

GENERAL ACRONYMS FOR EMS COMMUNICATIONS

A

AA—above average terrain
AC—alternating current
ACD—automatic call distributor
ACLS—advanced cardiac life support
ACSB—amplitude compandored single-sideband
ADP—automatic data processing
AGL—above ground level
ALS—advanced life support
ALERT—automatic law enforcement response team
ALI—automatic location identification
AM—amplitude modulation
AMSL—above mean sea level
ANI—automatic number identification
APB—all points bulletin
APCO—Associated Public-Safety Communications Officers
ASCII—American Standard Code for Information Interchange
ASTM—American Society for Testing and Materials.
ASTRA—Automated Statewide Telecommunications And Records Access
ATLS—Advanced Trauma Life Support
AT&T—American Telephone and Telegraph Company
AVC—automatic volume control
AVI—automatic vehicle identifications

B

balun—balanced-to-unbalanced line transformer
BCD—binary coded decimal
BFO—beat frequency oscillator
BIT—binary digit
BLS—basic life support

BPS—bits per second.

BSC—binary synchronous communications

C

C—Celsius
CAD—computer –aided Dispatch
CB—citizens band
CCH—computerized criminal history
CCITT—International Telegraph And Telephone Consultative Committee
CCSA—common control switching arrangement
CCTV—closed circuit television
CCU—Coronary Care Unit or Critical Care Unit
CDC—Cooperative Dispatch Center
CG—Channel Guard(R) Trademark of General Electric
CMED—Central Medical Emergency Dispatch
CMR—Common Mode Rejection
CMRR—Common Mode Rejection Radio
CNIL—Calling Number Identification and Location
CO—Central Office
COG—Council of Governments
COR—Coronary Observation Radio
CPR—cardiopulmonary resuscitation
CJIS—Criminal Justice Information System
CTCSS—Continuous Tone Controlled Squelch System

D

dB—decibel
dBm—decibel reference to 1 mW.
dBu—decibel referenced to 1 mV/m
dBv—decibel referenced to 1 V
dBW—decibel referenced to 1 W
DC—direct current
DCS—Division of Computer Services
DDD—direct distance dialing
DID—direct inward dialing
dod—direct outward dialing
DOD—US Department of Defense

DOT—US Department of Transportation
DRG—diagnosis related grouping
DP—double pole
DPDT—double pole double throw
DTMF—dual-tone multi-frequency
DPST—double pole single throw

E

EACOM—emergency and administrative communications system
EAS—extended area service
E & M—the receive and transmit leads of a signaling system
EAX—electronic automatic exchange
ECC—emergency communications center
EDP—electronic data processing
EIA—Electronic Industries Association
EMD—emergency medical dispatcher
EMF—electromotive force
EKG—electrocardiogram
EMDPRS—emergency medical dispatch priority reference system
EMS—emergency medical service
EMSS—emergency medical service system
EMT—emergency medical technician
EMT-B—emergency medical technician-basic
EMT-D—emergency medical technician-defibrillator
EMT-I—emergency medical technician-intermediate
EMT-P—emergency medical technician-paramedic
EOC—emergency operations center
EOM—end of message
ERCC—emergency resource coordination center
ERP—effective radiated power
ESS—electronic switching system
EST—Eastern Standard Time
ETA—Estimated Time of Arrival
ETV—Educational Television

F

F—Fahrenheit

FCC—US Federal Communications Commission
FCCA—Forestry Conservation Communications Association
FEMA—Federal Emergency Management Agency
FET—field-effect transistor
FM—frequency modulation
Freq.—frequency
FORTTRAN—formula translation (computer language)
FSK—frequency-shift keying
FX—foreign exchange

G

GE—General Electric
GESS—General Electric Service Station
GFW—ground fault warning
GHZ—gigahertz (1000 MHz)
GIGO—garbage in, garbage out
GMT—Greenwich Mean Time (Zulu)
GSA—General Services Administration
GT&E—General Telephone and Electronics

H

HEAT—hospital emergency administrative radio
HF—high frequency
HYSIS—highway safety information system
HV—high voltage
Hz—hertz

I

I—current in amperes
IAFC—International Association of Fire Chiefs
IACP—International Association of Chiefs of Police
IC—integrated circuit
ICO—individual channel oscillator
ICOM—integrated circuit oscillator module
ICU—intensive care unit
ICX—intercity exchange link

IEEE—Institute of Electrical and Electronic Engineers

IF—intermediate frequency

IMSA—International Municipal Signal Association

IMTS—improved mobile telephone service

IRAC—Interdepartmental Radio Advisory Committee

ISPERN—Illinois State Police Emergency Radio Network

IT&T—International Telephone and Telegraph Corporation

ITU—International Telecommunication Union

J

JAN—Joint Army-Navy Specifications

JETEC—Joint Electron Tube Engineering Council

JFET—junction field-effect transistor

UPS—uninterruptible power supply

USIT—US Independent Telephone Association

USFS—US Forest Service

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K

UPS—uninterruptible power supply

USIT—US Independent Telephone Association

USFS—US Forest Service

kbps—kilobits per second

kHz—kilohertz (1000hertz)

