

# Answers for Session 1c -WLAN Standards and Amendments

**1. Explain the difference with respect to IEEE & WFA. like who is having high command in Wi-Fi for any band certification & Features implementation process.**

IEEE is responsible for developing the Wi-Fi standards, while WFA is responsible for certifying Wi-Fi products to those standards. (WFA stands for Wi-Fi Alliance. It is a trade association of over 800 member companies that promote the adoption of Wi-Fi technology). From the core technology point of view, IEEE has the high command in defining the technology and protocols that will be used in the standard, but once the standard is released, its mostly organizations like WFA that will be working with the various stakeholders to figure out which subset of the standard will be widely adopted.

**2. With the standards change the physical layer design is also changed. Can you share some viewpoint on this.**

The physical layer design of Wi-Fi is concerned with the specific way that Wi-Fi signals are transmitted and received. This includes the type of modulation scheme used, the frequency band used, and the antenna configuration used

Sure, here are some specific examples of how the PHY design has changed with each generation of Wi-Fi:

**Wi-Fi 1 (802.11b):** Modulation scheme: BPSK, QPSK, and 16-QAM( Frequency band: 2.4 GHz)

**Wi-Fi 2 (802.11a):**This is the first wifi standard in which multi carrier modulation scheme i.e. OFDM has been introduced to support high data rates unlike single carrier used in wifi-1.

**Wi-Fi 3 (802.11g):** Frequency band: 2.4 GHz and 5 GHz . Supports features implemented in Wi-Fi1 and Wi-Fi 2

**Wi-Fi 4 (802.11n):** Multiple antennas at the transmitter and receiver (MIMO) Due to use of MIMO and higher BW (i.e. 40 MHz) data rates up to 150Mbps can be achieved.

**Wi-Fi 5 (802.11ac):**

1. RF Bandwidth of 80 and 160 MHz incorporated.
2. MIMO spatial streams increased up to 8
3. High density modulation schemes up to 256QAM incorporated

**Wi-Fi 6 ( 802.11ax):** Wi-Fi 6 introduced OFDMA, MU-MIMO, and BSS Color.

**Wi-Fi 6E:** Wi-Fi 6E introduced support for the 6 GHz band.

**Wi-Fi 7( 802.11be):** Wi-Fi 7 is expected to introduce 4K QAM, multi-link operation, UL OFDMA, and mesh networking.

**Is WPA currently the strongest security or any other amendment is in progress which is better than WPA?**

WPA3 is the current strongest security amendment to Wi-Fi Protected Access (WPA). It was released in 2018 and includes a number of new security features, such as:

- **Forward secrecy:** WPA3 uses forward secrecy to ensure that even if an attacker is able to crack the encryption key for one session, they will not be able to decrypt data from previous or future sessions.
- **Simultaneous authentication of equals (SAE):** SAE is a new authentication protocol that is designed to be more secure than the previous protocols used by WPA2.

WPA3 is currently the strongest security amendment available for Wi-Fi networks. However, there are a number of new security amendments that are in development, such as WPA4. These amendments are expected to include even more advanced security features than WPA3.

**If an enterprise used WiFi5 and wanted to update to WiFi7 then do they need to change the overall infrastructure?**

If we want to upgrade to Wi-Fi 7, we will need to consider the following changes to the infrastructure:

- **Access points:** The enterprise will need to purchase new Wi-Fi 7 access points.
- **Cabling:** The enterprise may need to upgrade their cabling to support Wi-Fi 7.
- **Network Infra:** There may be a need to change the switches etc...to support higher speeds and higher PoE power ratings.

