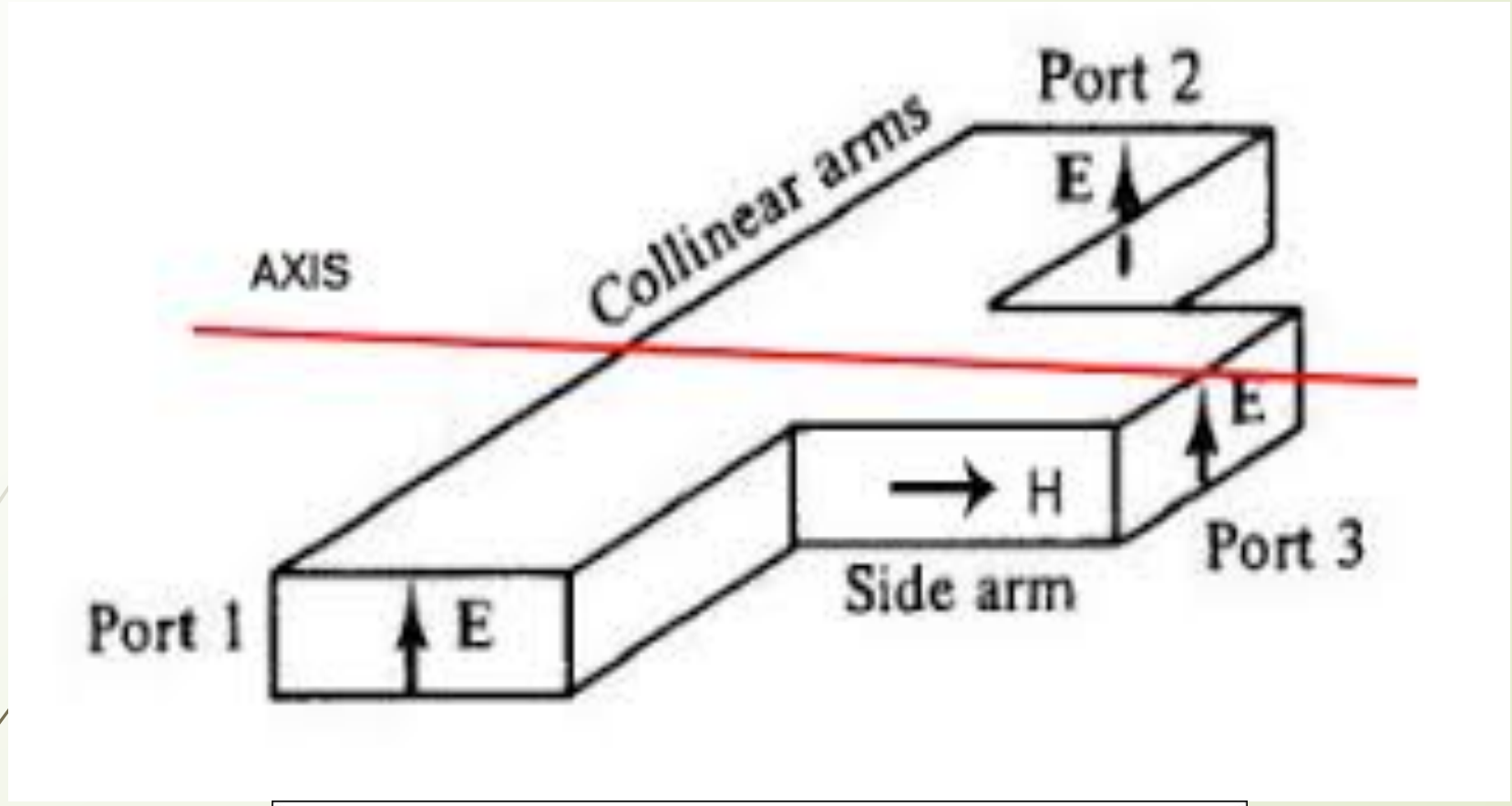
- When the wave/microwave power fed to Port 3 i.e. side arm, it gets equally divided into collinear arms i.e. Port 1 and Port 2. But they are out of phase