L

LATA—local access transport area

LMR—land mobile radio

LEAA—Law Enforcement Assistance Administration

LETS—Law Enforcement Teletypewriter Service

LORAN—long range navigation

LSI—large scale integration

LOS—line of sight

LRO—lead regional organization

LSU—life support unit

M

MAST—Military Assistance to Safety and Traffic

MCCU—mobile coronary care unit

MF—medium frequency

MHz—Megahertz

MICT—Mobile Intensive Care Technician

MICU—Mobile Intensive Care Unit

MRCC—Medical Resource Coordination Center

N

NABER—National Association of Business and E Radio, Inc.

NCIC—National Crime Information Center

NCMCN—North Carolina Medical Communications Network

NEAR—national emergency aid radio

NHTSA—National Highway Traffic Safety Administration

NLETS—national law enforcement telecommunications system

NPA—Number Plan Area

O

O-D—origin-destination

ONI—operator number identification

OTP—Office of Telecommunications Policy

P

UPS—uninterruptible power supply

USIT—US Independent Telephone Association

USFS—US Forest Service

PABX—Private Automatic Branch Exchange

PBX—Private Branch Exchange

PL—Private Line(r) Trademark of Motorola

PM—Pulse Modulation

PSAP—public safety answering point

PSCC—Public Safety Communications Council

PTT—Press to Transmit or Push to Talk

Q

QEI—quantifiable evaluation indicator

R

RCU—remote control unit

RF—radio frequency

Rx—receive

S

SERS—Special Emergency Radio Service

SIRSA—Special Industrial Radio Service Association

SMR—Specialized Mobile Radio

SMSA—standard metropolitan statistical area

SPA—State Planning Agency

SWR—Standing Wave Ratio

T

TASI—time assignment speech interpolation

TCAM—telecommunications access method

TLOF – Touchdown Liftoff Area

Telco—telephone company

TPL—terminal per line

TPS—terminal per station

Tx—transmit

U

UHF—ultra high frequency

UL—Underwriters Laboratories, Inc.

UPS—uninterruptible power supply

USIT—US Independent Telephone Association

USFS—US Forest Service

V

V—volts

VAC—volts, alternating current

VDC—volts, direct current

VHF—very high frequency

VOM—volt-ohm meter

VOR—voice operated relay

VOX—voice operated switch

VSWR—voltage standing wave ratio

VTVM—vacuum tube voltmeter

VU—Volume Unit

W

WATS—Wide Area Telephone Service

WECO—Western Electric Company

WPM—words per minute

X

Xcvr.—transceiver

Xfmr.—transformer

Xmit.—transmit

Xmtr—transmitter

Xtal—crystal

Z

Z—impedance

ZULU —time zone at Greenwich, England

FCC CODES AND NAMES OF RADIO SERVICES

Industrial:

- IB—business
- IF—forest products
- IM—motion picture
- IP—petroleum
- IS—special industrial
- IT—telephone maintenance
- IW—power
- IX—manufacturers
- IY—relay press

Motor Carrier:

- LI—interurban passenger
- LJ—interurban property
- LU—interurban passenger
- LV—urban property

Land Transportation:

- LA—automobile emergency
- LR—railroad
- LX—taxicab

Public Safety:

- PF—fire
- PH—highway maintenance
- PL—local government
- PP—police
- PO—forestry conservation
- PS—special emergency
- RS—radio location
- ZA—general mobile

Classes of Radio Stations (FCC):

- FB—base
- FB2—mobile relay
- FB4—community repeater
- FX1—control
- MO—mobile
- MO3—mobile/vehicular repeater
- FXO—operational fixed
- FX2—fixed relay
- FX—fixed
- FLT—auxiliary test
- FXY—interzone
- FXZ—zone
- LR—radio location
- MR—radio location mobile

806-821/851-866 MHz Bands:

<u>Conventional</u>	<u>Category</u>	<u>Trunked</u>
GB	business	YB
GO	industrial/land transportation	YO
GP	public safety/special emergency	YP
GX	commercial (SMRS)	YX

292-930 MHz Band:

- GS—private carrier paging systems

GLOSSARY

A

acoustic feedback—The transfer of sound waves from a loud speaker or end terminal to any previous component within an audio system.

activity—The expenditure of time and resources.

adapter—A device used for changing the terminal connections of a circuit or part to connect to another circuit or part with unlike connections.

alphabet, phonetic—A method of passing alphabetic information substitution over a poor communication path with word substitution for letters. One phonetic alphabet is: Alfa, Bravo, Charlie, Delta, Echo, Foxtrot, Golf, Hotel, India, Juliett, Kilo, Lima, Mike, November, Oscar, Papa, Quebec, Romeo, Sierra, Tango Uniform, Victor, Whiskey, X-ray, Yankee, Zulu.

