

IEEE 802.11 Standards

It is WLAN communication standard in the 900 MHz and 2.4, 3.6, 5, and 60 GHz standard.

802.11-1997

- It was the legacy standard and was released in 1997 and clarified in 1999.
- It specified two net bit rates of 1 or 2 Mbps.
- Forward Error Correction for error Correction
- Three physical layer technology alternative it provide:
 1. Diffuse infrared operating at 1mbps, operating at 900 Mhz frequency band
 2. Frequency hopping spread spectrum operating at 1mbps or 2mbps, operating
 3. Direct sequence spread Spectrum at 1mbps or 2mbps.

Last two technology uses Microwave technology at 2.4 GHz band.

As the time passes there are many other standards were defined like 802.11a, 802.11b 802.11g, 802.11n, 802.11ab and many more

Out of which popular was IEEE 802.11b, IEEE 802.11g, IEEE802.11n

IEEE802.11b

- Maximum data rate of 11 Mbps. It allows Adaptive Rate Selection(ARS).
- Access Method is same as legacy standard i.e. CSMA/ CA . It appeared in market in 2000.
- In reality the actual data rates achieved over a real time network are much smaller.This results from a number of factors. One is the use of CSMA/CA where the system has to wait for clear times on a channel to transmit and another is associated with the use of TCP and the additional overhead required. If UDP is used rather than TCP then the data rate can increase to around 7.1 Mbps.
- Prices was less leads to its popularity.
- Drawback: Devices like bluetooth, baby devices, Cordless telephone operating at 2.4 GHz may interfere with devices using IEEE802.11b standard.

IEEE802.11g

- Like 802.11b, its predecessor, 802.11g operates in the 2.4 GHz ISM band.

- It provides a maximum raw data throughput of 54 Mbps, although this translates to a real maximum throughput of just over 24 Mbps.
- The main modulation method chosen for 802.11g was that of OFDM - orthogonal frequency division multiplex, although other schemes are used to maintain compatibility, etc.
- In addition to the use of OFDM, DSSS - direct sequence spread spectrum is also used.

IEEE802.11n

It operate at both 2.4GHz ISM band and 5 GHz ISM band

To achieve the better performance a number of new features that have been incorporated into the IEEE 802.11n standard to enable the higher performance. The major innovations are summarized below:

- **Changes to implementation of OFDM**
- **Introduction of MIMO**
- **MIMO power saving**
- **Wider channel bandwidth**
- **Antenna technology**
- **Reduced support for backward compatibility under special circumstances to improve data throughput**

Maximum net **data rate from 54 Mbit/s to 600 Mbit/s** (slightly higher gross bit rate including for example error-correction codes, and slightly lower maximum throughput) with the **use of four spatial streams at a channel width of 40 MHz**

Data Encoding :

The transmitter and receiver **use precoding and postcoding techniques**, respectively, **to achieve the capacity of a MIMO link.**

4 MIMO Link can be established simultaneously