Communication Systems

Lecture - 5

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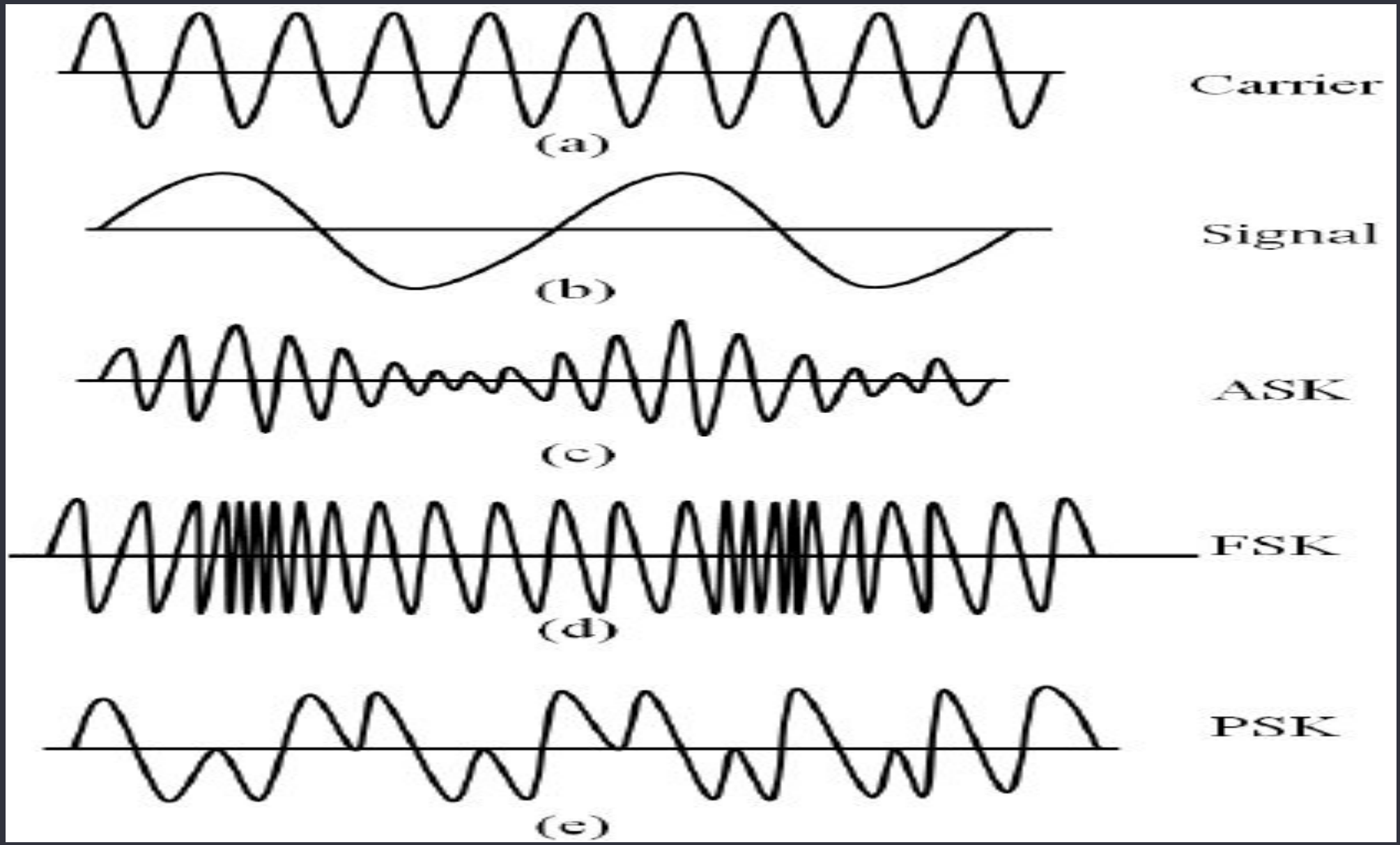
Need of Modulation

