

Glossary

of Rural Telecommunications Terms



Foundation
for Rural Service

In developing this glossary, it was our intention to provide an overview of widely used terms in the rural telecommunications industry. This is not a comprehensive list of all the highly technical terms that are used in the industry, but an informative reference guide to help those individuals who have a connection to or interest in rural telecommunications.



The Foundation for Rural Service, is a 501©(3) nonprofit organization based in Arlington, Va., that serves rural communities across the United States. Established in 1994 by the National Telecommunications Cooperative Association, their mission is to sustain and enhance the quality of life throughout Rural America by advancing an understanding of rural telecommunications issues. FRS educates the public about the benefits of a nationwide telecommunications network and promotes rural connectivity as an essential link in this network. FRS believes that rural communities—regardless of their size or location—deserve the same connection to the world as residents of urban areas. FRS provides a variety of programs, ranging from youth-based initiatives and educational materials, to consumer awareness and rural economic development.

For more information on FRS, visit www.frs.org



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FRS Glossary of Rural Telecommunications Terms

Welcome to the FRS Glossary of Rural Telecommunications Terms. This guide was developed to provide definitions of some of the most widely used terms in the rural telecommunications industry.

3G and 4G: The third and fourth generations of mobile communications standards providing high-speed Internet and transmissions of text, voice, video and multimedia. 4G is the next generation and is much faster than 3G. (see also LTE)

700 MHz: Prime spectrum freed up when broadcasters transitioned from analog to digital in 2009. Commonly referred to as “beachfront,” this spectrum has many wireless applications. The FCC started the 700 MHz FCC spectrum auction, officially known as Auction 73, on January 24, 2008, for the rights to operate the 700 MHz frequency band in the United States.

A

Access Charge: A fee charged to subscribers or other telephone companies for the use of local exchange facilities, especially for access to these facilities to provide long-distance service.

Access Point: A hardware device or a computer’s software that acts as a communication hub for users of a wireless device to connect to a wired LAN. Access points are important for providing heightened wireless security and for extending the physical range of service a wireless user has access to.

ACE (Association of Communication Engineers): A nonprofit organization of registered, professional engineering consulting firms committed to supporting consulting engineers working in the field of telecommunications.

Ad Hoc Network: A short-term wireless network created between two or more wireless network adapters without going through an access point. Ad hoc networks are handy for quickly trading files when there is no other way of connecting two or more computers.

ADS (alternate delivery system): Used in both local and national arenas, ADS refers to signals delivered by means other than via cable and over-the-air, such as satellite and telco.

ADSL (asymmetric digital subscriber line): An ‘always on’ technology designed to increase the bandwidth available over standard copper telephone wires. “Asymmetric” refers to the fact that the downstream speed is greater than the upstream. Thus, ADSL exploits the trend that most homes and businesses consume more data than they generate. This technology is ideal for one-way applications such as video on demand and graphics downloading, but much less suitable for two-way applications, such as videoconferencing. (see also DSL)

Adware: Software that automatically downloads or displays advertising information while the program is running. Some types of adware are considered privacy invasive and are termed as Spyware.

Air Interface: In cellular telephone communications, the air interface is the radio-frequency portion of the circuit between the cellular phone set (or wireless modem) and the base station. Air interface also defines the frequency use, the bandwidth of the individual radio channels, the encoding methods used (e.g., W-CDMA, cdma2000) and other quantities used by the radio technology.

Analog Transmission: A signaling technology in which sound waves or other information are converted into electrical impulses of varying strengths. Analog transmission is the traditional telephone technology for voice transmission, but has generally been replaced by digital transmission.

Android: A Linux-based operating system for mobile devices such as smartphones and tablets. Originally created by the Open Handset Alliance, it is now one of the largest smartphone platforms in the world.

Application (app): A computer software designed to help the user perform specific tasks. Although most commonly applied as software for smartphones, apps also are used on other wired and wireless broadband networks.

ARPU (average revenue per unit): The average revenue generated per wireless customer unit (e.g. pager or cellphone) per month. ARPU is an indicator of the financial performance of a wireless company.

ASP (application service provider): A business that offers software application capabilities to business users via the Internet from a centralized data center.

ATM (asynchronous transfer mode): A high-speed multiplexing and switching method utilizing fixed-length cells to transmit voice, data and video.

AWS (advanced wireless service): A term the FCC uses to refer to an array of innovative wireless services, including wireless broadband Internet access. In 2003, the FCC authorized 90 MHz of spectrum in the 1710–1755 MHz and 2110–2155 MHz bands for AWS (commonly referred to as the 3G spectrum). In September 2004, the FCC further designated 20 MHz of spectrum in the 1915–1920 MHz, 1995–2000 MHz, 2020–2025 MHz and 2175–2180 MHz bands for AWS.

B

Backhaul: Originally used to transmit a telephone call or data beyond its normal destination point and then back again in order to utilize available personnel (operators, agents, etc.) or network equipment not available at the destination location. For example, depending on distances and service arrangements, it might be cheaper to send a telephone call on a private line to a location way beyond the destination and then dial up the destination, which is back in the other direction. The term has evolved into a more generic meaning and often refers to transmitting from a remote site or network to a central or main site. It implies a high-capacity line; for example, to backhaul from a wireless mesh network to the wired network means aggregating all of the traffic on the wireless mesh over one or more high-speed lines to a private network or the Internet.

Bandwidth: The capacity of a telecom line to carry signals. Bandwidth is both the total frequency spectrum (in hertz or cycles per second) that is allocated or available to a channel and the amount of data that can be carried by a channel in bits per second (bps).

Basic Service: A telephone company service limited to providing only local switching and transmission.

BETR (basic exchange telecommunications radio): A digital, radio-based transmission system employed by telephone companies to provide basic local exchange telephone service to subscribers in remote areas where installation of conventional telephone lines is impractical due to expense or terrain.

BlackBerry: A hand-held device made by Research in Motion, marketed primarily for its wireless email handling capability.

Bluetooth: An open specification for seamless, wireless short-range communications of data and voice between mobile and stationary devices. For instance, it specifies how mobile phones, computers and PDAs interconnect with each other, with computers, and with office or home phones. The first generation of Bluetooth permits exchange of data up to a rate of 1 Mbps, even in areas with much electromagnetic disturbance. It transmits and receives via a short-range radio link using a globally available frequency band (2.4 GHz ISM band).

Broadband: A term used in evolving digital technologies in which multiple signals share the bandwidth of a medium, such as fiber-optic cable. This allows the transmission of voice, data and video signals over a single medium. The FCC's "official" definition of what qualifies as broadband service has changed over time, and currently stands at 768 kilobits per second.

BTA (basic trading area): A geographic region defined by a group of counties that surround a city, which is the area's basic trading center. The boundaries of each BTA were formulated by Rand McNally & Co. and are used by the FCC to determine service areas for PCS wireless licenses. The entire United States and some of its territories is divided into 493 non-overlapping BTAs.

Bundling (product bundling): A market strategy that involves offering several different products for one, usually lower, price. In the telecommunications industry, phone, television and Internet services often are bundled together.

BWA (broadband wireless access): Any technology that is aimed at providing wireless access to data networks with high data rates. From the connectivity point of view, BWA is equivalent to broadband wired access such as ADSL or cable modems. Examples of BWA are LMDS, MMDS and IEEE 802.16.

C

Cache Memory: A buffer, smaller and faster than main storage, used to hold a copy of instructions and data in the main storage that is likely to be needed next by the processor and that has been obtained automatically from main storage.

CALEA (Communications Assistance for Law Enforcement Act): A law enacted in October 1994 that defines the statutory obligation of telecommunications carriers to assist law enforcement in executing electronic surveillance.

