

Application of various Bands

Band	Frequency	wavelength	application
ELF	3-300HZ	10-1Mm	Communication with submarine
VLF	3-30 KHZ	100-10km	Long distance point –to point communication
LF	30-300KHZ	10-1 km	Point –Point marine Communication
MF	300-3000KHZ	1000-100m	Broadcasting and marine communication
HF	3-30MHZ	100-10m	Moderate and long distance communication all the types
VHF	30-300MHz	10-1m	Television FM service ,aviation and police
UHF	300-3000MHz	100-10cm	Short distance communication including Radar
SHF	3-30GHZ	10-1 cm	Radar microwave and space communication
EHF	30-300GHZ	10-1 mm	Radar microwave and space communication

Advantages of Microwave

- Increased band width availability
- Improved directive properties
- Fading effect and reliability
- Power requirement
- Transparency Property of microwaves

Application of microwaves

- Telecommunication
- Radar
- Commercial and industrial applications using heat property of microwaves
- Identifying object or personnel by non – contact method

Commercial and industrial applications using heat property of microwaves

- Microwave oven
- Drying machine
- Food Processing industry
- Rubber industry/Plastic/chemicals
- Mining/Public work
- Drying ink
- Biomedical application

Transverse modes classification

- **TE modes** (Transverse Electric) no electric field in the direction of propagation. $E_z=0, H_z \neq 0$
- **TM modes** (Transverse Magnetic) no magnetic field in the direction of propagation $E_z \neq 0, H_z=0$
- **TEM modes** (Transverse ElectroMagnetic) neither electric nor magnetic field in the direction of propagation. $E_z=0, H_z=0$
- **Hybrid modes** nonzero electric and magnetic fields in the direction of propagation. $E_z \neq 0, H_z \neq 0$

- Some authors use an alternate notation;
- **H modes** have a magnetic field component in the direction of propagation. H modes are equivalent to TE modes.
- **E modes** have an electric field component in the direction of propagations. E modes are equivalent to TM modes.