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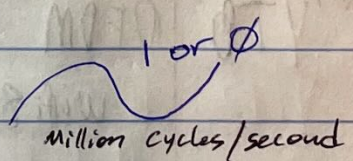
05/12/2025

2. Data Link Layer	Switch: Rule: Ethernet: CSMA/CD NAC NIC/Bridge/AP	data link wireless
1. Physical	Cables / hub | wired/wireless — antenna modem, repeater, transceiver ↳ copper, coax, fiber. TP → STP/UTP	Physical / wireless

YTB Electromagnetic Spectrum Explained.
YTB Sunny Electromagnetic Waves.

Radio - used broad cast radio & television
Microwaves used in cooking, radar, telephone & other signals
infrared
visible light
Ultraviolet
X rays
Gamma Rays - used in medicine

One cycle/second is Hertz "Hz".



Wireless Concepts

Wireless LANs (WLANS) transmit signals thru air via radio frequency (RF).

Wireless Spectrum.

ALL wireless signals carried thru air by Electromagnetic (EM) waves.

Radio - transmitter, receiver, the more powerful the transmitter & receiver, the further apart they can be spaced.

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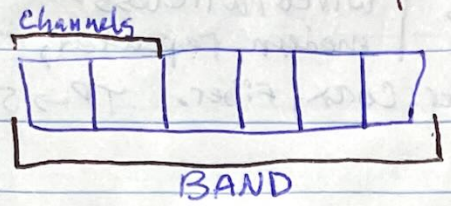
Wireless Concepts

Common WLAN frequency bands: 2.4 GHz, 5 GHz, 6 GHz



Sunny YTB FHSS - Frequency Hopping Spread Spectrum.

- Hedy Lamarr - FHSS inventor.

Sunny YTB - DSSS - Direct Sequence Spread Spectrum
- more bandwidth
- encoded data; &
- low-power density & noise-like signals.

Sunny YTB OFDM Orthogonal Frequency Division Multiplexing
wifi 802.11ac

VeEx YTB 802.11
a b g WiFi n A C
→ Wi-Fi Expert Part II: Wifi Frequency Bands & channels

VeEx YTB 2.4 GHz Frequency Band Allocation
b g WiFi n
- 13 usable channels
- Channel 1 starts at 2.412 ghz

Only 3 in the US - channels 1, 6 & 11.

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Frequency Bands	802.11	wifi	
2.4 ghz	802.11b	11 mbps	2.4 ghz
5 ghz	802.11a	54 mbps	5 ghz
6 ghz	802.11g	54 mbps	
	802.11/n		2.4/5 ghz
	802.11/ac		5 ghz
	802.11/ax	2.4/5 @	ghz

Vetx WiFi Expert Part III: Cutting the Cord.

1 Hz = 1 cycle/second

1 GHz = 1 billion cycles/second.

Travels the Furthest - 2.4 GHz band.

Can penetrate ~~solid~~ objects.

YTB. 2.4 GHz vs 5 GHz wifi: what is the difference?

YTB. Which channel should I pick: 1, 6 or 11: A NetaGeek Tutorial.

1, 6, 11 does not overlap.

Tech Videos YTB - CSMA/CD and CSMA/CA Explained

802.3	ethernet	10 Mbps.
802.1q or Dot1q	vlan trunk	
802.1x	NAC	
802.11	Wifi	

2.4 GHz - channel 1, 6, 11

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Powercert videos
YTB CSMA/CD & CSMA/CA Explained
Sunny YTB CSMA/CA - Wireless Medium Access Control Protocol
Professor Messer YTB Wireless Standard
Powercert videos YTB MU-Mimo Explained
Mimo - multiple input - multiple output
APs/STAs w/ multiple antennas (802.11n + above) will transmit/receive concurrently.

YTB Explained: wifi 1 2 3 4 5 6

old	new
802.11a	wifi 2
11 b	wifi 1
11 g	wifi 3
11 n	wifi 4
11 ac	wifi 5
11 ax	wifi 6

Bobbins Bodean.

Powercerti videos YTB Wifi 6 explained 802.11ax
9.6 Gbps - is shared accross multiple devices.

Mu-Mimo - available in both download/upload.

Power Cert Videos YTB Wifi-7 Explained 802.11be

1 — b
2 — a
3 — g
4 — N
5 — ac
6 — ax
7 — be