HEMA VARSHIKA V ( 20PW11 )

MOBILE COMPUTING ASSIGNMENT PRESENTATION

**Antenna** - An antenna is a device used to transmit and/or receive electromagnetic waves in all directions.

**Isotropic Antenna** - Ideal antenna is one that radiates equal power in all direction. All points with equal power are located on a sphere with the antenna as its centre. The radiation pattern is symmetrical.

**Omnidirectional Antenna** - An omnidirectional antenna is a type of antenna that is designed to radiate or receive electromagnetic waves in all directions equally, without any need for orientation or directionality. This means that it can pick up or transmit signals from any direction, making it particularly useful in situations where the direction of the signal source may be unknown or constantly changing.

Usage : radio and television , used in situations where a single antenna needs to cover a large area, such as in public Wi-Fi hotspots.

**Directional Antenna** - A directional antenna is an antenna that is designed to radiate or receive electromagnetic waves in a specific direction or over a limited range of directions, rather than equally in all directions like an omnidirectional antenna. This means that it can provide a higher signal strength in a particular direction.

Usage : wireless LANs, satellite communications

**Dipole Antenna** - Half-wave dipole or Hertz antenna consists of two straight collinear conductor of equal length. The antenna is called a "dipole" because it has two poles or ends, with each pole having an equal and opposite electrical charge. When an alternating current is applied to the dipole antenna, it generates an electromagnetic field around the antenna that radiates outward as electromagnetic waves.

Usage : radio and television broadcasting, wireless communication, and amateur radio

They are particularly useful for their simplicity, low cost, and ease of construction, and can be designed to operate at a wide range of frequencies by adjusting the length of the elements.

**Quarter wave Antenna** - A quarter-wave antenna or Marconi antenna is a type of radio antenna that is approximately one-quarter of the wavelength of the radio waves it is designed to transmit or receive. It is also known as a monopole antenna.

Usage : used in applications where a low-profile, omnidirectional antenna is required, such as in mobile phones, portable radios, and other wireless devices.

**Sectorized Antenna** - A sectorized antenna is a type of directional antenna that is designed to cover a specific sector or segment of a circle. It consists of multiple individual antennas, each of which is designed to cover a particular sector of the circle, with each sector overlapping slightly to provide seamless coverage across the entire area.

Usage : used in radar systems and other applications where directional coverage is required

They are generally more complex and expensive than omnidirectional or dipole antennas, but offer improved performance and flexibility in certain applications.

**Comparison of Omni and directional Antenna**

| ISSUES | OMNI | DIRECTIONAL |
| --- | --- | --- |
| Spatial Reuse | Low | High |
| Connectivity | Low | High |
| Interference | High | Low |
| Cost and Complexity | Low | High |

**Spatial Reuse** - Spatial reuse in antennas refers to the ability of an antenna system to use the same frequency channel for multiple simultaneous transmissions within the same geographical area.

**Connectivity** - Connectivity as a problem generally refers to the challenges related to establishing and maintaining a reliable connection between two or more devices or systems. Omni antennas typically have lower gain than directional antennas, which means they transmit signals at a lower power level. Hence Due to their low signal strength they have low Connectivity.

**Interference** - Interference in antennas refers to the phenomenon where undesired signals or noise are picked up by the antenna along with the desired signal, leading to degradation or disruption of the original signal. Omni-directional antennas have a higher potential for interference compared to directional antennas as they radiate signals in all directions, which means they pick up signals from all directions as well.