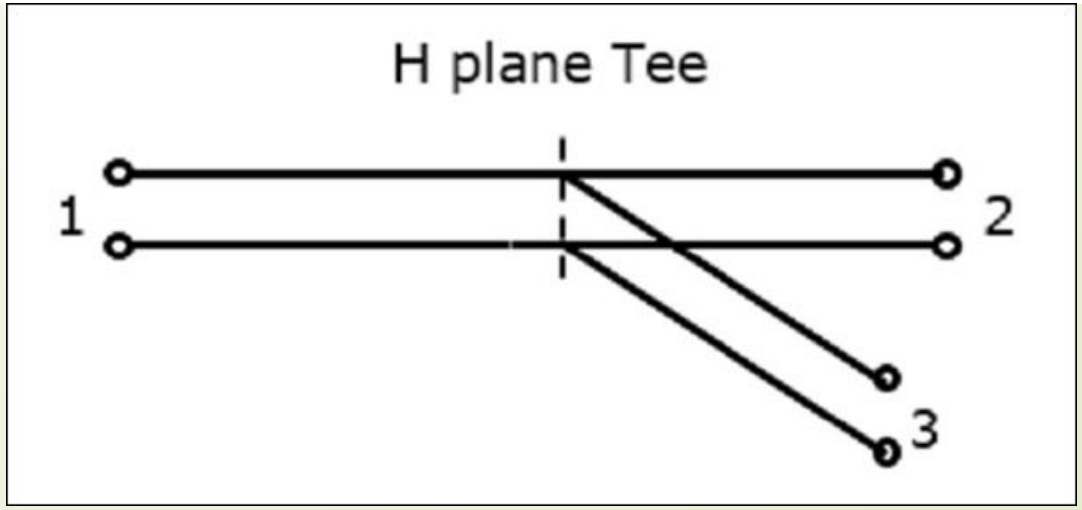
- When the wave/microwave power given to both Port 1 and Port 2 is equal in amplitude but opposite in phase then it will get added in Port3.

- When the wave/microwave power given to both Port 1 and Port 2 is equal in both amplitude and phase then there will be no power in Port 3.

H-plane Tee

It is a Tee in which the axis of side arm is parallel to the planes of H-field of main transmission line.


