

# Answers for Session 1b -Wi-Fi Network Topologies

**1. Can mesh networks reduce throughput on wifi networks considering dual band radio for example do mesh networks function as repeaters . Do they divide the air space between the station and the link**

Mesh networks if we have a wireless backhaul connection between the main node and repeaters we can see reduced throughputs ( Using wireless backhaul for shorter distance helps greatly in good coverage)

Imagine you have a dual-band radio access point setup, consisting of a main node and a repeater. Typically, data travels from the main node to the repeater through one of the available channels. The choice of channel is determined by certain metrics, such as channel utilization. If there's significant interference or if the channel utilization is high, the system may dynamically switch to a different backhaul channel for better performance.

Coming to the air space, It follows the same principle as of a client and an access point. It considers the repeater as a client.

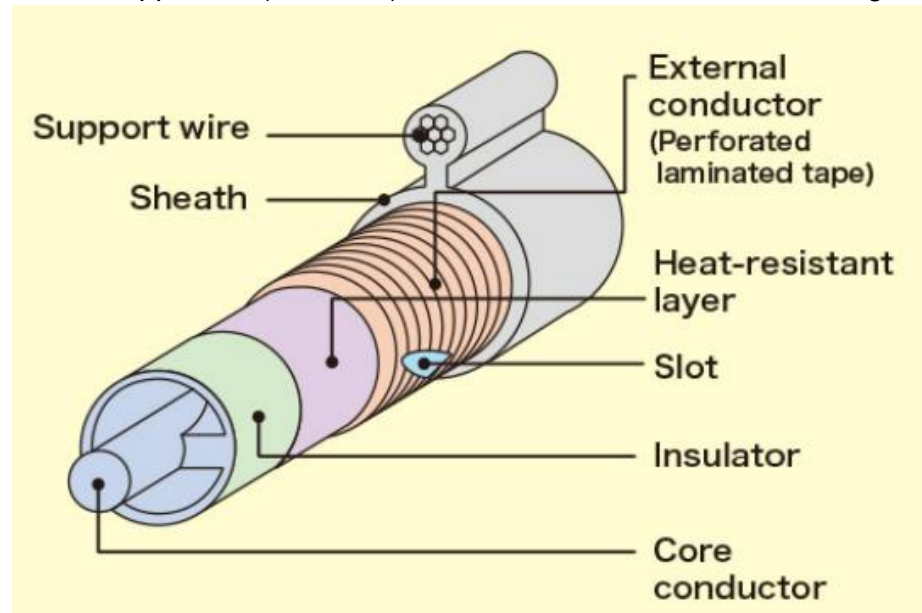
**2. Is copper cable a co-axial cable?**

They are a bit different.

A copper cable consists of only single copper wire surrounded by a plastic insulator. ( Easily prone to electromagnetic interference and if the cables are long they add up)

Coming to Coaxial cable, as the name tells us there are different layers that share the same

axis. A copper wire( Insulator) that is shielded, to avoid electromagnetic interference



**3. Like microwave oven if there is another WiFi n/w with same frequency will interference happen, if yes then upto what extent ?**

Yes, any signal operating on the identical frequency as our Access Point can lead to interference.

Interference comes in two forms: Co-channel interference and adjacent channel interference. The degree to which this interference impacts communication depends on the strength of the interfering signal.

**4. Can we transmit the signal from an access point in a parallel beam mode or with a particular angle?**

Generally the Access points have omni directional antennas that has equal coverage in all directions.

In 802.11n a new technology called Beamforming is introduced where the Signal is directed towards a specific target, such as a Wi-Fi client device, rather than broadcasting it in all directions (after analyzing the surrounding environment).

**Any certifications for dev/test engineers?**

In the networking domain we have certifications like CCNA, CCNP, CCIE

In the wireless domain we have CWNA, CWNP, CWT

### **What is MoCA?**

MoCA stands for **Multimedia over Coax Alliance**

One of the Wi-Fi backhaul, where data is transmitted using co-axial cables. As discussed in the previous question on how Co-axial cables are more reliable in data transmission. The Access points and routers are also designed to have coax back haul ( not only ethernet) .

### **Are repeaters and mesh the same ?**

No, repeater and mesh are not the same. They are two different technologies for extending the range of a Wi-Fi network.

Repeaters work by taking the existing Wi-Fi signal from your router and re-broadcasting it. This can be helpful for extending the range of your network to areas where the signal is weak or nonexistent. However, repeaters can also reduce the speed of your Wi-Fi network, as they are essentially adding another layer of interference.

Mesh networks are a more sophisticated way to extend the range of your Wi-Fi network. A mesh network consists of multiple units, or nodes, that work together to create a single, seamless Wi-Fi network. Mesh networks are more expensive than repeaters, but they offer better performance and reliability.

Here is a table that summarizes the key differences between repeaters and mesh networks:

Feature	Repeater	Mesh network
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How it works	Takes the existing Wi-Fi signal from the router and re-broadcasts it.	Creates a single, seamless Wi-Fi network using multiple units, or nodes.
Range	Can extend the range of a Wi-Fi network by a few hundred feet.	Can extend the range of a Wi-Fi network by thousands of feet.
Speed	Can reduce the speed of the Wi-Fi network.	Offers better performance and reliability than repeaters.
Cost	Less expensive than mesh networks.	More expensive than repeaters.

**While communicating building to building using high gain antennas . Will the transmit power be over limits ?**

Found few examples of a Access point that is used to bridge building to building :

<https://arstechnica.com/gadgets/2021/08/point-to-point-wi-fi-bridging-between-buildings-the-cheap-and-easy-way/>

<https://www.dlink.com/en/products/dap-3712-20-km-long-range-80211ac-wireless-bridge>

Adjustable transmission Power from 0 to 27dBm/500mW

A powerful antenna effortlessly extends high-speed coverage to distances of up to 20 km away(23 dBi).

We don't see any effect with high gain antennas being used, environment friendly.

**What is the difference Between switch and access point?**

Both are Layer 2 devices, the main difference between a switch and an access point is that a switch connects wired devices, while an access point connects wireless devices.

Document regarding the Backhaul powerline communication:

<https://pdhonline.com/courses/e454/e454content.pdf>