lamaPLC Communication: Wi-Fi

Wi-Fi is a family of wireless network protocols based on the IEEE 802.11 family of standards, which are commonly used for local area networking of devices and Internet access, allowing nearby digital devices to exchange data by radio waves. These are the most widely used computer networks, used globally in home and small office networks to link devices and to provide Internet access with wireless routers and wireless access points in public places such as coffee shops, hotels, libraries, and airports.

Wi-Fi is a trademark of the Wi-Fi Alliance, which restricts the use of the term *"Wi-Fi Certified"* to products that successfully complete interoperability certification testing. Non-compliant hardware is simply referred to as WLAN, and it may or may not work with *"Wi-Fi Certified"* devices. As of 2017, the Wi-Fi Alliance consisted of more than 800 companies from around the world. As of 2019, over 3.05 billion Wi-Fi-enabled devices are shipped globally each year.

Wi-Fi uses multiple parts of the IEEE 802 protocol family and is designed to work seamlessly with its wired sibling, Ethernet. Compatible devices can network through wireless access points with each other as well as with wired devices and the Internet. Different versions of Wi-Fi are specified by various IEEE 802.11 protocol standards, with different radio technologies determining radio bands, maximum ranges, and speeds that may be achieved. Wi-Fi most commonly uses the 2.4 gigahertz (120 mm) UHF and 5 gigahertz (60 mm) SHF radio bands, with the 6 gigahertz SHF band used in newer generations of the standard; these bands are subdivided into multiple channels. Channels can be shared between networks, but, within range, only one transmitter can transmit on a channel at a time.

Wi-Fi's radio bands work best for line-of-sight use. Many common obstructions, such as walls, pillars, home appliances, etc., may greatly reduce range, but this also helps minimize interference between different networks in crowded environments. The range of an access point is about 20 m indoors, while some access points claim up to a 150 m range outdoors. Hotspot coverage can be as small as a single room with walls that block radio waves or as large as many square kilometers using many overlapping access points with roaming permitted between them. Over time, the speed and spectral efficiency of Wi-Fi have increased. As of 2019, some versions of Wi-Fi, running on suitable hardware at close range, can achieve speeds of 9.6 Gbit/s.

Versions and generations

Generation	IEEE standard	Adopted	Maximum link rate (Mb/s)	Radio frequency (GHz)
(Wi-Fi 0*)	802.11	1997	1–2	2.4
(Wi-Fi 1*)	802.11b	1999	1–11	2.4
(Wi-Fi 2*)	802.11a	1999	6–54	5
(Wi-Fi 3*)	802.11g	2003	6–54	2.4
Wi-Fi 4	802.11n	2009	6.5–600	2.4, 5
Wi-Fi 5	802.11ac	2013	6.5–6933	5
Wi-Fi 6	802.11ax	2021	0.4–9608	2.4, 5
Wi-Fi 6E	802.11ax	2021	0.4–9608	2.4, 5, 6
Wi-Fi 7	802.11be	exp. 2024	0.4–23,059	2.4, 5, 6

Generation	IEEE standard	Adopted	Maximum link rate (Mb/s)	Radio frequency (GHz)
Wi-Fi 8	802.11bn	exp. 2028[	100,000	2.4, 5, 6

Sources

Wikipedia (here)

Wi-fi topics on lamaPLC

Page	Date	Tags
• ISM Band	2026/04/23 21:51	ism, ism band, rfid, nfc, dash7, hc-12, arduino, zigbee, z-wave, bluetooth, wi-fi, thread, miwi, nrf24, starlink, wiegand, rf, communication, bus, radio, ku band, ka band, k band, x band
• lamaPLC Communication: IoT	2026/04/23 21:51	communication, iot, internet, iomt, 6lowpan, ipv4, ipv6, bluetooth, ble, li-fi, nfc, rfid, wi-fi, zigbee, z-wave, lte-advanced, 5g, lora, dash7, lpwan, lorawan, sigfox, nb-iot, weightless, rpma, mioty, vsat, ethernet, thread, matter
• lamaPLC Communication: Wi-Fi	2026/04/23 21:51	communication, iot, internet, wi-fi, wifi, ieee 802.11
• lamaPLC Communication: Zigbee	2026/04/23 21:51	communication, ethernet, bus, ip, zigbee, wpan, bluetooth, wi-fi, ism, ieee 802.15.4, zdo, zigbee pro, zc, zr, zed, smart energy, homegrid, homeplug, powerline, ipso, sunspec, 6lowpan, ipv6, rf4ce
• lamaPLC: ESP32 / ESP8266	2025/11/22 00:07	esp8266, esp32, esp32-c2, esp32-c3, esp32-c5, esp32-c6, esp32-c61, esp32-h2, esp32-s2, esp32-s3, esp32-p4, espressif systems, communication, ethernet, ip, wi-fi, thread, zigbee, matter, homekit, bluetooth, mqtt, adc, spi, uart, i2c, i2s, rmt, pwm, usb, usb otg, twai

communication, IoT, internet, Wi-Fi, Wifi, IEEE 802.11