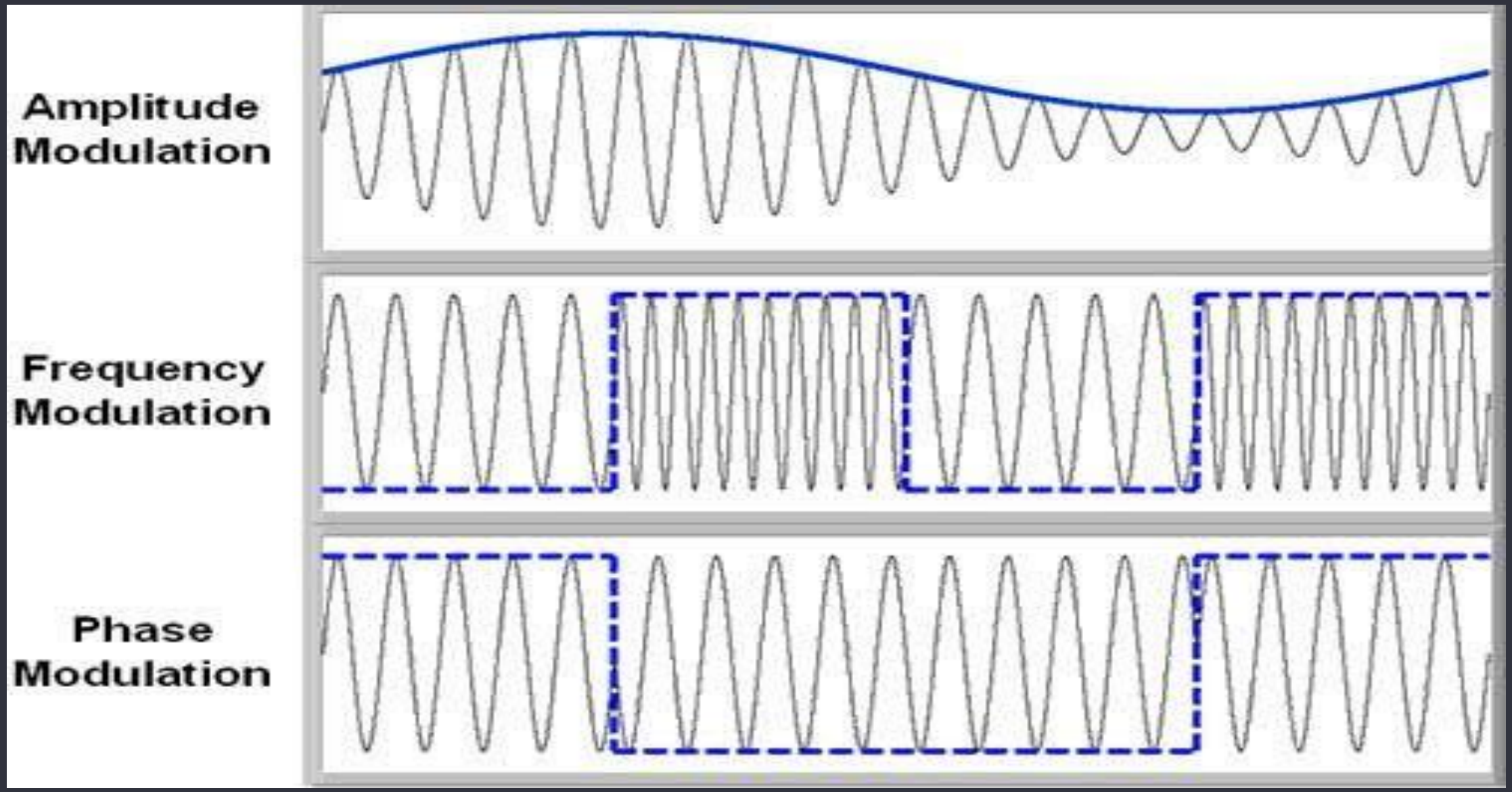
- For transmitting a signal ,we need an antenna (also called an aerial) which should have a size of comparable to the wavelength (λ) (or at least λ/4) of the signal . For example ,in case of a signal (an EM wave travelling with speed $c= 3x10^8$ m/s of frequency 20 kHz ,

