

Common Wireless Connectivity Terms

Below are some common terms used in the wireless networking industry.

Amplitude Modulation (AM): A technique whereby the voltage level or amplitude of a carrier is varied in order to transmit digital or analog information.

ANSI: The American National Standards Institute sets voluntary consensus standards for products, services, processes, systems, and personnel in the United States.

Antenna: That part of a radio communications system intended to radiate and/or collect radio frequency energy.

Antenna Gain: A relative measure of an antennas ability to direct or concentrate radio frequency energy in a particular direction or pattern. Typically measured in dBi or dBd.

Attenuation: The loss or weakening of a signal through a transmission line, transmission component, or signal path. Usually refers to loss in signal amplitude or signal power, and is typically measured in decibels (dB).

Attenuator: A component that reduces the magnitude of current, voltage, or power of a signal in transmission between points. The input and output Impedance of the Attenuator normally matches the system.

Band Pass Filter: A signal filter designed to pass a continuous range of frequencies, while attenuating frequencies that are both above and below that range. Also called a BPF.

Bandwidth: The term Bandwidth must be used in the proper context. The Bandwidth of a Filter is the difference between the highest and lowest frequencies of a band expressed in Hertz. The Bandwidth of a system or channel is the volume of information per unit of time that a transmission medium can handle.

Bias-T: A Bias-T is a type of Diplexer that is installed in-line device with a transmission cable enabling both DC power and RF signals to travel through the same cable. The Bias-T is normally used to power remote equipment.

Bi-Directional Amplifier: A device that amplifies an RF signal in both Forward (Transmit) and Reverse (Receive) directions. Also called a Bilateral Amplifier. Amplifiers can operate in Half Duplex or Full Duplex modes. The Forward and Reverse frequencies of operation can be the same or different.

BPSK: Binary Phase Shift Keying – a modulation technique in which different phase angles in the carrier signal are used to represent the binary states of 0 and 1. 180 degrees separates the two states.

Bridge: Typically used to describe a component of a communications network that connects one network to another. For example a Wireless, Wired or Fiber Bridge can be used to connect two networks together.

Bulkhead Connector: A connector type that is designed for mounting through a panel or wall.

Carrier Sense Multiple Access/Collision Detection (CSMA/CD): A technique of transmitting over a wired or wireless network where only one transmitter may be operating at the same time.

Cavity Filter: A popular type of RF filter that employs one or more resonant cavities to filter out unwanted frequencies.

Cellular: A wireless communications network architecture that employs "cells" or modular coverage areas, typically serviced by a "cell site", and usually provides hand-off capability between cells for roaming devices.

Coaxial Cable, Coax: A concentric two-conductor cable in which one conductor surrounds the other, separated by an insulator or dielectric.

Code Division Multiple Access (CDMA): A technique used to increase channel capacity which is associated with spread-spectrum systems. Typically each user is given a different pseudo-random spreading code. To communicate with a particular user, the sender must select the code assigned to that user. This technique can permit many users to operate simultaneously on the same frequency.

Collisions: In network systems, when two nodes transmit simultaneously, causing destruction of a data packet's information.

Compression: In RF amplification, an amplifier is said to be "in compression" (distorting) when the output is no longer a linear representation of the input signal, typically at the operational limits of the amplifier.

CW: Continuous wave. An analog signal that is always "on" (100% duty cycle).

Data Encryption Standard (DES): An encryption standard issued by the National Bureau of Standards.

dBd: Decibels relative to a dipole. (See also Decibel and Dipole)

dB_i : Decibels relative to an isotrope. (See also Decibel and Isotrope)

dBm: Decibels (dB_i) relative to one milliwatt. (See also Decibel)

dBW: Decibels (dB_i) relative to one Watt. (See also Decibel)

Decibel (dB): A logarithmic representation of magnitude relationships commonly used in radio and sound measurement. A Decibel is 1/10 of a Bel.

Demodulate: To convert a modulated signal back to an unmodulated "baseband" signal.

Digital Signal Processor (DSP): A specialized microprocessor that contains hardware features specifically tailored to the processing of signals.

Diplexer: A device that combines two signals onto a single transmission line. In general the two signals operate are at different frequencies.

Dipole Antenna: The most common wire antenna. Length is equal to one-half of the wavelength for the frequency of operation. Fed by coaxial cable.

Direct Sequence (DS): A spread spectrum modulation technique where a pseudo-random code directly phase modulates a carrier, increasing the bandwidth of the transmission. The resulting signal has a noise-like spectrum.

Diversity: A transmission or reception technique used to improve system performance via switching amongst multiple antennas. Two methods are generally used, Polarization Diversity or Spatial Diversity. This technique is useful for operating in areas susceptible to the affects of multi-path interference.

Dummy Load: A device that serves as a transmitters antenna without radiating radio waves. Generally a resistive device who's Impedance is matched to the Transmitter.

Duty Cycle: A percentage of the time "on" (transmitting) versus the time "off" (not transmitting).