Calling Party Pays: A billing method in which a wireless phone caller pays only for making calls and not for receiving them. The standard billing system in the United States requires wireless phone customers to pay for all calls made and received on a wireless phone.

CATV (Community Antenna Television, Community Access Television): A system of distributing television programs to subscribers via radio frequency. It is more commonly referred to as cable television.

CDMA2000: A 3G technology based on the CDMA platform. CDMA2000 can support mobile data communications at speeds ranging from 144 Kbps to 2 Mbps.

Cell Site: The central radio transmitter/receiver that maintains communications with a mobile telephone within a given range. A cellular network is made up of many cell sites, all connected back to the mobile telephone switching office via landline or microwave. Also called the base station.

Cellular Technology: This term, typically used for all cellular phones regardless of the technology use, derives from cellular base stations that receive and transmit calls. Both cellular and personal communications service phones use cellular technology.

CDMA (code division multiple access): A digital cellular technology that uses spread-spectrum techniques. Unlike competing systems such as GSM that use time-division multiplexing, CDMA does not assign a specific frequency to each user. Instead, every voice channel uses the full available spectrum. Individual conversations are encoded with a pseudo-random digital sequence. The CDMA idea, first commercialized by Qualcomm, was originally developed for military use over 30 years ago.

CLEC (competitive local exchange carrier): A U.S.-based telecommunications provider (sometimes called a "carrier") that competes with other already established carriers (generally the incumbent local exchange carrier).

Cloud Computing (the cloud, cloud backup, cloud drive): The use of computing resources such as hardware and software over a network (the Internet). A cloud drive is a storage or backup of resources using an online network.

Closed Captioning: A service for people with hearing disabilities that translates television program dialog into written words on the television screen.

CMSS (cable media switching system): An integrated solution that handles both VoIP and circuit-switched voice calls simultaneously on a single packet switch.

CO (central office): A common-carrier switching center where trunks and loops are terminated and switched. The central office contains the associated inside plant network elements required to perform this function, such as distribution frames, interoffice facility termination points, etc.

Codec: A device or program capable of encoding and/or decoding a digital data stream or signal.

Cognitive Radio: A cognitive radio is aware of its own capabilities, the needs of its user, the RF environment, and the governing regulatory framework in ways that allows it to configure itself intelligently in response to novel and rapidly changing conditions. More recently, the DARPA XG program extended the concept to allow the cognitive radio to operate as an intelligent agent.

Colocation: The placement of multiple antennas at a common physical site to reduce environmental impact and real-estate costs, as well as to speed zoning approvals and network deployment.

Commercial Leased Access: The manner through which independent video producers can access cable capacity for a fee.

Common Carrier: A telephone company or similar supplier of non-private telecommunications services. Under the common carrier principle, telephone companies must offer service to the public without discrimination, within a territory approved by a governmental agency, and with the companies held strictly accountable to the public through government regulation.

Communications Act of 1934: The first communications legislation that established the FCC to regulate interstate and foreign communications by wire or radio. It sets forth the duties and responsibilities of common carriers engaged in wire and radio communications, all of which are subject to FCC regulation. This act also established the principle of universal service.

Convergence: The blending of data, voice and entertainment.

Cookie: A small piece of information that is automatically stored on a client's computer by a Web browser and referenced to identify repeat visitors to a website and to tailor information in anticipation of the visitor's interests.

COS (class of service): A method of managing traffic on a network by grouping like traffic together and giving each type a different priority level. COS differs from quality of service in that it does not guarantee a certain level of service, but instead offers a 'best effort' delivery.

CPE (customer premises equipment): The terminal, equipment and/or inside wiring located at a subscriber's premises, which are connected to a carrier's communication channel(s) at the interconnection point.

CPNI (customer proprietary network information): Any information about the specific service agreement provided to customers by their telephone company; any specific information about the customer's usage of telephone service; and, any trade secrets, marketing data or other information of a proprietary nature supplied to a telephone company by its customers to facilitate provisioning the customer's telephone service.

Cramming: The addition of charges to a subscriber's telephone bill for services that were neither ordered nor desired by the client, or for fees for calls or services that were not properly disclosed to the consumer. These charges are often assessed by dishonest third-party suppli-

ers of data and communication service that phone companies are required, by law, to allow the third-party to place on the bill.

Cream Skimming: A situation in which a service provider only offers its service to the more profitable segments, the “cream,” of a communications market.

CRM (customer relationship management): A technique of establishing and maintaining a long-term business relationship with customers that generally involves utilizing the data collected during customer interactions to determine the demographics and future needs of each customer.

Cyberbullying: The act of willful and repeated use of cellphones, computers and other electronic communications devices, particularly by young people, to harass and threaten other people.

D

Database: An organized collection of data on a computer, structured so that it can be retrieved or controlled.

DBS (Direct Broadcast Satellite): TV programming or other content transmitted via high-powered satellite to a dish mounted outdoors whether on a residence or a business, e.g. DIRECTV and Dish Network. 1: Satellites powerful enough (approximately 120 watts on the Ku-band) to transmit a signal directly to a medium or small receiving dish (antenna) at 18” and 3 feet in diameter. DBS does not require reception and distribution by an intermediate broadcasting facility and transmits directly to the end user. 2: Satellite broadcasts intended for home reception also referred to more broadly as direct-to-home signals.

Denial of Service Attack (DOS attack): An attack on a computer system or network that causes a loss of service to users, typically the loss of network connectivity and services, by consuming the bandwidth of the victim’s network or overloading the computational resources of the victim’s system.

Deregulation: The reduction or elimination of government power in a particular industry, usually enacted to create more competition within the industry. In 1984, AT&T no longer was allowed to provide local service. The Bell companies were no longer allowed to provide interLATA, long-distance information service nor could they manufacture equipment. In 1996, the barriers preventing competitive entry into the local exchange market were lifted, allowing broadcast cable, telephone and utilities to compete equally.

Detariffing: The removal of regulations requiring that a common carrier service be offered under a tariff approved by the regulatory agency. Detariffing affects direct price controls.

Digital Transmission: A system using discrete numbers to represent data. Digital transmission provides sharper, clearer, faster transmission than analog transmission.

Disaggregation: The splitting of a spectrum license into two or more licenses of fewer frequencies.

DOCSIS (data over cable service interface specifications): A set of communications and interface specifications for cable modems.

DSL (digital subscriber line): A technology for bringing high-bandwidth information to homes and small businesses over ordinary copper telephone lines. xDSL refers to different variations of DSL, such as ADSL (asymmetric DSL), HDSL (high bit-rate DSL) and RADSL (rate adaptive DSL). Assuming the location is close enough to a telephone company's central office, one may be able to receive data at rates up to 6.1 Mbps.

DSLAM (digital subscriber line access multiplexer): A network device, generally located within a company's central office that receives signals from multiple customer DSL connections and puts the signals on a high-speed backbone line using multiplexing techniques.

DSP (digital signal processor): An integrated circuit especially designed to process digital waveforms generally used for compressing and decompressing audio and video data.

DTV (digital television): A new technology for transmitting and receiving broadcast television signals. DTV provides clearer resolution and improved sound quality. Since June of 2009, full-power television stations nationwide have been broadcasting exclusively in a digital format.

Dual Band: Mobile phones that work on networks that operate on two frequency bands. In the United States, dual band technology enables a network operator with spectrum on both 900MHz and 1800 MHz to support the seamless use of dual band handsets across both frequencies. Dual band networks can provide major benefits in terms of capacity enhancement and revenue optimization through the introduction of new services.

Dual Mode: Mobile phones that have more than one air interface and can work on more than one network. One example is phones that operate on both digital and analog networks. Another example is phones that could work in both CDMA2000 and W-CDMA networks.