American Standard Code for Information Interchange (ASCII)—An eight-level code for data transfer adopted by the American Standards Association to achieve compatibility between data devices.

amplitude compandored single-sideband—A form of sideband modulation used for narrow channel transmission that incorporates a pilot tone.

amplitude modulation (AM)—Modulation in which the amplitude of the carrier-frequency current is varied above and below its normal value in accordance with the audio, picture, or other intelligence signal to be transmitted.

analog—Physical representation of information such that the representation bears an exact relationship to the original information. Pertaining to data in the form of continuously variable physical qualities

analog communication—System of telecommunications used to transmit information other than voice which is sometimes used in telemetry.

antenna—A system of wires or electrical conductors employed for reception or transmission of radio waves. Specifically, a radiator that couples the transmission line or lead-in to space for transmission or receptions of electromagnetic radio waves. It changes electrical currents into electromagnetic radio waves and vice versa.

antenna, isotropic—A theoretical antenna with identical radiation in every direction.

antenna, parabolic—A directional antenna with a radiating (or receiving) element, and a parabolic reflector that concentrates the power in a beam.

antenna polarization—The direction of the radiated electrical field in relation to the surface of the earth. Generally vertical in mobile radio use.

arc—A discharge of electricity.

arrester, lightning—A device designed to protect electrical equipment or property from damage by lightning.

assigned frequency—The frequency appearing on a station authorization from which the carrier frequency may deviate by an amount not to exceed that permitted by the frequency tolerance.

Associated Public-Safety

Communications Officers (APCO)—A non-profit public safety radio users group composed of administrators and communications technical, operations, and command personnel.

ASTM—A scientific and technical organization formed for the development of standards on characteristics and performance of materials, products, systems, and services.

attack time—The interval required after a sudden increase in input signal to a transducer (transmitter, receiver, etc.) to attain a percentage of final output level due to this increase.

attenuation—The decrease in amplitude of a signal during its transmission from one point to another. It may be expressed as a ratio or, by extension of the term, in decibels.

attenuator—A device for reducing the energy of a wave without introducing distortion. Also called a pad, gain control, level adjustor, volume control, etc.

audible signal—A buzzer, bell, or other audible sound device that indicates an incoming call.

audio—Pertaining to frequencies corresponding to normally audible sound waves. These frequencies range from 15 to 20,000 Hz.

aural—Pertaining to the ear or sound.

automatic gain control (AGC)—A receiver circuit that maintains the output constant with wide variations in the in the receiver input level.

automatic volume control (AVC)—A self-acting gain control which maintains the output of a receiver constant despite variations in received signal strength.

automatic number identification (ANI)—Equipment for recording the calling party's number without operator intervention.

B

back bone—A point-to-point communications system utilizing several stations.

back-to-back repeater—A repeater consisting of a receiver and transmitter with the output of the receiver connected directly to the input of the transmitter.

band (radio frequency)—A range of frequencies between two definite limits. By international agreement, the radio spectrum is divided into nine bands. For example, the very high frequency (VHF) band extends from 30 MHz to 300 MHz.

bandpass filter—Passes frequencies within a specified band, and attenuates all frequencies outside that band.

bandwidth—(1) The width of a band of frequencies used for a particular purpose, (2) the range of frequencies within which a performance characteristic of a device is above specified limits. For filters, attenuators, and amplifiers these limits are generally taken to be 3 dB (half-power) below the average level.

baseband—For microwave systems, the available frequency band that the RF equipment is capable of transmitting.

base station—An item of fixed radio hardware consisting of a transmitter and receiver.

baud—Used to define the operating speed of a printing telegraph or data system. It is the total number of discrete conditions or signal events per second.

baudot code—A five-unit code used for teletypewriter signals.

beacon—A radio transmitter or lights designed to indicate exact geographical location or direction.

beam—A configuration of radiated energy whose rays are sharply directional and parallel.

beat—A regularly recurring pulsation from the combination of two-tone or frequency waves of different frequencies.

beat frequency—the frequency produced when signals of two different frequencies are combined and refracted. The beat frequency is equal in value to the difference between the original frequencies.

bel—A unit of relative power, named after Alexander Graham Bell, and used to express differences in power.

beeper—a pocket paging receiver that emits a beeping sound upon receiving a page specifically directed to it.

biomedical telemetry (biotelemetry)—The technique of monitoring or measuring vital biological parameters and transmitting data to a receiving point at a remote location.

