SPREAD SPECTRUM

In communication systems ....

- Generally we employ with –
1. Transmission of data over a long distance
2. Reduce the effect of noise
3. Achieve the frequency translation
4. Multiplexing of signals

The all above mentioned purpose lacking in important aspect i.e. "SECURITY"

Why is this security - a big concern?

- Because all the conventional modulation employ one single carrier.

- Therefore, it is easy to either tap the signal or jam the signal.

- So a new technique called SPREAD SPECTRUM is implemented for secured communication, which is widely used in areas like military communication.

SPREAD SPECTRUM SYSTEM

- Like other communication system this aims following criteria:

1. To confine the o/p power in narrow band

2. To avoid interference with other signals in the same band

3. To limit BW used up by the signal to just that amount it needs for its data transmission.

Continue…

- So for all above concepts are not immune to external tapping or jamming and security cannot be maintained.

- So simple communication system cannot be maintained.

- So in applications like cellular telephony & personal communication, large no of users share a band of frequencies.

- We need multiple access capability because there is not enough available BW to assign a permanent frequency channel to each user.

ADVANTAGES OF SPREAD SPECTRUM

- Its ability to reject interference, Whether it to be intentional or unintentional

- In this spectrum of signal is deliberately spread across a wide band.

- Only a corresponding receiver will be able to receive the signal and no other receiver can detect the signal.

- More over jamming of the signal is not possible.

WHAT EXACTLY A SPREAD SPECTRUM?

- Already modulated signal modulated second time in order that a new wave form produce.

- This interferes in a barely noticeable way with any other signal operation in same frequency band.

- Now this signal power is spread over a large bandwidth and appears like noise.

- No un authorized receiver can neither demodulate it or jam the signal.

Continue….

- Any receiver tuned to receive a specific AM or FM broadcast would not notice the presence of a spread spectrum signal operating over the same frequency band.

- Similarly, the receiver of the SPREAD SPECTRUM would not notice the presence of an AM or FM signal.

- The interfering signals are transparent to the spread spectrum and the spread spectrum is transparent to the interfering signal.

DEFINITION

- The spectrum spreading is accomplished before transmission through the use of a code that is independent of data sequence. The same code is used at the receiver to de-spread the receiver signal so that the original data can be recovered.

- Spread spectrum is a mean of transmission in which the data of interest occupies a bandwidth in excess of the minimum bandwidth necessary to send the data.

MEANS –

The bandwidth of the transmitted signal say s(t) must be much greater than that of the message signal, m(t).

- In general modulation technique, the amount of spreading is dependent on the data.

where as,

- In the case of spread spectrum, the amount of spreading is independent on the data.

BLOCK DIAGRAM OF SPREAD SPECTRUM MODULATION

ADVANTAGES

- REDUCED INTERFERENCE

- LOW SUSCEPTIBILITY TO MULTI PATH FADING

- CO-EXISTANCE OF MULTIPLE SYSTEM

- IMMUNITY TO JAMMING