DWDM (dense wavelength division multiplexing): Puts data from different sources together on an optical fiber, with each signal carried at the same time on its own separate light wavelength. Using DWDM, up to 80 separate wavelengths or channels of data can be multiplexed into a lightstream transmitted on a single optical fiber. Each channel carries a time division multiplexed signal. In a system with each channel carrying 2.5 Gbps, up to 200 billion bits can be delivered per second by the optical fiber.

E

E-Business: May be defined as broadly as any business process that relies on an automated information system. Today, this is mostly done with Web-based technologies.

E-Health (also known as Telehealth): The advancement of medicine and health sectors through information technology.

E-911: Short for enhanced 911, a location technology advanced by the FCC that will enable mobile, or cellular, phones to process 911 emergency calls, and enable emergency services to locate the geographic position of the caller.

E1: The European counterpart to T-1, which transmits at 2.048 mega bits per second.

EAS (emergency alert system): A national system in the United States put into place in 1994, superseding the Emergency Broadcast System. The system is jointly coordinated by the FCC, FEMA and the National Weather Service.

EBS (educational broadband service): A band of microwave frequencies set aside by the FCC exclusively for the transmission of educational programming. It allows educational institutions to broadcast audio, video and data to receive sites located within 20 miles of the point of origination. Receive sites require a converter that changes signals to those used by a standard television set.

EDGE (enhanced data rates for GSM evolution): An enhanced modulation technique designed to increase network capacity and data rates in GSM networks. EDGE should provide data rates up to 384 Kbps. EDGE will let operators without a 3G license to compete with 3G networks offering similar data services.

Email (electronic mail): Refers to text and multimedia messages sent over the Internet. Email also can be sent and received via wireless phones.

Encoding: The process of transforming information from one format into another. The opposite of decoding.

End User: Customers who directly use, rather than provide, telecommunications services.

Enhanced Service Providers: A business such as a telephone answering service, alarm/security company and transaction processing company that transmits voice and data messages.

Equal Access: Starting in 1985, consumers could choose their long-distance carrier.

ESMR (enhanced specialized mobile radio): Digital, specialized mobile radio networks that provide voice, messaging, dispatch and data services to customers. ESMR most commonly refers to Nextel Communications Inc.

Ethernet: A frame-based, computer networking technology for local area networks. The name comes from the physical concept of ether. It defines wiring and signaling for the physical layer, and frame formats and protocols for the media access control/data link layer of the OSI model. Ethernet is mostly standardized as IEEE 802.3.

F

Facebook: A popular online social networking site that allows people to connect with their friends and family. (see also social media)

FCC (Federal Communications Commission): The federal agency empowered by law to regulate all interstate and foreign wire and radio communications services originating in the United States, including radio, television, facsimile, telegraph and telephone systems. The agency was established under the Communications Act of 1934.

FDMA (frequency division multiple access): The division of the frequency band allocated for wireless communication into individual channels, each of which can carry a voice conversation or, with digital service, carry digital data. FDMA is a basic technology for analog AMPS, which divides the cellular spectrum into 832 channels each with 30 kHz bandwidth. With FDMA, each channel can be assigned to only one user at a time. D-AMPS also uses FDMA but adds TDMA to get three channels for each FDMA channel, tripling the number of calls that can be handled on a channel.

Federal-State Joint Board: An ad hoc advisory panel established by the FCC and composed of commissioners representing state and federal jurisdictions.

Fiber/Fiber Optics: Communications technology that uses thin filaments of glass or other transparent materials. Fiber-optic technology offers extremely high transmission speeds, allowing for data-intensive services such as video on demand.

Fiber to the “x” (FTTx): A general term for any broadband network using optical fiber to replace the regular subscriber line. The term was generalized for several different configurations of fiber deployment, including fiber to the home (FTTH), fiber to the premises (FTTP), fiber to the curb (FTTC), etc.

FIOS: A Verizon Communications service that runs on a fiber-optic communications network to provide Internet access, telephone and television service. It is offered in some areas of the United States.

Firewall: A computer that acts as an interface between two networks (e.g., the Internet and a private network, respectively) and regulates traffic between those networks for the purpose of protecting the internal network from electronic attacks originating from the external network.

FirstNet (First Responder Network Authority): An independent authority within the National Telecommunications & Information Administration that is tasked with establishing a single nationwide, interoperable public safety broadband network. FirstNet was created by the Middle Class Tax Relief and Job Creation Act of 2012.

Fixed Wireless: The operation of wireless devices or systems in fixed locations such as homes and offices. Fixed wireless devices usually derive their electrical power from the utility mains, unlike mobile wireless or portable wireless that tend to be battery-powered. Although mobile and portable systems can be used in fixed locations, efficiency and bandwidth are compromised compared with fixed systems. Mobile or portable, battery-powered wireless systems can serve as emergency backups for fixed systems in case of a power blackout or natural disaster. Fixed wireless technologies are increasingly being used as a fast and economic way to roll out modern telephone services since it avoids the need for wires.

Flat Rate: A type of service pricing charged on a monthly basis (or other stated billing period) that does not vary according to usage.

Foundation for Rural Service (FRS): The Foundation for Rural Service is a 501(c)(3) nonprofit organization based in Arlington, Va., that serves rural communities across the United States. Established in 1994 by the National Telecommunications Cooperative Association, FRS edu-

cates the public about the benefits of a nationwide telecommunications network and promotes rural connectivity as an essential link in this network. The foundation produces an array of materials and programs related to rural youth, rural economic development and rural telecommunications.

Frame Relay: A telecommunications service that provides cost-efficient data transmission for sporadic traffic between local area networks and end-points in a wide area network.

G

GIF (graphics interchange format): A bitmap image format for pictures with up to 256 distinct colors chosen from the 24-bit RGB color space.

Gigabyte: A gigabyte is a unit of measurement for computer memory. A byte is the smallest measurement. One gigabyte is 1 billion bytes. Gigabytes are a common storage measurement for computers, smartphones and MP3 players.

Global Wide Area Network (GWAN; backbone network): A GWAN is a telecommunications network that covers a large area.

Google: An American public corporation that specializes in Internet search and online advertising. “Googling” has become a part of everyday language as a synonym for Internet searching.

GPRS (GSM packet radio service or general packet radio service): An upgrade to the GSM technology that adds packet-switching capability to the voice network. GPRS uses the same time slots as voice calls, and each time slot is capable of approximately 9.6 Kbps of data throughput.

GPS (global positioning system): A satellite-based navigation system that allows people using small, hand-held receivers to pinpoint their geographic location within 10 to 100 meters. GPS consists of a “constellation” of 24 satellites that orbit the Earth at a height of 10,900 miles. The satellites use simple mathematical calculations to broadcast information that is translated by hand-held receivers as longitude, latitude and altitude. GPS is owned and operated by the U.S. Department of Defense, but is available for general use around the world.

GSM (global system for mobile communications): One of the leading digital cellular telephone systems. GSM uses a variation of TDMA that employs eight time slots in a 200 kHz channel. GSM was originally developed as a pan-European digital cellular system, and has become the de facto digital cellular standard in much of the world. GSM operates in the 900 MHz and 1.8 GHz bands in Europe, and 800 MHz and 1.9 GHz bands in the United States. AT&T and T-Mobile are the largest U.S. wireless carriers on the GSM system.

H

H.323: A specification by the International Telecommunications Union that defines how voice, data and video traffic will be transported over IP-based local area networks.

HDTV (high-definition television): An improved television system that provides approximately twice the resolution of existing video standards.

HFC (hybrid fiber coaxial): A technology that allows optical fiber cable and coaxial cable to be used in different portions of a network to carry broadband content such as video, data and voice.

Hotspot: A specific geographic location in which an access point provides public wireless broadband network services to mobile visitors through a wireless LAN. Hotspots often are located in heavily populated places such as airports, train stations, libraries, marinas, convention centers and hotels. Hotspots typically have a short range of access.