Biophone—Trade name of Biocom, Inc. for portable telemetry devices.

bit—A unit of digital information (abbreviation of “binary digit”).

boom microphone—A microphone arranged on an arm type mechanical support to permit better placement of the microphone.

braid—A group of fibrous or metal filaments or threads woven into a cylindrical shape to form a covering over one or more wires.

broadcast—Radio or television transmission intended for general reception.

Business Radio Service—A subpart of the Industrial Radio Services section of the FCC rules.

busy indicator—An indicator provided at a control point to indicate the in-use condition of a circuit or channel.

C

cable—One or more insulated or noninsulated wires used to conduct electrical current or impulses. Grouped insulated wires are called a multi-conductor cable.

calibrate—To determine error by comparison with a known standard.

call, all—The alerting of all decoder equipped units in a system by the transmission of a single coded signal.

call, group—The alerting of subdivided selective call groups by function, type of vehicle, location, etc. by sending a single coded signal.

call, individual—The alerting of a specific coded decoder unit by sending a single coded signal.

call answer—The initial answer of a call for assistance whether by 9-1-1 or other telephone method.

call sign—Federal Communications Commission assigned identifying letters and numbers used for identification of a radio station, transmitter, or transmission.

call referral method—The calling party is referred to a secondary number

call relay method—The call is answered at the PSAP where the pertinent information is gathered and then the interrogator relays the information to the proper public safety agency for their action. This can be accomplished by radio, intercom, telephone, etc.

call transfer method—The PSAP interrogator determines the proper responding agency and connects the user to that agency which then performs the necessary dispatching in accordance with prearranged plans with cooperating agencies.

call party hold—Enables the public safety answering point to control the connection for confirmation and tracing of a call.

capture effect—An effect occurring in FM reception when the stronger of two signals on the same frequency suppresses the weaker signal.

cardioid microphone—A microphone having a heart-shaped space response pattern of 180° in front, and minimum response in the rear.

carrier—A radio signal generally without voice or other information.

carrier control timer (CCT)—A device that limits the length of time that the transmitter carrier is on.

carrier frequency—The frequency of an unmodulated electromagnetic wave produced by the transmitter.

cavity resonator—A space enclosed by a metal conductor in which oscillating electromagnetic energy is stored and whose resonant frequency is determined by the geometry of the enclosure.

cellular radio—A commercially available mobile or portable radio telephone service.

Celsius—The metric scale of temperature in which water freezes at zero degrees and boils at 100°C. To convert a Celsius temperature to Fahrenheit, multiply by 9/5 and add 32.

central medical emergency dispatch (CMED)—See command and control center.

central office—Sometimes called a wire center; the smallest subdivision within the telephone system which has relatively permanent geographic boundaries.

change out—To replace.

channel element—A temperature compensated crystal oscillator

channel guard—General Electric's trademark for continuous tone coded squelch system (CTCSS).

channel, point-to-point—A radio channel used for radio communications between two definite fixed stations.

channel, radio—An assigned band of radio frequencies of sufficient width to permit its use for radio communication. The necessary width of a channel depends on the type of transmission and the tolerance for the frequency of emission.

channel, television—A band of radio frequencies 6 MHz wide used for television broadcast

channelization—The assignment of circuits to channels, and the arrangement of those channels into groups.

charge—To replenish the electrical potential in a battery or capacitor.

charge, fast or quick—A method of quickly recharging batteries under controlled conditions.

charge, trickle—The continuous charge of a battery at a slow rate.

chart, 4/3 earth's radius—A radio profile chart whose horizontal lines are curved to correspond to an earth having a radius 4/3 times larger than actual earth radius.

chassis—The framework on which parts of a radio or other electronic circuits are mounted.

circuit merit—A rating of overall circuit quality. Circuit merit '5' is clear circuit. Merit '3' is readable with noise. Any rating below '3' is not readable and generally unacceptable.

class of service—Service order code designation of the combination of telephone service features (equipment, calling area units, dial types) to which business and residence customers subscribe. It is

used for rating, identification, and assignment purposes.

coaxial cable—A transmission line in which one conductor completely surrounds the other, the two being coaxial and separated by a continuous solid dielectric or by dielectric spacers.

code dialing—A method of signaling or encoding and decoding address codes by the use of standard telephone dial.

command and control center (central communications center)—A system which is responsible for establishing communications channels and identifying the necessary equipment and facilities to permit immediate management and control of an EMS patient. This operation must provide access and availability to public safety resources essential to the effective and efficient EMS management of the immediate EMS problem.

common mode rejection (CMR)—The ability of differential amplifier to reject unwanted signals.

communications subsystem—Comprises those resources and arrangements for notifying the EMS system of an emergency, for mobilizing and dispatching resources, for exchanging information, for remote monitoring of vital indicators, and for the radio transmission of treatment procedures and directions.