Effective Isotropic Radiated Power (EIRP): A measure of a signals absolute power in a particular direction (see ERP), but relative to an Isotrope rather than a Dipole.

Effective Radiated Power (ERP): The product of the transmitter peak envelope power, expressed in Watts, delivered to the antenna, and the relative gain of the antenna over that of a half wave dipole antenna.

EMI/RFI: Electro Magnetic Interference/Radio Frequency Interference. Broad spectrum noise or interfering signals.

Encryption: Modification of a bit stream so that it appears random. Encryption is used for security purposes. The sender and receiver must both employ the same encryption method.

Ethernet: Ethernet is a type of wired network that supports high-speed communications among devices over Coaxial or Twisted pair cables.

ETSI: The pan-European communications regulatory standards board.

Fade Margin: The loss in signal along a signal path, measured in dB, caused by environmental factors such as terrain, atmospheric conditions, etc.

Federal Communications Commission (FCC): A board of commissioners, appointed by the President, having the power to regulate wire and radio telecommunications in the United States.

Feed horn: That part of a parabolic or grid reflector antenna that contains the driven element.

Filter: A device used to block or reduce signals at certain frequencies while allowing others to pass through.

Frequency: The number of cycles of alternating current in one second, measured in Hertz (Hz).

Frequency Hopping (FH): A spread spectrum modulation technique where the transmitter frequency hops from channel to channel in a predetermined but pseudo-random manner.

Frequency Modulation (FM): An analog modulation technique whereby the frequency of a carrier is varied to encode information.

FTP: File Transfer Protocol, the FTP application is used to provide file transfer services across a wide variety of network systems.

Full-Duplex Transmission: A channel that allows transmission in two directions at the same time. For example, cellular telephone service or an Ethernet based Network is typically full duplex.

Gain: The relative increase in power or magnitude of a signal typically measured in decibels (dB).

Gas Tube Arrestor: A type of lightning arrester that employs a Gas Discharge Tube (GDT) as the protective device. A GDT consists of a sealed module containing two or more metallic elements and a mixture of gasses that conduct under high voltages.

Grid Antenna: A type of antenna that employs an open-frame grid as a reflector, rather than a solid one. The grid spacing is sufficiently small to ensure that waves of the desired frequency cannot pass through, and are hence reflected back toward the driven element.

Ground: A connection between a device or circuit and the earth or some device serving as the earth.

Half-Duplex Transmission: A channel that allows transmission in only one direction at a time, switching back and forth between transmit and receive. Most spread spectrum wireless LAN equipment is Half-Duplex.

Hertz (Hz): One completed alternating cycle per second. Named after Heinrich R. Hertz, a German physicist. Used as the international unit of frequency.

High-Pass Filter: A signal filter that passes all frequencies above a certain frequency, and attenuates all lower frequencies.

Impedance: A measure of the total opposition to current flow in an alternating current circuit, made up of two components, ohmic resistance and reactance, and usually represented in complex notation as $Z = R + iX$, where R is the ohmic resistance and X is the reactance.

Insertion Loss: The loss in signal strength due to the insertion of a device in series with a signal path. Typically measured over the intended operating frequency range of the device and expressed in dB.

IP: Internet Protocol. The TCP/IP standard protocol that defines the IP as a unit of information passed across an Internet and provides the basis for packet delivery service. The protocol suite is often referred to as TCP/IP because TCP and IP are the two most fundamental protocols.

IP Address: Internet Protocol Address. This is a 32-bit address assigned to host on a TCP/IP Internet. The IP address has a host component and a network component.

Isotropic: A theoretical "isotrope" is a single point in free space that radiates energy equally in every direction similar to the Sun.

Jamming: The typically intentional or malicious interference with another radio signal.

Lightning Arrester: A device whose purpose is to eliminate transients on a conductor that are induced by nearby lightning activity.

Linear Amplifier: A device that accurately reproduces a radio wave in magnified form.

Low-Pass Filter: A signal filter that passes all frequencies below a certain frequency, and attenuates all higher frequencies.

Low-Noise Amplifier (LNA): Typically small-signal amplifiers for receive applications.

Metal Oxide Varistor (MOV): A type of surge protector arrester which offers high resistance to low voltages, and low resistance to high voltages. Placing a MOV from a conductor to ground causes high voltage spikes to short-circuit to ground.

Microwave: Usually referring to all radio frequencies above 1 GHz or so.

Modulate: To vary the amplitude, frequency or phase of a radio frequency wave in accordance with the information to be conveyed.

Multipath Interference: Signal reflections and delayed signal images that interfere with the desired un-delayed and larger desired signal. Causes picture ghosting for over the air analog TV and errors in digital transmission systems.

Multiple Access: A method for accommodating more users in the same frequency band.

Multipoint: A communications circuit interconnecting several nodes (usually more than two).

Multi-Strike Capability: The ability for a device to survive and work again after a surge event.

Network Address: A unique number associated with a host that identifies it to other hosts during network transactions.

Network Interface Card (NIC): Usually refers to a network adapter card that installs in a computer.