HTML (hypertext markup language): An application of SGML (standard generalized markup language) implemented in conjunction with the Web to facilitate the electronic exchange and display of simple documents using the Internet.

Hybrid Fiber Coax (HFC): A broadband network, commonly used by cable companies, that combines optical fiber and coaxial cable.

I

I-mode: A proprietary packet-based information service for mobile phones. I-mode delivers information (such as mobile banking and train timetable) to mobile phones and enables the exchange of email from handsets.

IDEN: A Motorola proprietary version of TDMA with a unique “push-to-talk”, two-way radio capability. Sprint/Nextel is the largest iDEN operator in the United States.

IEEE (Institute of Electrical and Electronics Engineers): An international technical professional association composed of engineers, scientists and students that fosters the development of standards that often become national and international standards. The institute is best known for developing standards for the computer and electronics industry. In particular, the IEEE 802 standards for local area networks are widely followed.

IETF (Internet Engineering Task Force): A standards body that regulates the technical standards of the Internet.

IGMP (Internet group management protocol): An Internet protocol that provides a way for an Internet computer to report its multicast group membership to adjacent routers. Multicasting allows one computer on the Internet to send content to multiple other computers that have identified themselves as interested in receiving the originating computer’s content.

ILEC (incumbent local exchange carrier): A U.S.-based telephone company that was providing local service when the Telecommunications Act of 1996 was enacted. ILECs are in contradistinction to CLECs.

IM (instant messaging): A service that enables users to see whether a specific user is connected to the Internet and, if they are, to exchange messages with them. Users must be online at the same time and subscribe to the same service. Messages, which appear in a pop-up box on the user’s screen, are exchanged in a real-time.

IMAP (instant message access protocol): One of the most prevalent Internet standard protocols for email retrieval used to transfer email messages from a server (Gmail, Hotmail, etc.) to a client (Microsoft Outlook, Apple Mail, etc).

IMT-2000: The term used by the International Telecommunications Union (ITU) for the specification for third-generation wireless services. The ITU officially endorsed five standards for 3G, the most widely accepted of which are W-CDMA and CDMA2000.

Incentive Auctions: A voluntary, market-based means of repurposing spectrum by encouraging licensees to voluntarily relinquish spectrum usage rights in exchange for a share of the proceeds from an auction of new licenses to use the repurposed spectrum.

Independent Carrier: A telephone company not affiliated with one of the Bell telephone companies. There are approximately 1,400 independent phone companies serving more than half of the geographic area of the United States, but only around 15% of telephones.

Interference Temperature: A FCC proposed model for determining RF interference. It accounts for the cumulative radio frequency energy from transmissions and sets a maximum cap on the aggregate level, as opposed to the current approach that manages interference by limiting the transmit power of individual devices.

Interconnection: Connecting one wireless network to another, such as linking a wireless carrier's network with a local telephone company's network.

Internet: See IP

Interoperability: The ability of a network to coordinate and communicate with other networks, such as two systems based on different protocols or technologies.

Intra-LATA: Telecommunications between two points located within the same local access and transport area (LATA).

iOS (iPhone OS): A mobile operating system developed by Apple for the iPhone. It also has been distributed into other Apple devices such as the iPad and Apple TV.

IP (Internet protocol): The method by which data is transmitted from one computer (or host) to another over the Internet using a system of addresses and gateways.

iPhone/iPad/iPod: Popular Apple products designed with simple and user-friendly interfacing that rely on wireless technology.

IPTV (IP Television): A system where a digital television service is delivered to subscribing consumers using IP over a broadband connection. Often provided in conjunction with video on demand, the service also may include Internet services such as Web access and VOID. In those cases, it may be called triple play and would typically be supplied by a broadband operator using the same infrastructure. A simpler definition would be television content received by the viewer through technologies used for the Web.

IPv4 (IP version 4): The most widely used version of Internet protocol. It uses a system of unique 32-bit identifiers to address data to computers (or hosts) on the Internet.

IPv6 (IP version 6): A newer, increasingly popular version of IPv4 that expands the address length of 32 bits up to 128 bits.

ISDN (integrated services digital network): A set of standards for digital transmission over ordinary telephone copper wire and other media.

ISM (industrial, scientific and medical) Band: Originally reserved internationally for non-commercial use of RF electromagnetic fields for industrial, scientific and medical purposes. Individual countries' use of the bands may differ due to variations in national radio regulations. In recent years, ISM bands have also been used for unlicensed (or license-free) communications applications such as wireless LANs and Bluetooth.

ISP (Internet service provider): A company that provides customers with access for a fee to the Internet, Web hosting and/or other related services.

IVDS (interactive video data service): A communications system operating over a short distance that allows nearly instantaneous, two-way responses by using hand-held devices at a fixed location. Examples include: viewer participation in game shows, distance learning and email on computer network.

IXC (interexchange carrier): A common carrier that provides services to the public between local exchanges on an intra or inter-LATA basis in compliance with local or federal regulatory requirements. IXC is not an end user of the services provided.

J

Java: Industry standard object-oriented language and virtual machine invented by Sun Microsystems and formally released in 1996. Java is an ideal language for network applications and applets.

JavaPhone: A Java API specification controlling contacts, power management, call control and phonebook management, intended specifically for the programmability requirements of mobile phones.

Jitter: An undesired variation or delay in packet delivery often found in electronics and telecommunications.

JPEG: A commonly used standard method of compression for photographic images. The file format that employs this compression is commonly also called JPEG. The most common file extensions for this format are .jpeg, .jif, .jpg, .JPG or .JPE, although .jpg is the most common on all platforms.

K

Kernel: The core of an operating system that manages the machine's hardware resources (including the processor and the memory), and provides and controls the way any other software

component can access these resources. The kernel runs with a higher privilege than other programs (user-mode programs). The power and robustness of an operating system's kernel play a major role in shaping overall system design and reliability.

L

LAN (local area network): A computer network limited to the immediate area, usually the same building or floor of a building.

Land Mobile Service: A public or private radio service providing two-way communications, paging and radio signaling on land.

Landline: Traditional wired phone service.

Last Mile: A phrase used by the telecommunications industry to refer to the technologies and processes used to connect the customer to a communication network.

LATA (local access transport area): A local telephone exchange area established as a result of the AT&T divestiture that serves to distinguish local from long-distance phone service.

Latency: A measure of time delay experienced in a network.

LDAP (lightweight directory access protocol): A software protocol that enables anyone to locate organizations, individuals and/or files, whether on the public Internet or on a corporate intranet.

LEC (local exchange carrier): A telephone company.

Lifeline Service: Basic local exchange telephone service provided at a discount to low-income and elderly people. Lifeline service is subsidized by other telephone services or by state and local taxes.

LMDS (local multipoint distribution services): A fixed wireless technology that operates in the 28 GHz band and offers line-of-sight coverage over distances up to 2–3 miles. It can deliver data and telephony services to 80,000 customers from a single node. LMDS is one proposed solution for bringing high-bandwidth services to homes and offices within the “last mile” of connectivity, an area where cable or optical fiber may not be convenient or economical.

Local Loop: The physical connection, also called the subscriber line, from a company's central office to a customer's telephone, usually through copper wires called twisted pair.

LOS (line of sight): RF engineers use this term to describe an unobstructed path between the location of the signal transmitter and the location of the receiver. Obstacles that can cause an obstruction in the line of sight include trees, buildings, mountains, hills, and other natural or manmade structures or objects.

LTE (Long Term Evolution): The next generation of 4G, said to eventually take the place of GSM and CDMA networks. (See 4G, GSM and CDMA)

M

MAC (media access control) Address: A computer's unique hardware number in a LAN. When connected to the Internet from a computer (or host), a correspondence table relates your IP address to your computer's physical MAC address on the LAN.