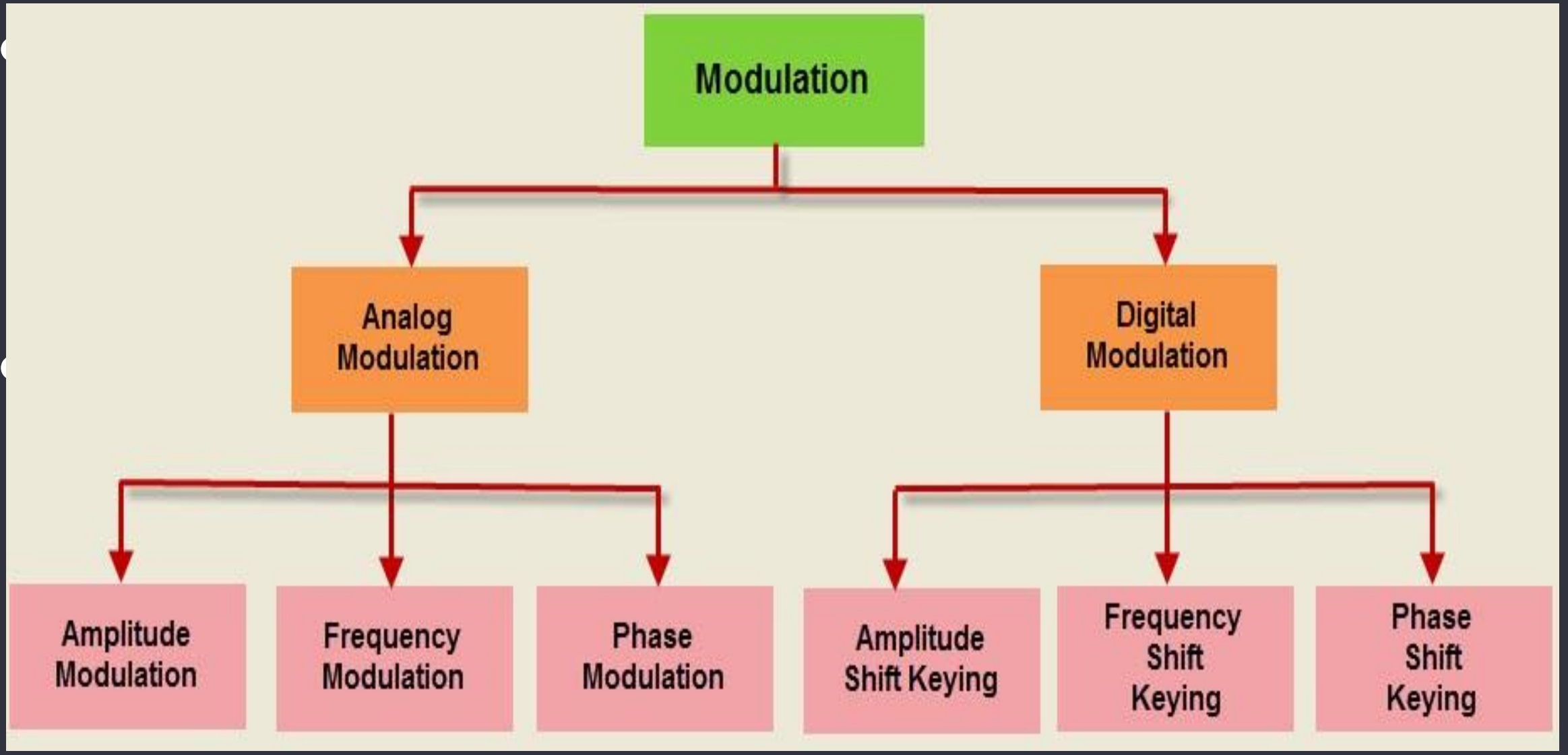
  $\lambda = c / \upsilon \;\; 3x10^8 / 20x10^3 \;\; = 15$ km
- Obviously , this is an impossible size for an antenna . hence , the necessity of carrier wave (high frequency wave) to reduce the size of an antenna to transmit the signal .


Carrier
(a)
Signal
(b)
ASK
(c)
FSK
(d)
PSK
(e)

Modulation :

- The process in which low frequency modulating or signal wave is superimposed on a high frequency (carrier wave) as such characteristics (amplitude , frequency phase) of their carrier changes in accordance with signal wave ,i.e , called modulation .
- Types of modulation :
  - Amplitude modulation
  - Frequency modulation
  - Phase modulation


Amplitude Modulation
Frequency Modulation
Phase Modulation


Modulation
Analog Modulation
Digital Modulation
Amplitude Modulation
Frequency Modulation
Phase Modulation
Amplitude Shift Keying
Frequency Shift Keying
Phase Shift Keying