Omni-Directional Antenna: An antenna that radiates or receives RF energy in a 360 degree patterns about an axis.

Oscillator: A device that produces a "vibration" or variation in level at a given frequency.

Parabolic Dish Antenna: An antenna that utilizes a dish-like reflector to focus radio energy of a specific range of frequencies on a tuned element.

Parabolic Grid Antenna: An antenna that employs an open-frame grid rather than a solid dish reflector. (See also Grid Antenna)

Part 15 Rules (FCC): That part of the FCC regulations which regulates unlicensed use of the ISM bands for wireless networking and other uses.

Patch Antenna: Typically a flat rectangular or round antenna having a directional radiation pattern.

Path Budget: A mathematical model of a wireless communications link that accounts for a wide variety of factors that affect operating range and performance. Sometimes called a "link" budget.

Path Loss: The weakening of a signal over its path of travel due to various factors like terrain, obstructions and environmental conditions. Measured in dB.

PING: The Packet Internet Groper is a program that is useful for testing and debugging networks. It sends an Echo to the specified host, and waits for a response. It reports success or failure statistics about its operation.

PN: Pseudo Noise - a digital signal with noise-like properties.

Polling: A process in which a device polls the terminals connected to it, asking whether or not they have data to be sent to the host.

Point-to-Point: A communications channel that runs from one point to another.

Point-to-Multipoint: A communications channel that runs from one point to several other points.

Power Meter: A device used to measure radio frequency energy in Watts into a standard Impedance like 50 Ohms.

Powder Coat: An "environmentally sound" type of durable plastic coating used on various types of outdoor equipment.

Propagation: The travel of a signal through a medium such as air or free space.

Radio Frequency (RF): Typically a frequency from 20 kHz to 100 GHZ. RF is usually referred to whenever a signal is radiated through an enclosed medium like a transmission cable or air.

Radio Wave: A combination of electric and magnetic fields varying at a radio frequency and traveling through space at the speed of light.

Receive Gain: A measure of receive signal boost contributed by an amplifier or antenna system, and typically measured in dB.

Receiver Sensitivity: A measure of a receiver's ability to differentiate a desired signal from the background noise.

Roaming: Typically used to describe a portable communications device moving its network connection from one fixed access point to another.

Router: A router has two or more network interfaces to different networks. The primary function of a router is to direct packets between these networks, delivering them to their final destination or to another router. When used with TCP/IP, the term refers to an IP gateway that routes data using IP destination addresses.

Safety Ground: The local earth ground. The earth ground which grounds the neutral return A system may be earth grounded as many times as needed.

Saturation: In amplification, a term which describes the point at which the amplifier is producing the most output power it is capable of, basically in an over-driven situation. There is no fixed definition for the Saturation point in a amplifier or system.

Server: A computer or network node that provides services to the network or other nodes.

Signal-To-Noise Ratio (SNR): A measure of the magnitude of a desired signal relative to the magnitude of an undesired signal or noise.

Spectrum: A series of radiated energies arranged in order of wavelength. The radio spectrum extends from 20 kilohertz upward.

Spectrum Analyzer: An instrument that can be used to view signal amplitude across a wide range of frequencies.

Splitter/Combiner: A transmission component which divides or sums power between two or more ports.

Spread Spectrum (SS): A wideband modulation that imparts noise-like characteristics to an RF signal.

Spurious Emissions: Unwanted radio frequency signals emitted from a transmitter that sometimes causes interference.

Throughput: A measure of the volume of information which can be transmitted (typically bits per second) through a given communications system. See Bandwidth.

Time Division Multiple Access (TDMA): A digital multiplexing technique whereby each signal is sent and received at a fixed time slots in a series of time slots. The transmitter and receiver must be time-synchronized.

Transceiver: A combination radio transmitter and receiver.

Ultra High Frequency (UHF): Ultra high frequency radio waves that are in the range of 300 to 3,000 MHz.

Very High Frequency (VHF): Very high frequency waves that are in the range of 30 to 300 MHz.

Voltage Standing Wave Ratio (VSWR): VSWR is a measure of how efficiently radio-frequency power is transmitted from a power source, through a transmission line, into a load. Perfect = 1.0:1, Good < 2.0 :1

Wide Area Network (WAN): Large network formed by bridging smaller LANs or using dial-up lines. WANs can span the globe.

Wavelength: The distance that an electromagnetic wave travels in one complete cycle.

Wind Loading: A characteristic of an antenna or other structure that is a measure of the forces applied to the structure due to wind.

Wireless: A new all-encompassing "buzzword" which describes what used to be called "radio", but which typically also implies some of the newer cellular or digital radio technologies as well.

Wireless "Ethernet": A misnomer in actuality since "Ethernet" is a wired system by definition, but appropriate nevertheless to describe CSMA/CA wireless LAN's—since their operation has a great deal in common and they are typically integrated easily.

Wireless Local Area Network (WLAN): A short-range computer-to-computer wireless data communications network.

Yagi Antenna: A narrow band directional antenna named for one of its inventors, which consists of a boom supporting a series of metallic elements or rods.