Port 2
E
Collinear arms
AXIS
E
H
Port 3
Side arm
Port 1
E


H plane Tee
1
2
3

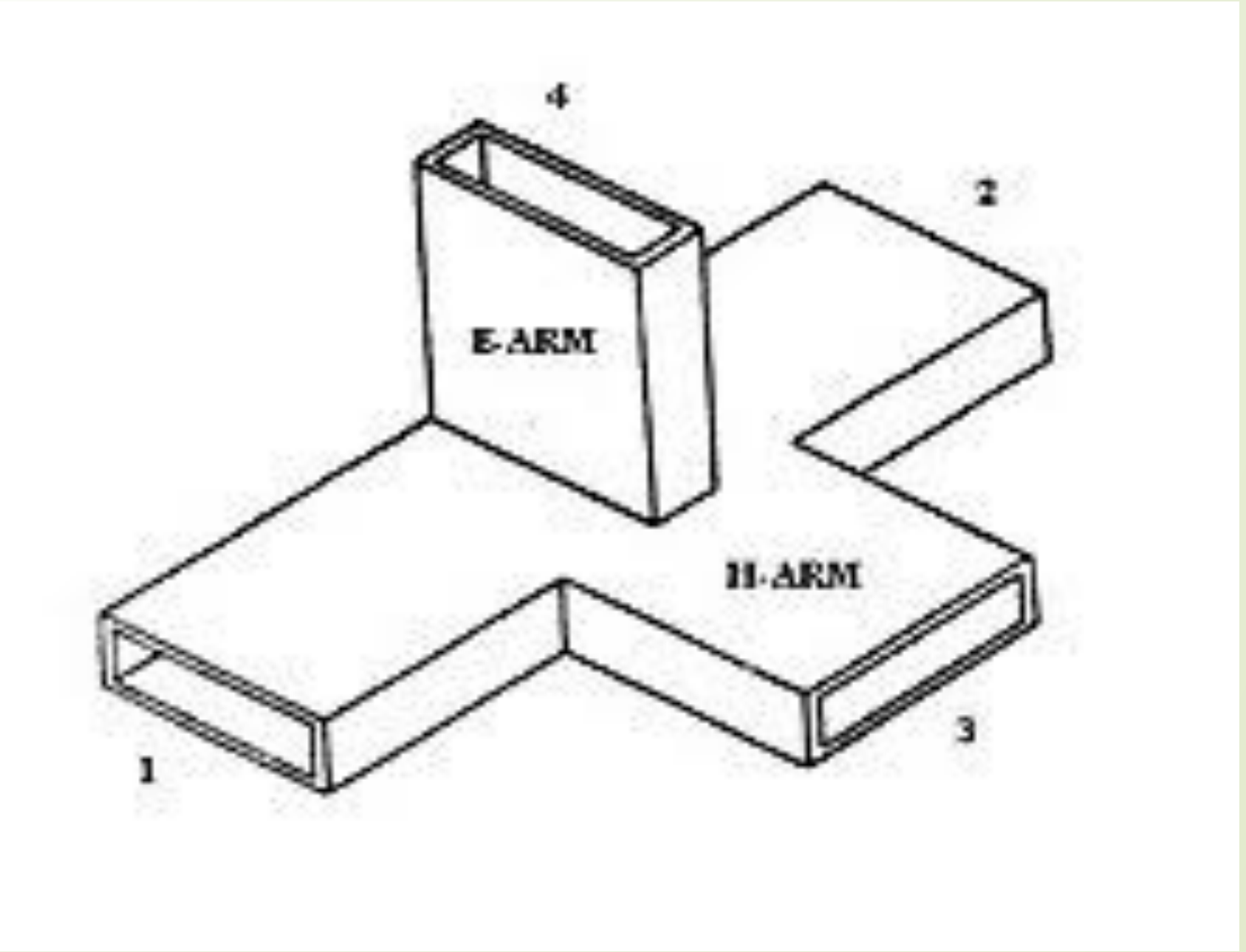
- When the wave/microwave power fed to Port 3 i.e. side arm, it gets equally divided into collinear arms i.e. Port 1 and Port 2. And they are in phase.

- When the wave/microwave power given to both Port 1 and Port 2 is equal in both amplitude phase then it will get added in Port3.

- When the wave/microwave power given to both Port 1 and Port 2 is equal in amplitude but opposite in phase then there will be no power in Port 3.

EH-plane Tee or Magic Tee or Hybrid Tee

It is a combination of E-plane Tee and H-plane Tee.


4
2
E-ARM
H-ARM
3
1

- Since it is a combination of both the planes:

Port 1, Port 2 and Port 3 form H-plane Tee and
Port 1, Port 2 and Port 4 form E-plane Tee.

- When microwave power is fed to Port 4 (E-plane arm), it gets equally divided only into Port 1 and Port 2 but are out of phase.
- When microwave power is fed to Port 3 (H-plane arm), it gets equally divided only into Port 1 and Port 2 and are in phase.
- When microwave power is fed to Port 1 and Port 2 are equal in amplitude but out of phase then they will be added in Port 4 with no power in Port 3.
- When microwave power is fed to Port 1 and Port 2 are equal in both amplitude and phase then they will be added in Port 3 with no power in Port 4.

Applications of EH-plane Tee:

- As an isolator.
- As a matching device.
- As a phase shifter.
- As a T/R switch in trans-receivers.