communications system—a collection of individual communication networks, transmission system, relay stations, control and base stations, capable of interconnection and inter-operations that are designed to form an integral whole. The individual components must serve a common purpose, be technically compatible, employ common

procedures, respond to control and operate in unison.

comparator—A circuit which compares two or more signals, and selects the strongest or best.

compression—In audio systems, reducing the volume range of the input signal so that the minimum output has less noise, and the maximum output has less distortion.

compressor—A variable gain audio device used to provide a relatively constant output level for a wide range of varying input levels.

cone of silence—The area directly over or under a vertical transmitting antenna in which little or no signal is radiated.

console—A cabinet housing electronic circuitry normally used in controlling other equipment such as transmitters and receivers installed at a remote location.

consolette—(1) Motorola Communications name for a desk top radio station (2) A device for mounting a mobile microphone, control head and speaker.

continuous tone controlled squelch system (CTCSS)—A system wherein radio receiver(s) are equipped with a tone responsive device which allows audio signals to appear at the receiver audio output only when a carrier modulated with a specific tone is received. The tone must be continuously present for continuous audio output. CTCSS functions are sometimes referred to by various trade names such as private line or PL(Motorola Communications & Electronics), Channel Guard or CG(General Electric Mobile Radio) or Quiet Channel (RCA).

control console—A desk-mounted, enclosed piece of equipment which contains a number of controls or circuits used to operate a radio station.

control head—A device with appropriate controls, microphone, volume, squelch, on/off, etc., generally mounted in a vehicle, from which control of the radio or mobile unit is performed.

control point—A position from which a radio system is controlled and supervised.

control, remote—A control scheme for a radio system where all control functions are performed remotely via telephone lines.

continuous duty—(1) An unending transmission (2) Operating 100% of the time (3) EIA—full load output under the manufacturer's normal loading conditions for the class of service for 24 hours.

control, local—A control system packaged with the control unit mounted directly on the base station.

coordination, frequency—The cooperative selection and allocation of radio frequencies such that all systems can operate with minimum interference.

couple—To connect two circuits so that signals are transferred from one to the other.

coverage—In a radio communications system, the geographic area where reliable communications exist; usually expressed in terms of miles extending radially from a fixed radio station.

crosstalk—The unwanted transfer of energy from one communication circuit to another by means of a mutual coupling.

crystal—A piece of quartz or similar material that has been ground thin and to the proper size to produce vibrations at the desired frequency. Used in radio transmission to generate, with a high degree of accuracy, the assigned carrier frequency of a station.

cut over—To transfer from one system to another.

cycle—One complete reversal of an alternating current, including a rise to the maximum level in one direction and a return to zero. The number of cycles occurring in one second is the frequency of the current. The word cycle is commonly used to mean cycles per second (hertz).

D

dBm—Decibels referenced to one milliwatt. Employed in communication work as a measure of absolute power. Zero dBm equals one milliwatt.

dBV—Decibels referenced to 1 V.

dBW—Decibels relative to 1 W (1 dBw = 30 dBm).

decibel (dB)—A unit which expresses the level of power value relative to a reference power value. Specifically, the level of power, value P, relative to a reference value, PR, in decibels is defined as $dB = 10 \cdot \log_{10}(P/PR)$.

DC control—A remote base station control scheme that requires metallic conductors and currents

decoding—The conversion and recognition by the addressed (receiving) unit of numerical address codes that have been

transmitted through a communications system.

dedicated telephone line—A telephone wire pair, originating at one point, and terminating at another point, operating in a closed circuit. Also called private line.

defibrillator—An electrical device used to eliminate fibrillation of the heart muscle, by the application of high voltage impulses.

demodulation—The process of recovering the modulating information from a modulated signal.

deviation ratio—The ratio of the maximum frequency deviation of the RF carrier to the highest frequency contained in the modulating band.

dial tone first—Allowance of a 9-1-1 or '0' operator calls to be completed without the deposit of a coin in a telephone pay station.

digital—Data represented in discrete, discontinuous form, as contrasted with analog data represented in continuous form.

digital dial code—A signaling technique generally used in VHF radio systems to bypass a receiver CTCSS system

diplexer—A device which enables the use of two radio transmitters, operating on different frequencies, on the same antenna simultaneously.

direct—In terms of communications circuits, means a dedicated instant method of communications. A dial telephone is not direct, a radio or a ring down line are direct.

direct dispatch method—A system where all 9-1-1 call answering and radio

dispatching is performed by the personnel at the public safety answering point.

direct distance dialing(DDD)—Telephone service which permits subscribers to dial their own long distance calls.

direct leased land lines—Dedicated or designated point-to-point wire circuits (telephone) used in transmitting voice or data communications. See dedicated telephone line.

direct trunking—An arrangement where a telephone line connection has no intermediate points before reaching the final destination (called) party.