MAG (Multi-Association Group): A group formed to propose access charge and universal service reform plans that are friendly to small, independent telecommunications providers.

Malware (malicious software): Software designed to infiltrate or damage a computer system without the owner's consent or, often, knowledge.

MAN (metropolitan area network): A regional computer or communication network spanning the area covered by an average to large city. A WiMAX network is an example of a MAN.

Mashing: A website or Web application that seamlessly combines content from more than one source into an integrated experience.

Megahertz (MHz): A unit of frequency equal to one million hertz or cycles per second. Wireless mobile communications within the United States generally occur in the 800 MHz, 900MHz and 1900MHz spectrum frequency bands.

Mesh: A type of Internet infrastructure that is decentralized, relatively inexpensive, and very reliable and resilient. Wireless mesh networking is mesh networking implemented over a wireless LAN. With this type of networking, each node must not only capture and disseminate its own data, but also serve as a relay for other nodes and collaborate to propagate the data in the network.

MGCP (media gateway control protocol): An IETF protocol that enables communication between IP and circuit-based networks with gateway interface devices.

Microwave: A form of wireless communication that uses frequencies between 300 MHz and 300 GHz to transmit radio waves.

Middle-Mile Networks: Connect an ISP's access network with the rest of the Internet or Web.

MIME (multipurpose Internet mail extensions): A messaging standard that allows Internet users to exchange email messages enhanced with graphics, video and voice as attachments to the body of the text.

MMDS (multichannel multipoint distribution service): A broadcasting and communications service that operates between 2.1 and 2.7 GHz. MMDS, also known as wireless cable, was originally conceived as a substitute for conventional cable TV. However, it also has applications in telephone/fax and data communications.

MMOG (massive multiplayer online gaming): Interactive, Web-based games capable of supporting thousands of players at a time.

MMS (multimedia messaging service): MMS Messages that contain plain text and include multimedia elements such as pictures, video and audio. These multimedia elements are included within the body of the text message.

MPLS (multiprotocol label switching): A technology designed to speed up network traffic and manage flow. Each packet is given a label that designates its network path. This helps to unclog networks, because routers simply pass the packet on, instead of determining a route. MPLS is called multiprotocol because it works with multiple standards.

MSA (metropolitan statistical area): When the FCC began issuing cellular radio licenses, it divided the United States into RSA and MSA markets. An MSA is one of the 305 urban cellular telephone service areas as used by the FCC (determined by the Office of Management and Budget).

MSO (multiple system operator): A company that operates more than one cable TV system.

MSP (multiple service provider): A company that contracts with a subscriber to provide media services such as television, telephone and Internet.

MTA (major trading area): An area consisting of two or more BTAs as defined by Rand McNally & Co. These large areas are used by the FCC to determine service areas for some PCS wireless licenses. The United States is divided into 51 MTAs.

MTSO (mobile telephone switching office): The central computer that connects a wireless phone call to the public telephone network. The MTSO controls the entire system's operations, including monitoring calls, billing and handoffs.

MVNO (mobile virtual network operator): A mobile service operator that does not have its own licensed spectrum and does not have the infrastructure to provide mobile service to its customers. Instead, MVNOs lease wireless capacity from pre-existing mobile service providers and establish their own brand names different from the providers.

Multi-Channel Operator: Video content and service providers, usually referred to as MSOs, satellite companies (Satcos) and telephony companies (telcos).

Municipal Wi-Fi: Wireless Internet provided for free to the entire public of a municipal community.

N

NANP (North American Numbering Plan): The numbering system used primarily within the United States, Canada, Bermuda, Puerto Rico and certain Caribbean Islands. NANP format stipulates a 10-digit telephone number, comprised of a three-digit numbering plan area code (more commonly referred to as an area code), followed by a three-digit central office code, and ending with a four-digit line number.

Narrowband (or narrow bandwidth): A signal that occupies only a small amount of space on the radio spectrum. The opposite of broadband or wideband.

NARUC (National Association of Regulatory Utility Commissioners): An association of state and local utility commissioners who regulate intrastate utility services such as electric, power, gas, transportation and telephone.

National Telecommunications Cooperative Association (NTCA): The “voice of rural telecommunications,” a nonprofit association representing more than 580 small and rural telephone cooperatives and commercial companies, as well as hundreds of associate member vendor companies. NTCA is a full-service association, featuring a highly effective government affairs program; expert legal and industry representation; a broad range of educational services; a comprehensive communications program with visibility in the media; and a well-rounded complement of industry events and an array of employee benefit programs.

NECA (National Exchange Carrier Association): Established by the Federal Communications Commission to act as an association for LECs. NECA prepares common tariffs and administers the revenue pool among its members for access provided to interexchange long-distance carriers. The creation of NECA required that all exchange carriers participate in a common tariff arrangement for the carrier common line element. Voluntary common tariff arrangements were provided for end-user access elements, traffic-sensitive access elements other than billing and collection, and billing and collection elements. Exchange carriers choosing not to participate in all NECA common tariff arrangements have filed their own access tariffs.

Netiquette (network etiquette): Written or unwritten rules of etiquette that govern online interaction between Internet users.

Network: Any connection of two or more computers that enables them to communicate. Networks may include transmission devices, servers, cables, routers and satellites. The phone network is the total infrastructure for transmitting phone messages.

Network Neutrality: A principle applied to residential broadband networks, and potentially to all broadband networks. Precise definitions vary, but a broadband network free of restrictions on the kinds of equipment attached and the modes of communication allowed would be considered neutral by most advocates, provided it met additional tests relating to the degradation of various communication streams. Arguably, no network is completely neutral. Neutrality represents for some an ideal condition toward which networks and their operators may strive.

NLOS (non (or near) line of sight): A term RF engineers use to describe a partially obstructed path between the location of the signal transmitter and the location of the signal receiver.

NOI (notice of inquiry): Issued by the FCC when it is seeking information or ideas on a given topic. Time periods are specified during which all interested parties should submit comments.

NPA (numbering plan area): A geographic area identified in the ANP by a unique, three-digit area code.

NPRM (notice of proposed rulemaking): Issued by the FCC when it proposes a new body of regulations or changes to existing regulations. Before any changes to regulations can be made, interested parties are given a time period during which they can comment on the proposed changes. If the FCC decides to make substantial alterations to the proposed rules, an additional comment period may be allotted.

NTIA (National Telecommunications and Information Administration): A federal, executive-branch agency within the U.S. Department of Commerce that promotes the telecommunications policy of the incumbent administration. NTIA also contributes to developing administration policy on telecom issues.

Number Portability: A term used to describe the ability of individuals, businesses and organizations to maintain their existing telephone number(s) and the same quality service when switching to a new local service provider. Also sometimes referred to as local number portability.

NXX Code: A code normally used as a central office code. It also may be used as an NPA code or special NPA code.

O

OFDM (orthogonal frequency-division multiplexing): A method of digital modulation in which a signal is split into several narrowband channels at different frequencies. OFDM is similar to conventional FDM. The difference lies in the way the signals are modulated and demodulated. Priority is given to minimizing the interference or crosstalk among the channels and symbols comprising the data stream. Less importance is placed on perfecting individual channels. 802.11a WLAN, 802.16 and WiMAX use OFDM.

OS (operating system): The minimum set of software needed to manage a device's hardware capability and share it between application programs. Windows XP and Mac OSX are examples of widely used OSs.

OSS (operational support system): Carrier systems that provide operations services such as workforce management, trouble processing, dispatch, customer line records and testing.

OTT (over-the-top): A general term for service utilizing a network that is not offered by that network operator such as over-the-top video over-the-Internet video (ex. Netflix). Often referred to as "over-the-top" because these services travel on top of the service you already subscribe to, such as DSL or FTTH, and don't require any business or technology affiliations with your network operator.

