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. These techniques are used for a variety of reasons, including the establishment of secure communications, increasing resistance to natural interference, noise and jamming, to prevent detection, and to limit power flux density. The spread spectrum can be deployed in two methods, namely Direct Sequence Spread Spectrum (DSSS) and Frequency Hopping Spread Spectrum (FHSS).

**Problem statement**

**Debate on the statement: “Direct Sequence Spread Spectrum (DSSS) technique is more efficient than**

**Frequency Hopping Spread Spectrum (FHSS) technique.”**

**Highlight the following features in the debate:**

**1.1 Techniques involved in DSSS and FHSS**

**1.2 Spectrum efficiency of DSSS and FHSS**

**1.3 Security aspects of DSSS and FHSS**

**1.4 Justification of the stance taken with conclusion**

**Debate on the statement: “Direct Sequence Spread Spectrum (DSSS) technique is more efficient than Frequency Hopping Spread Spectrum (FHSS) technique.”**

In Wireless Communication Spread spectrum is one of the important class. Purpose of design of spread spectrum system is to overcome jamming of signals.

There are many techniques in Spread Spectrum System. We are interested in DHSS and FHSS.

**1.1 Techniques involved in DSSS and FHSS**

Frequency Hopping Spread Spectrum: Signal is broadcast over random series of radio frequencies.

If signal is transmitted it has to be received at receiver in FHSS there are 3 types of receivers

1. HDMV receiver
2. MRSR receiver
3. FROD receiver

1 .HDMV receiver: It stands for Hard Decision Majority Vote receiver .For individual hops it makes hard decisions and produces final decision by vote on majority.

2. MRSR receiver: It stands for Maximum rank sum receiver here in gives the rank according to the energies and adds up the all ranks at each hop of frequency. It select the one which gives largest sum.

3. FROD receiver: It stands for Fuzzy Rank Order Detector. On fading channels it performs competitive frequency hopping. It ranks the received signals based on the captured information.

Direct Sequence Spread Spectrum: The spreading of data takes place by using pseudo-random code. Techniques used in DSSS as follows

CDMA: It stands for Code Division Multiple Access method here many transmitters can transmit the information over single communication channel simultaneously.

IEEE 802.11: It is a protocol developed in IEEE Community. It uses Media access control and physical layer protocols.

**A.1.2 Spectrum efficiency of DSSS and FHSS**

It is also known as spectral efficiency or bandwidth efficiency or bandwidth efficiency. Rate of information that transmitted over given bandwidth. It measures efficient utilization of frequency spectrum. It is measured in bits/S/Hz per site. It can also refer to quantity of users supported by particular bandwidth simultaneously.

FHSS /CDMA

They have very less link spectral efficiency. The spectral efficiency can be improved by techniques of radio resource management data rate can be increased.

**1.3 Security aspects of DSSS and FHSS**

DSSS: In Dsss carrier frequency is fixed. In DSSS Limited Number of frequencies. In DSSS transmission we can tune in messages. Data protection is achieved by encryption which rises the cost and also it deceases its performance.

FHSS: The frequency hops can chosen by users. We can tune up to 26 frequencies out of 79.

The user should have knowledge of selected number of frequency and hopping sequence known for layer 1 encryption. No need of application level encryption.

**1.4 Justification of the stance taken with conclusion**

From above observations Security level in FSSS is more compare to DSSS and Techniques involved in FHSS are easy compare to DSSS .So I conclude that FHSS is more efficient than DSSS.