directional antenna—An antenna which radiates radio waves more effectively in some directions than in others.

directivity—The value of the direction gain of an antenna in the direction of its maximum value.

dish—A type of antenna. A parabolic reflector used in microwave systems.

dispatch point—A position from which a radio system is used but not a supervision or control point. Dispatch points are not usually listed on a station radio license.

distortion—Unfaithful reproduction of audio or video signals due to change occurring in the wave form of the original signal, somewhere in the course of its transmission or reception. The lower the percentage of distortion, the more distortion free the system is and the more intelligible the message.

diversity—A method of radio transmission, or reception, or both, which counteracts the

effects of fading by combining several signals all bearing the same information.

doctor-interrupt—The ability of a physician or hospital-based communicator to interrupt the voice or telemetry transmission from a radio in the field.

dual-tone multi-frequency (DTMF)—The simultaneous generation of two audio tones generally compatible to AT&T's standard "touch-tone" frequencies. Used for control or signaling purposes. A method of sending specific pairs of audio tones for each digit, up to a total of 16.

duplex—The operation of transmitting and receiving apparatus at one location in conjunction with associated transmitting and receiving apparatus at another location: the process of transmission and reception being simultaneous. The simultaneous transmission and reception of information. A duplexed piece of equipment is capable of transmitting and receiving simultaneously. Duplex systems generally employ different transmitting and receiving frequencies.

duplexed operation—The operation of associated transmitting and receiving apparatus concurrently as in ordinary telephones without manual switching between talking and listening periods. For comparison see simplex operation.

duplexed/multiplexed telemetry unit—A radio device capable of simultaneous transmission and reception and concurrent transmission of both voice and EKG information.

duplexer—A device which is used in radio equipment to provide simultaneous transmit and receive capabilities on a single antenna.

duplex, half—A system in which communication may be in either direction but only one way at a time. Transmission in one direction at a time over a single channel.

E

E & M signaling—An arrangement by which signaling between two points on a radio or carrier path is accomplished. An M lead is associated with the transmit (or mouth) while the E lead is associated with the receiver (or ear).

EACOM—Emergency and Administrative Communications for hospitals. Trade name for VHF radio system operating on standard frequencies with a selective calling system between stations. The system is similar to Motorola Communications HEAR radio system.

effective height—The true electrical height of an antenna corresponding to a “perfect” antenna that will produce the same field strength. The height of its center of radiation above the effective ground level.

effective radiated power(ERP)—The calculated power output from an antenna system which incorporates all the gains and losses in the antenna system. ERP is calculated as follows (1) convert power output of transmitter to dB referenced to 1 W(dBw); (2) subtract all transmission line losses including losses in equipment between the transmitter and antenna (filter, duplexers, circulators, duplexers, etc.) expressed in dB; (3) add the antenna’s power gain (expressed in dB reference to a half-wave dipole); and (4) convert the results into watts.

effective signal radiated—The rating basis for licensing radio transmitters. Equal to the square root of the effective radiated power

times the antenna height in feet aboveground level.

EKG display console—A unit of electronic equipment located in a hospital emergency room, or cardiac care unit, or both, which displays EKG and records voice and data information received from an EMS scene by transmission via radio or telephone path. A demodulation display console.

electrocardiogram(ECG or EKG)—A visual or hard copy trace of a patient’s electrical heartbeat information.

electrode—(1) Either of the two terminals of an electric source, such as a battery, (2) A conducting element through which electric current enters or leaves an electrolyte, gas, or vacuum, (3) A conducting element, usually metallic (such as silver/silver chloride), with a conducting medium or electrolyte (such as sodium chloride and water) attached to a patient to obtain the electrical signals of the heart.

electromagnetic radiation—Radiation associated with a periodical varying electric and magnetic field and is traveling at the speed of light, including radio waves, light waves, X-rays, and gamma radiation.

electromagnetic wave—A wave of electromagnetic radiation, characterized by variations of electric and magnetic fields.

emergency call—A call that requires immediate action.

emergency medical dispatcher (EMD)—a trained public safety telecommunicator with additional training and specific emergency medical knowledge essential for the efficient management of emergency medical communications.

emergency medical dispatching—The reception and management of requests for emergency medical assistance.

emergency medical dispatch priority reference system (EMDPRS)—A medically approved reference system used by a local dispatch agency to dispatch aid to medical emergencies, which includes: systematized caller interrogation questions, systematized pre-arrival instructions, and protocols matching the dispatcher's evaluation of injury or illness severity with vehicle response mode and configuration

Emergency Medical Service (EMS)—The service utilized in responding to the perceived individual need for immediate medical care in order to prevent loss of life or aggravation of physiological or psychological illness or injury.

emergency operations center (EOC)—(1) A secure, protected facility designed and equipped for the use of community officials to manage response of a community in time of emergency, (2) A communications center designed and operated by a community or within a geographic area for a combination of emergency resources, such as police, fire and EMS.

