

## WiFi Training Program 2025

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### Question-2:

What are DSSS and FHSS? How do they work?

**FHSS (Frequency Hopping Spread Spectrum) and DSSS (Direct Sequence Spread Spectrum) are two different wireless data transmission methods that fall under the spread spectrum communication umbrella. While both FHSS and DSSS can be used to improve the security and reliability of wireless transmissions.**

#### **Working of DSSS:**

1. **DSSS, or Direct Sequence Spread Spectrum, is a wireless data transmission method that involves spreading the signal across a wide range of frequencies using a spreading code. Before transmission, the spreading code is combined with the data signal, and the receiver uses the same code to extract the original data signal.**
2. **The DSSS spreading code is typically a long, complex sequence of 1s and 0s generated by a mathematical algorithm. This sequence is combined with the original data signal via a process known as "chipping," which involves multiplying each bit of the data signal by a corresponding bit from the spreading code. This method effectively spreads the signal across a wide frequency range, making it more resistant to interference and noise**
3. **The spreading code is used at the receiver to "de-chip" the signal and extract the original data signal. The receiver must be synchronized with the transmitter at all times so that it knows which spreading code is being used.**
4. **Example: It is used in consumer applications such as wireless LANs, GPS, and Bluetooth.**

#### **Working of FHSS:**

1. **FHSS, or Frequency Hopping Spread Spectrum, is a wireless data transmission method that involves constantly changing the frequency of the transmitted signal across a wide frequency range. This is accomplished by segmenting the frequency spectrum into multiple channels and rapidly switching between them at regular intervals. The transmitter and receiver are synchronized so that they both know which frequency is currently in use. FHSS signals cause little interference in narrowband communications and vice versa.**
2. **FHSS's frequency hopping pattern is typically pseudorandom, which means it appears random but is actually determined by a mathematical algorithm. This reduces the possibility of unauthorized users intercepting or jamming the signal. It is used in different applications such as wireless LANs, wireless sensors, and military communications.**
3. **FHSS allows multiple users to share the same frequency band without interfering with each other. FHSS can make the best use of the available spectrum by using a different frequency channel for each transmission. FHSS adds a layer of security by making it difficult for unauthorized parties to intercept the signal. FHSS allows multiple users to share the same frequency band without interfering with each other. FHSS can make the best**

use of the available spectrum by using a different frequency channel for each transmission. FHSS adds a layer of security by making it difficult for unauthorized parties to intercept the signal. FHSS can operate in high-interference environments, such as those in industrial settings or densely populated urban areas.

