

# 1) Spread Spectrum

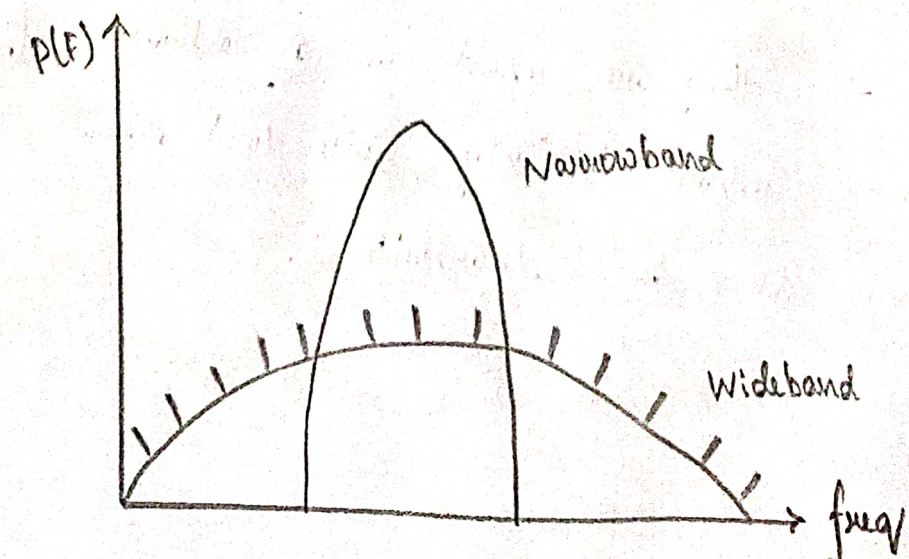
→ In telecommunication and radio communication spread spectrum techniques are methods by which a signal generated with a particular bandwidth is deliberately spread in the frequency domain resulting in a signal with a wider bandwidth.

→ Spread spectrum technology is widely used in radio signals transmission because it can easily reduce noise and other signal issues.

→ It can enable multiple-access communications

→ It can limit the power flux density.

## Narrow and Wide band systems :-



## Narrowband :-

→ For applications which requires long range, low power and reliable communications narrowband is choice.

→ Narrowband occupies less bandwidth compare to broadband systems.

→ But transmit power is higher compare to broadband system.

→ Speed of Narrowband is limited to 9600 bps while broadband has over 10,000 bps.

→ Its signals usually have a far greater range of reception as narrower filters can be used and therefore cancel out unwanted wideband noise.

→ They are used in a slower form of communication where mainly voice (or) slow datastreams have to be transmitted.

→ It is implemented to carry voice data on a limited no. of freq. sets.

→ The size of the message to be sent via a narrow band technique utilizes lesser bandwidth than the cumulative bandwidth.

### Wideband System :-

→ The term wideband audio is also known as HD voice.

→ It denotes a telephone using a wideband codec which uses a greater frequency range of the audio spectrum than conventional frequency.  
voiceband telephone calls.

→ Wideband allows for a higher bandwidth and therefore for a faster communication.

→ And also allows a spectrum spreading the signals to encrypt it.

→ Real time example of Wideband System is

Recording System.

<u>Specification:-</u>	Narrowband	Wideband
i) Spectrum Efficiency	Very High	Low
ii) Power Efficiency	High	Low
iii) Data rate	Low	High
iv) Coverage range	Very less	less
v) Preamble code length	Short	Long