emergency resource coordination center (ERCC)— Generally a facility that has the resources and ability to coordinate all emergency services (police, fire, EMS, etc.) within a given geographic area. ERCC works in conjunction with a public safety answering point (PSAP) and may be in the same facility or location.

enclosure—A housing such as a case, cabinet, cabinet rack or console which is designed to provide protection and support to equipment.

encoding—The conversion of numerical address codes, such as telephone number or message codes, into a format of tone or on-off pulses of audio tones for transmission over a communications system, usually for individual or group addressing, such as for paging or selective calling.

exchange—A defined area, served by one or more telephone central offices, within which the telephone company furnishes service.

exciter—The low level stages of a transmitter which normally consists of an oscillator, modulator and multiplier.

extender board—A printed circuit board that plugs into a module's circuit connector at one end and the module on the other to maintain a circuit so that the module may be conveniently tested out of an inaccessible position.

F

facility—A communications facility is anything used or available for use in the furnishing of communications service.

facsimile—The process by which pictures, images, and other fixed graphic materials are scanned and the information converted into electrical signals for local use or transmission remotely to produce a likeness of the subject copy.

fading—The variation of radio field strength caused by a gradual change in the transmission medium.

fade margin—The number of decibels of attenuation which can be added to a specified radio frequency propagation path before the signal-to-noise ratio of the channel falls below a specified minimum.

FCC Part 90—The section of the Federal Communications Commission's Rules and Regulations that affects most EMS communications.

Federal Communications Commission (FCC)—A Board of commissioners appointed by the President under the Communications Act of 1934 to formulate Rules and Regulations and to authorize use of radio communications. The FCC regulates all communications in the United States by radio or wireline, including television, telephone, radio facsimile and cable systems.

feedback—The act of returning a portion of the output voltage of a circuit which includes amplification to the input of that circuit.

feedback, acoustic—The feeding back of sound waves from a loudspeaker to a microphone in the same audio system.

field strength—The strength of an electric, magnetic or electromagnetic field. Electromagnetic (radio) field strength is expressed in microvolts per metre or millivolts per metre.

fixed service—A service or radio communication between specified fixed points. Fixed station: (1) a radio station which is not mobile; (2) a station which is permanently installed; (3) a base station in a mobile radio system.

fixed relay station—An operational fixed station established from the automatic retransmission of radio communications received from either one or more fixed stations or from a combination of fixed and mobile stations and directed to a specified location.

F-Layers—The upper layers of ionization in the ionosphere. The f-1 layer is about 130 miles above the earth. The f-2 layer height varies from about 250 miles during the day to about 150 miles at night.

float—To operate a storage battery in parallel with a charger and a load at such voltage that the charger supplies the load current and the battery supplies only transient peaks above the normal load.

FM transmitter—A radio transmitter that emits or radiates a frequency modulated wave.

folded dipole—A receiving or transmitting antenna composed of two parallel dipoles, connected at the ends. The connection to the receiver or transmitter is made at the center of one of the poles.

forced disconnect—The capability of the 9-1-1 center to disconnect a 9-1-1 call to avoid caller jamming of the incoming phone lines.

four wire operation—Telephone operation in which the inbound audio signal is carried on one pair of wires and the outbound signal on another pair.

free space loss—The theoretical radiation loss that would occur in transmission if all variable factors were disregarded. Free space loss depends only on the frequency and the distance between antennas.

frequency—The number of cycles, repetitions, or oscillations of a periodic process completed during a unit of time. The frequency of waves in the electromagnetic spectrum (radio waves) is designated in hertz (Hz), kilohertz (kHz = 1000 Hz). One hertz is equivalent to one cycle per second.

frequency modulation (FM)—A method of modulating a carrier-frequency signal by causing the frequency to vary above and below the unmodulated value in accordance with the intelligence signal to be transmitted. The amount of deviation in frequency above and below the resting frequency is at each instant proportional to the amplitude of the intelligence signal being transmitted. The number of complete deviations per second above and below the resting frequency corresponds at each instant to the frequency of the intelligence signal being transmitted.

frequency response—The transmission loss or gain of a system, measured over the useful bandwidths, compared to the loss or gain at some reference frequency (generally 1000 Hz).

fresnel zone—The circular zone about the direct path between a transmitter and a receive at such a radius that the distance from a point on this circle to the receiving point has a path length that is some multiple of a half wave length longer than the direct path.

fringe area—An area or locality at such a distance from the transmitter that the signals received are weak.

full-duplex operation—A method of operation of a radio system which provides simultaneous two-way communications between two points. In EMS radio systems, provides for mutual interrupt capabilities between the field technician and the physician or medical direction at a hospital location.