P

Packet: In data communication, a sequence of binary digits, including data and control signals, which is transmitted and switched as a composite whole.

Packet-Switching: Technique whereby the information (voice or data) to be sent is broken up into packets of a few kilobits each (at most), which are then routed by the network between different destinations based on addressing data within each packet. The packets are typically split up and reordered during transmission, then reassembled upon reaching their destination. Use of network resources is optimized, as resources are needed only during the handling of each packet. This is an ideal model for ad hoc data communication, and works well for voice, video and other streamed data.

PAN (personal area network): Typically covers the few meters surrounding a user's workspace and provides the ability to synchronize computers, transfers files and gain access to local peripherals such as printers and a range of pocket hardware. Examples of wireless PAN technologies are Bluetooth and UWB.

PBX (private branch exchange): A telephone switching system that interconnects in-house telephone extensions to each other, as well as to the outside telephone network.

PCS (personal communications services): Used to describe a set of digital cellular technologies introduced in the mid-1990s. PCS emerged after the U.S. government auctioned commercial licenses in 1994–1995. Unlike cellular systems that employ both analog and digital technologies and operate in the 800 MHz frequency range, PCS systems are completely digital and operate at the 1900 MHz frequency range.

Phantom Traffic: Calls that do not have sufficient information or records for the local phone company to bill for access charges. Local telephone companies recover part of their operating costs by charging other companies access charges for delivering messages on their network. Telephone calls are supposed to be accompanied by electronic data such as the originating area code or telephone company to allow the local carrier to track access charge minutes and bill for them.

Phased Array Antenna: Consists of many radiating elements, each equipped with a phase shifter. Beams are formed by shifting the phase of the signal emitted from each radiating element to provide constructive/destructive interference to steer the beams in the desired direction.

Phishing: The criminally fraudulent process of using electronic communication to masquerade as a trustworthy entity in an attempt to acquire sensitive information such as usernames, passwords and credit card details.

PICC (prescribed interexchange charge): The fee that a local exchange company charges a long-distance company when a customer chooses it as their long-distance carrier.

Platform: The type of computer on which an OS or application runs (e.g. PC or Mac).

Plug and Play: Of or pertaining to the ability of certain OSS to automatically a) detect a new device that has been added to the system, b) uniquely identify that device, and c) install the appropriate drivers and system files for that device.

PON (passive optical network): A system that brings optical fiber cabling and signals all or most of the way to the end user. Depending on where the PON terminates, the system can be described as fiber-to-the-curb (FTTC), fiber-to-the-building (FTTB) or fiber-to-the-home (FTTH).

POP3 (Post Office Protocol 3rd version): Used by local email clients to retrieve email from a remote server over a TCP/IP connection. This service is most used by people with temporary Internet access such as dial-up, allowing these users to retrieve email while connected, and to view and manipulate messages while offline.

POPs (point of presence): For traditional 'landline' communications, POPs defines the physical interconnection points between the two networks. For wireless, POPs generally refers to the number of people in a specific area where wireless services are available (the population).

POTS (plain old telephone service): The most basic form of residential and small business telephone connections still used in many parts of the world.

Price Cap: An alternative to rate-of-return regulation in which a ceiling price is set for telecommunications services. The regulated company is free to move rates to any point below the ceiling level without prior approval of the regulatory agency.

Process: An instance of a program running in a computer. A multitasking OS may switch between processes to give the appearance of many processes executing concurrently or simultaneously, though in fact only one process can be executing at any one time per CPU thread.

Proprietary: Indicates that a party, or proprietor, exercises private ownership, control or use over an item of property, usually to the exclusion of other parties. Where a party holds or claims proprietary interests in relation to certain types of property (e.g. a creative literary work or software), that property also may be the subject of intellectual property law (e.g. copyright or patents).

Protocols: Strict procedures for the initiation, maintenance and termination of data communications. Protocols define the syntax (arrangements, formats and patterns of bits and bytes) and the semantics (system control, information context or meaning of patterns of bits or bytes) of exchanged data, as well as numerous other characteristics (data rates, timing, etc.).

Proxy: An application acting on behalf of another application or system in response to protocol requests.

PSAP (public safety answering point): The dispatch office that receives 911 calls from the public. May be a local fire or police department, an ambulance service or a regional office covering all services.

PTN (public switched telephone network): The traditional telephone system.

PTT (push-to-talk): A two-way communication service that works like a walkie-talkie. A normal cellphone call is full-duplex, meaning both parties can hear each other at the same time. PTT is half-duplex, meaning communication can only travel in one direction at any given moment. To control which person can speak and be heard, PTT requires the person speaking to press a button while talking and then release it when done. The listener then presses the button to respond. This way, the system knows which direction the signal should be traveling in.

Q

QoS (quality of service): The probability of the telecommunication network meeting a given traffic contract. Or in many cases, the term is used informally to refer to the probability of a packet succeeding in passing between two points in the network. In the field of telephony, telephony QoS refers to lack of noise and tones on the circuit, appropriate loudness levels, etc., and includes grade of service.

Query: Any operation that obtains data or attributes from an object.

R

Radio-Frequency Fingerprinting: An electronic process that identifies each individual wireless handset by examining its unique radio transmission characteristics. Fingerprinting is used to reduce fraud since the illegal phone cannot duplicate the legal phone's radio-frequency fingerprint.

Rate of Return: The percentage that a regulated telephone company, an interexchange carrier or a public utility company is authorized to earn on its capital investment for services provided.

Regression Analysis: A statistical approach used to determine network costs for purposes of establishing high-cost recovery.

Resale: An arrangement in which a carrier sells telecommunications services to another carrier that does not own transmission facilities. The buying carrier then resells the services to the public for profit.

Reverse Auctions: A type of auction in which the roles of buyer and seller are reversed. In an ordinary auction (also known as a forward auction), buyers compete to obtain a good or service by offering increasingly higher prices. In a reverse auction, the sellers compete to obtain business from the buyer, and prices will typically decrease as the sellers undercut each other.

RFC (request for comment): A proposal created by a working group of the Internet Engineering Task Force and provided to the general public as a draft for comment for the specific purpose of establishing standards on the Internet.

RFID (radio frequency identification): A technology similar in theory to bar code identification. With RFID, the electromagnetic or electrostatic coupling in the RF portion of the electromagnetic spectrum is used to transmit signals. An RFID system consists of an antenna and a transceiver, which read the radio frequency and transfer the information to a processing device and a transponder, or tag, which is an integrated circuit containing the RF circuitry and information to be transmitted. RFID systems can be used just about anywhere, from clothing tags to missiles, to pet tags and food.

RLEC (rural local exchange carrier): A public telephone company that provides (at minimum) local telephone service in rural areas.

Roaming: Using a wireless phone outside of your service provider's local coverage area or home calling. Roaming arrangements between service providers expand the potential area for phone use. Service providers typically charge a higher per-minute fee for calls placed outside their home calling or coverage area. International roaming means that you can use networks other than your own when traveling abroad.

Routers: Devices that connect autonomous networks of like architecture at the network layer (layer 3), based on IEEE 802 local area network standards.

RSA (rural service area): Areas not included in MSAs are divided into RSAs. Generally these are the rural regions of the United States. The FCC used RSAs to license cellular carriers in areas not included in MSAs. There are 428 RSAs in the United States.

RUS (Rural Utilities Service): A rural lending system made up of the Rural Electrification Administration and other similar programs.

S

Satellite: Device located in geostationary orbit above the earth that receives transmissions from separate points and retransmits them to cable systems, DBS and others over a wide area.

SDR (software-defined radio): Wireless communication in which the transmitter modulation is generated or defined by a computer, and the receiver uses a computer to recover the signal intelligence. SDR allows network operators to simultaneously support multiple communications standards on one network infrastructure without being bound by a particular standard. Sometimes shortened to software radio (SR).

