

Communication Systems:

Communication: The act of transmission and receive information.

Transducer:

It is an electrical device which converts one form of energy into another.

Transmitter:

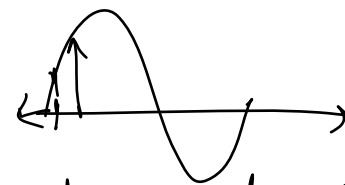
Device where information is ready for propagation. It is a device that

converts the digital signal from coded into an analogue signal which can travel the wire.

Signal:

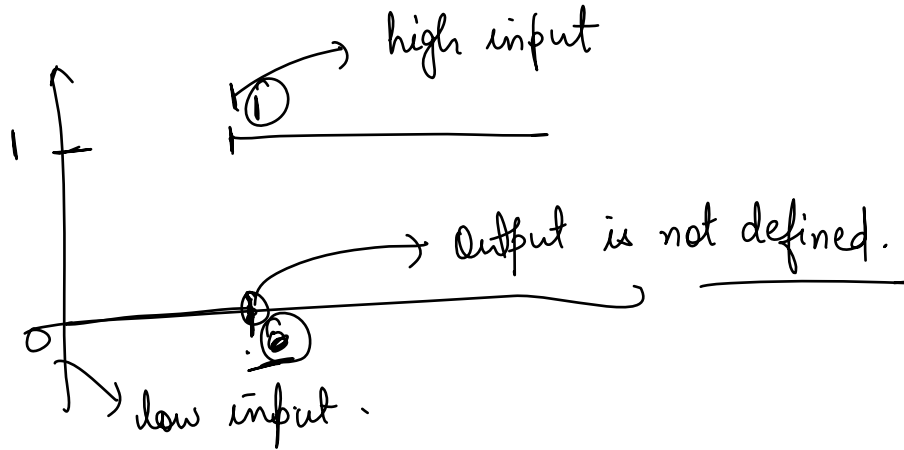
Message:

Information is converted in the form of electrical signals to send from one place to another.

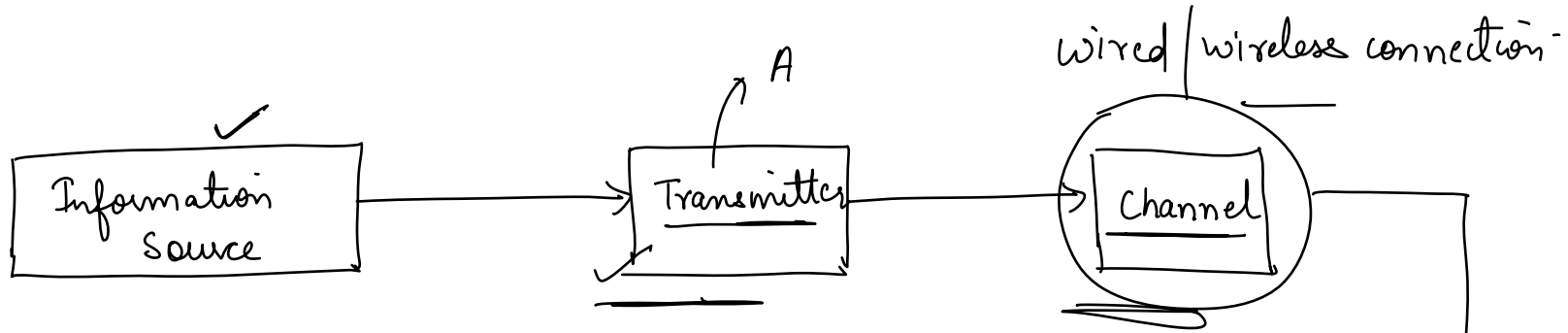
- Analog Signals: Continuous Alternating Wave 
(Sinusoidal wave) At each
each point, a value is defined.

Digital Signals:

Two levels, [low & high input] - , then the signals are transmitted.



Eg: Logic Gates



Receiver: Information is received from the channel.

It is a device that selects a signal from among all of the signals received from the communication channels, recovers the base band signal and delivers it to the user.

Noise:

Distorted Signal.

It is the unwanted signal that disturbs the main information.

Attenuation:

The gradual decrease in the strength of the message signals as it propagates.

Amplification: The process of increasing the amplitude of signals to strengthen the electrical signals.