SDSL (single-line digital subscriber line): A version of DSL technology using just one twisted pair line. Previous DSL standards needed two, or even three, pairs.

Secondary Market: An FCC initiative to allow spectrum leasing by licensed users. The goal is to allow spectrum to be used more efficiently by flowing more freely among users and uses in response to economic demand.

Service Area: The geographic area a telecommunications provider services.

Service Plan: The rate plan a customer selects when choosing a wireless phone service. Typically consists of a monthly base rate for access to the system, as well as a fixed amount of monthly minutes.

Service Provider: A telecommunications provider that owns circuit-switching equipment.

Signal-to-noise ratio: A measure of the power of a signal versus noise. A lower ratio means there is more noise relative to signal.

SIM (subscriber identity module) Card: A small, printed circuit board that must be inserted in any GSM-based mobile phone when signing on as a subscriber. Contains subscriber identification, security information and memory for a personal directory of numbers. The card can be plugged into any GSM-compatible phone, and the phone is instantly personalized to the user.

SIP (session initiation protocol): A standard protocol for initiating an interactive user session that involves multimedia elements such as video, voice, chat, gaming and virtual reality.

Siri: An intelligent speech-recognition software built into some Apple products. The software is used as an interactive “personal assistant” and “knowledge navigator” using Web services to pull up information on voice command.

Skype: A VoIP service and software application owned by Microsoft that allows users to communicate with voice, video and instant messaging over the internet.

SLA (service level agreement): A contract between a network service provider and a customer that specifies, usually in measurable terms, what services the network service provider will furnish.

Slamming: The unauthorized switching of a customer’s long-distance phone service from one carrier to another without the customer’s permission. Slamming violates FCC regulations.

SLC (subscriber line charge): A monthly access charge that telephone subscribers pay to compensate the local telephone company for a portion of its costs to install and maintain telephone wires, poles and all other facilities.

Smart Antenna: A digital antenna system whose technology enables it to focus its beam on a desired signal to reduce interference. A wireless network employs a smart antenna at its base stations to reduce the number of dropped calls, improve call quality and improve channel capacity.

Smart Rural Community Initiative: An initiative NTCA began in 2012 to promote “best practice” models for broadband deployment and applications in rural America, as well as collaboration across various sectors.

Smart Grid: An electrical grid that uses information and communications technology to gather and act on information, such as the behaviors of suppliers and consumers, in an automated fashion to improve the efficiency, reliability, economics, and sustainability of the production and distribution of electricity. Smart grid technology is being used to bring utility electricity delivery systems into the 21st century, using computer-based remote control and automation.

Smartphone: A mobile phone offering advanced capabilities, often with PC-like functionality (e.g. the BlackBerry and iPhone).

SMR (specialized mobile radio service, also known as PAMR (public access mobile radio), PMR (private mobile radio), TMR (trunked mobile radio) and TRS (trunked radio system): A two-way radio telephone service making use of macro cells covering an area up to 50 miles in diameter. An SMR system is simpler than a cellular telephone network. Typically, there is only one repeater in a SMR system, and it links only the mobile/portable units for that system, not to other repeaters. In SMR, the range of each individual mobile/portable transceiver is greater than the range of a cellphone set. But total system coverage is usually far more limited than that of a cellular network, because there is no linking among repeaters.

SMS (short messaging service): Popularly known as text messaging. With SMS, subscribers can send short text messages (usually about 160 characters) to and from wireless handsets.

SMTP (simple mail transfer protocol): An Internet standard for email transmission across IP networks. While electronic mail servers and other mail transfer agents use SMTP to send and receive mail messages, user-level client mail applications typically only use SMTP for sending messages to a mail server for relaying.

Social Media: Internet applications that allow users to comment and create, share and exchange contents among themselves in virtual communities and networks. Different types of social media sites include Facebook, YouTube, Twitter, WordPress, LinkedIn, Pinterest, Google, Tumblr and MySpace. In recent years, there has been an increase in mobile social media, which has created new opportunities, particularly for businesses, which are able to utilize social media for marketing research, sales promotions and customer relationship development.

Softswitch: A central device in a telecommunications network that connects telephone calls from one phone line to another. “Soft” refers to digital, rather than mechanical, processing.

SONET (synchronous optical network): An ultra-high-speed, fiber-optic transmission standard developed for large-scale, fiber-based digital transmission networks that use equipment from many different manufacturers.

Spam: Unwanted or unsolicited email messages or mailing-list or newsgroup postings.

Spectrum: The range of electromagnetic radio frequencies used in the transmission of voice, data and television.

Spectrum Allocation: Federal government designation of a range of frequencies for a category of uses.

Spectrum Cap: A limit to the allocated spectrum designated for a specific service.

Spoofing: The practice of causing the telephone network to display a number on the recipient's caller ID display that is not the actual originating station; the term is commonly used to describe situations in which the motivation is considered nefarious by the speaker. Just as email spoofing can make it appear that a message came from any email address the sender chooses, caller ID spoofing can make a call appear to have come from any phone number the caller wishes.

Spread Spectrum: A communication technique in which the frequency of the transmitted signal is deliberately varied. This results in greater bandwidth and lessens the chances of interruption or interception of the transmitted signal. There are two types of spread spectrum radio: direct spread and frequency hopping. In direct sequence spread spectrum (DSSS), the stream of information to be transmitted is divided into small pieces, each of which is spread across the entire allocated spectrum. With frequency hopping spread spectrum (FHSS), a carrier spreads out information (voice or data packets) over different frequencies.

Spyware: A type of malware that is installed surreptitiously on personal computers to collect users' information and their computer or browsing habits without their informed consent. Spyware is known to change computer settings, resulting in slow connection speeds, different home pages, and/or loss of Internet or functionality of other programs. In an attempt to increase the understanding of spyware, a more formal classification of its included software types is captured under the term privacy-invasive software.

SS7 (signaling system 7): A specific network control system made up of protocols for the interpretation and use of an array of network control and operation signals. The system puts the information required to set up and manage telephone calls in a separate network, rather than within the same network that the telephone call is made.

Stand Alone Broadband: Broadband service without a voice component.

Subscriber Line: See Local Loop

T

Tablet: A type of mobile computer that is smaller than a regular computer, and is usually touch screen with no physical keyboard.

TCP (transport control protocol): A widely used network protocol that supports communication across interconnected networks and between computers with diverse hardware architectures and various operating systems.

TDM (time division multiplexing): Transmits data by breaking the signal down into multiple segments, which are transmitted separately over a single signal. Data is then reconstructed at the receiving end using a method based on the timing of the transmissions.

TDMA (time division multiple access): A method of digital wireless communications transmission that allows a large number of users to access (in sequence) a single-radio frequency channel without interference by allocating unique time slots to each user within each channel. Rather than encoding bits of data like CDMA, each frequency is broken into time slots through which bits of data flow. Data can only flow in their assigned time slots. TDMA is used in second-generation wireless phone systems, such as GSM and D-AMPS, the latter is often called TDMA.

Telco: An abbreviated term referring to a telecommunications or telephone company.

Telecommunication: Telecommunication is the transmission of information over significant distances to facilitate communication.

Telecommunications Act of 1996: Enacted and signed into law by President Bill Clinton on February 8, 1996, this act provides a comprehensive reform of the Communications Act of 1934. It was designed to promote competition between wireless and wireline carriers.

Telemedicine: A method of using communications technology to bring health care patients and professionals together regardless of geographic location to provide consultations and ongoing care. Telemedicine applications include videoconferencing, remote health monitoring, email and general Web use for medical-related issues.

Telephony: A term used to describe the science of transmitting voice over a telecommunications network.

Text Messaging (Also SMS, texting or messaging): A SMS that is available on most mobile phones and other devices such as tablets. Used to send quick messages from one phone to another. (See also SMS)

Traffic-Sensitive Costs: Costs that vary according to use.