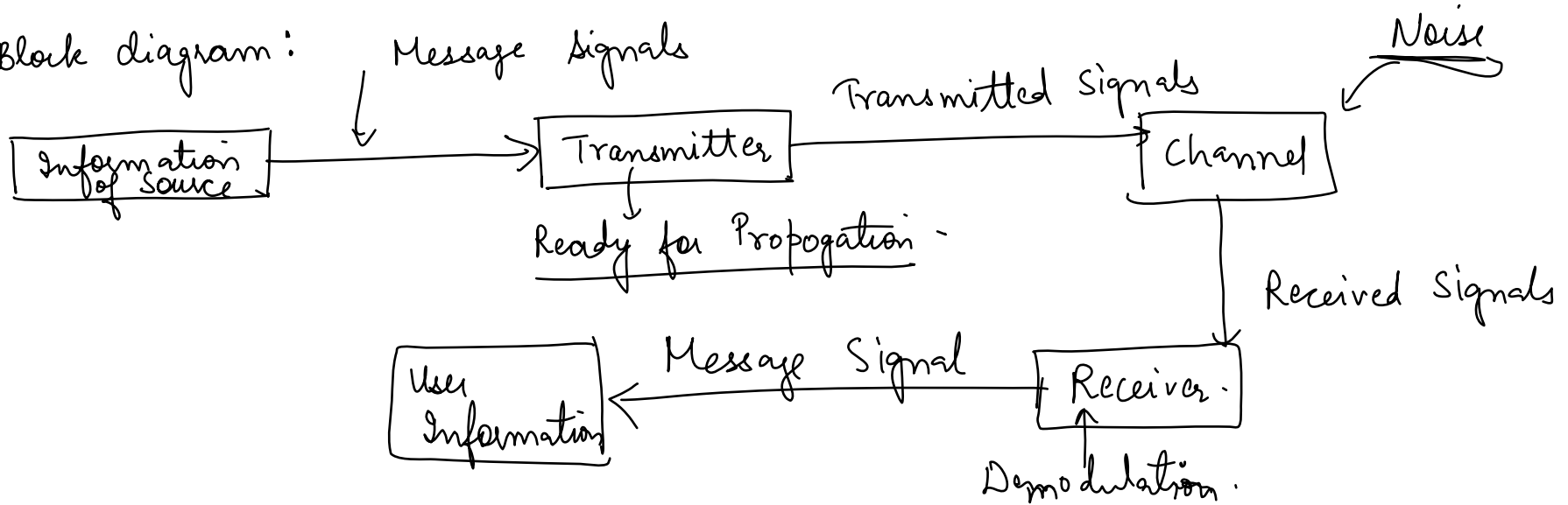
Range: Whose the signals can be the maximum transmitted to.

It is the maximum distance between the source upto which the signal is received with sufficient strength.

Repeater:

It receives the signal and then retransmits. They are used in the transmission of signals to a larger distance.

Block diagram:



Propagation of Electromagnetic Wave:

a) Ground or Surface Wave Propagation:

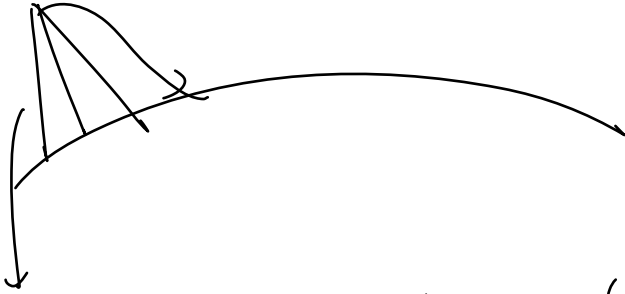


These waves propagate over earth's surface in low & medium frequency.

These waves glide over the surface of earth.

A wave induce induces current in the ground over which it passes and it is attenuation as a result of absorption of energy by the earth surface [energy gets lost].

* Ground wave propagation cannot take place for larger distance



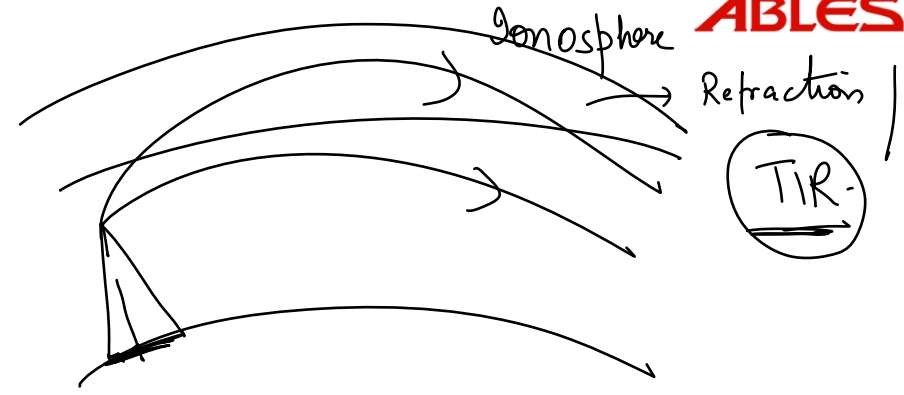
Antenna Size should be $(\frac{\lambda}{4})$ of the signal for efficient transmission

The attenuation of surface wave increases very rapidly with the frequency increase.

FM, Radio wave, of frequency $< \underline{\underline{1.5 \text{ MHz}}}$

Sky Wave:

Bends from the atmosphere after
TIR occurs
→ (Total internal reflection)



It is reflected / refracted (large ions / charged particles) back waves to the earth from the ionosphere, [which is electrically charged large of the upper atmosphere].

2 MHz to 30/40 MHz.

- Used by short wave broadcast services.
- Extends from height of 65 Km to 400 Km, else ^{wave} light gets propagated outside the atmosphere.

[↑ of Atmosphere ↓, As height ↑

Earth near layer, molecular concentration is high,
Radiation Intensity is low, Ionisation is low.

At greater height, solar radiation is high.