TRS (trunked radio systems): A system used whenever a large number of mobile radios need to share radio frequencies. Local government and industry that operate private radio systems use them. Public service providers that install system infrastructure and sell airtime on the system also operate them. In a trunked radio network, a large number of users can share a small number of channels because the trunking equipment dynamically allocates an available channel when users key their radio.

Tri-Band: A communications device (especially a cellphone) that operates on three different frequency bands. This is more typical for phones using the GSM standards because in Europe the GSM frequencies used are 900 MHz and 1800 MHz, while American GSM, or PCS, operates at 1900 MHz.

Trunking: Spectrum-efficient technology that establishes a queue to handle demand for voice or data channels.

Twisted Pair: A telephone service wire line made from two copper wires twisted together. There are two types of twisted pair: shielded twisted pair and unshielded twisted pair. Unshielded twisted pair is ordinary wire. Shielded twisted pair is copper wire covered in a metal shield that acts as a ground and prevents electromagnetic interference.

U

UDP (user datagram protocol): One of the protocols for data transfer that is part of the TCP/IP suite of protocols. UDP is a “stateless” protocol, making no provision for acknowledgement of packets received.

Unbundling: Access provided by a local exchange carrier so that other service providers can buy or lease portions of its network elements such as interconnection loops to serve subscribers.

Unicode: A computing industry standard allowing computers to consistently represent and manipulate text expressed in most of the world’s writing systems. Developed in tandem with the universal character set standard and published in book form as the Unicode Standard, Unicode consists of a repertoire of more than 100,000 characters, a set of code charts for visual reference, an encoding methodology and set of standard character encodings, an enumeration of character properties such as upper and lower case, a set of reference data computer files, and a number of related items, such as character properties, rules for normalization, decomposition, collation, rendering and bidirectional display order (for the correct display of text containing both right-to-left scripts, such as Arabic or Hebrew, and left-to-right scripts).

Universal Service: The government’s aim, as stated in the Communications Act of 1934, of providing phone service to everyone, regardless of their distance from the switch or ability to pay. Expanded under the Telecommunications Act of 1996, universal service also encompasses a subsidy to public schools, libraries and rural health care facilities for telecom services. More recently, the concept of universal service has been expanded beyond basic voice service.

Universal Service Cap: A limit on the amount of universal service funding available to local exchange carriers.

UWB (ultra wideband): Also known as digital pulse wireless, a wireless technology for transmitting large amounts of digital data over a wide spectrum of frequency bands with very low power for a short distance. UWB radio not only can carry a huge amount of data over a distance up to 230 feet at very low power (less than 0.5 milliwatts), but has the ability to carry signals through doors and other obstacles that tend to reflect signals at more limited bandwidths and at a higher power. Both UWB and Bluetooth are considered PAN technologies.

V

Vishing: The criminal practice of using social engineering over the telephone system, most often using features facilitated by VoIP, to gain access to private personal and financial information from the public for the purpose of financial reward. The term is a combination of “voice” and “phishing.” Vishing exploits the public’s trust in landline telephone services, which have traditionally terminated in physical locations that are known to the telephone company and associated with a billpayer. The victim is often unaware that VoIP makes formerly difficult-to-

abuse tools/features of caller ID spoofing, complex automated systems (IVR), low cost and anonymity for the billpayer widely available.

VoATM (voice over ATM): A cell-based broadband service that uses asynchronous transfer mode technology to transmit voice. (See also ATM)

VOD (Video on Demand): An interactive multimedia system similar to cable television that gives customers the ability to select movies from a large video database to view at their convenience.

VoDSL (voice over DSL): A method used to transmit voice conversations using DSL technology. (See also VoIP)

VoIP (voice over Internet protocol): The technology used to transmit voice conversations over a data network using IP. This is done by digitizing voice into discrete packets that are transferred independently over the network, instead of traditional circuit-committed protocols of the PSTN.

VPN (virtual private network): Generally refers to a network in which some of the parts are connected using the public Internet. Encryption is used to protect data, making the network “virtually” private. Companies wishing to set up their own VONs can use the public Internet, instead of leasing lines.

W

W-CDMA (wideband code division multiple access): One of the five 3G standards endorsed by the ITU. It makes use of a wider spectrum than CDMA, and therefore can transmit and receive a greater amount of information faster. W-CDMA is being backed by most European and Japanese mobile operators and is expected to compete with CDMA2000 to be the de facto 3G standard.

WAN (wide area network): An Internet or network that covers an area larger than a single building or campus.

White Spaces: Broadcasting services, which are assigned different frequencies for specific uses and the license to broadcast over these frequencies, are also assigned white spaces between frequencies to avoid technical interferences.

Wi-Fi (wireless fidelity): A term promulgated by the Wi-Fi Alliance that is meant to be used generically when referring to any type of 802.11 network, whether 802.11b, 802.11a or dual-band. Wi-Fi devices operate in both the 2.4 GHz (802.11b and 802.11g) and 5 GHz bands (802.11a). Wi-Fi is gaining acceptance as an alternative to a wired LAN in companies and multicomputer homes. However, when unprotected, a Wi-Fi wireless LAN can be susceptible to access from the outside by unauthorized users seeking to access the Internet for free.

WiMax: Popular name of the IEEE 802.16 wireless metropolitan-area network standard that is currently being developed. WiMax technology is expected to enable multimedia applications with wireless connection and, with a range of up to 30 miles, enable networks to have a wireless last-mile solution.

Wireless Local Loop: A system that connects subscribers to the PSTN using radio signals as a substitute for copper for all or part of the connection between the subscriber and the switch. This includes cordless access systems, proprietary fixed radio access and fixed cellular systems. Sometimes called radio in the loop (RITL) or fixed-radio access (FRA).

WISP (wireless ISP): An ISP that allows subscribers to connect to a server at designated hot spots (access points) using a wireless connection such as Wi-Fi.

WLAN (wireless LAN): One in which a mobile user can connect to a LAN through a wireless connection. IEEE 802.11 is a popular standard for wireless LANs.

X

XG Communication (Next Generation Communication): A program created by the Defense Advanced Research Projects Agency, part of the U.S. Department of Defense. U.S. forces face unique spectrum access issues in each country in which they operate, due to competing civilian or government users of national spectrum. To overcome the difficulties of spectrum access in different countries, the XG program aims to develop the underpinning concepts and technologies for dynamic control of the spectrum. The goal is to provide dramatic improvements in assured military communications in support of a full range of worldwide deployments.

Z

ZigBee: Popular name for the IEEE 802.15.4 standard for an extremely low power and low bit rate wireless PAN technology. ZigBee is designed for wireless automation and other lower data tasks, such as smart home automation and remote monitoring.

Website Addresses of Organizations Referenced in Glossary

ACE (Association of Communication Engineers)—www.ace-engineers.org

FCC (Federal Communications Commission)—www.fcc.gov

FRS (Foundation for Rural Service)—www.frs.org

IEEE (Institute of Electrical and Electronics Engineers)—www.ieee.org

IETF (Internet Engineering Task Force)—www.ietf.org

NARUC (National Association of Regulatory Utility Commissioners)— www.naruc.org

NECA (National Exchange Carrier Association)—www.neca.org

NREDA (National Rural Economic Developers Association)—www.nreda.org

NRTC (National Rural Telecommunications Cooperative)—www.nrtc.coop

NTCA (National Telecommunications Cooperative Association)—www.ntca.org

**NTIA (National Telecommunications and Information Administration)—
www.ntia.doc.gov**

RTFC (Rural Telephone Finance Cooperative)-www.rtfc.coop

RUS (Rural Utilities Service)—www.usda.gov/rus

USDA (U.S. Department of Agriculture)-www.usda.gov



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