G

gain, of an antenna—The effectiveness of a directional antenna in a particular direction,

compared against a standard (usually an isotopic antenna). The ratio of standard antenna power to the directional antenna power that will produce the same field strength in the desired direction.

generator, standby power—A device which develops electrical voltage from mechanical energy. An a-c electrical power source held in reserve and used to supply the necessary a-c power when commercial power fails.

generator, signal—A portable test oscillator which can be adjusted to provide a test signal at some desired frequency, voltage, modulation, or waveform.

geographical assignment—The assignment and use of communications channels on a dedicated used basis within a given geographic area.

GHz—Gigahertz (billion hertz, 1000 MHz)

gin pole—A pole which is used together with ropes and pulleys as a derrick for lifting heavy loads and for erecting poles or towers.

ground—A reference point. Also a connection, intentional or accidental, between an electrical circuit and the earth or its equivalent.

ground plan antenna—A type of vertical transmitting or receiving antenna used primarily for short wavelength or high band communications. A ground plane antenna consists of a quarter-wave vertical element, and four radial elements spaced 90° apart, and mounted on the base of the vertical element. Antennas of this type are non-directional and have a low angle of radiation.

ground wire—A conductor leading from the radio equipment to an electrical connection with the ground.

guard band—A narrow band of frequencies provided between adjacent channels in certain portions of the radio spectrum to prevent interference between stations.

guy anchor—The buried weight or mass to which the lower end of a guy wire is attached.

H

half-duplex channel—A communication channel providing duplex operation at one end of the channel, but not the other. Sometimes, the base station is operated in the duplex mode, however, in EMS the portable or mobile radio is often operated in the duplex mode, and the base station at the hospital operated simplex, to permit the medical direction physician to interrupt transmissions from the field technician. See also Simplex.

half-duplex operation—Generally refers to the ability of directing medical personnel in EMS radio system to interrupt or ‘break in’ on radio transmissions from field personnel to give instructions or ask questions. Sometimes referred to as “physician interrupt”. Requires duplexed communications equipment in the field.

half-wave dipole antenna—A straight, ungrounded antenna having an electrical length equal to half the wave length of the signal being transmitted or received. Mounted vertically, it has a donut-shaped pattern, circular in the horizontal plane.

ham—A term applied to an amateur radio operator, as opposed to business or

commercial operators. A person that makes amateur radio operation a hobby.

harmful interference—Any emission, radiation, or induction which endangers the functioning of a radio service or seriously degrades, obstructs, or repeatedly interrupts a radio communication service.

hand microphone—A microphone designed to be held in the hand. Sometimes called a “palm” microphone.

handset—A device similar to a telephone handset used in place of a hand microphone.

hardcopy—A tangible printed copy of a message such as that obtained from a typewriter.

hardware—The screws, nuts, clamps, anchors, connectors, etc. used in the installation and maintenance of communications systems.

hardwire—To wire or cable directly between units of equipment without passing through other media.

harmonic—An integral multiple of a fundamental frequency. The third harmonic of 20 Hz is 60 Hz. The fifth harmonic of 40 Hz is 200 Hz.

hash—Noise signal produced by an electrical or mechanical source.

headphone—A device which can be placed on the head to allow individual listening to messages.

HEAR—Hospital Emergency Administrative Radio— Motorola Communications and Electronics trade name for a VHF radio system operating on

standard frequencies with a selective calling system between stations. The system is similar to General Electric Mobile Radio Department's EACOM radio system.

helix—A single layer, spiral wound coil usually having air or foamed polyethylene core.

heterodyne—(1) pertaining to the production of difference in frequencies (beat frequencies) by the combination of the two frequencies, (2) to shift an incoming radio signal to a different frequency, often to a lower intermediate frequency.

Heterodyne frequency—The beat frequency, which is the sum or difference between two frequency signals.

hertz(Hz)—International unit of frequency identical to and used instead of the old term cycles. One hertz is equal to one cycle per second.

high band—A portion of the VHF radio frequency spectrum from 150 to 174 MHz in which two-way radio operates.

hollerith code—A twelve-level code which defines the relation between an alphanumeric character and the punched holes in an 80-column data card.

hookswitch—The device on which a handset or microphone hangs when not in use. The handset operates a switch, or switches, which open the associated circuits.

hop—(1) The number of reflections from the ionosphere encountered by the radio wave in traveling from the transmitter to the receiver (2) the number of radio links required to span a given path.

hot line—Direct circuit between two or more points for immediate use without patching or switching. (See direct leased land lines) The hot line can employ various signaling configurations (ringdown, audio amplifier, etc.)

hot standby operation—A method of achieving reliable operation by energizing two identical equipments fed by and to a switchable input and output. A sensing device causes transfer of input and output circuits when a failure is indicated.

hum—Audio frequency interference which is at the frequency of the power supply or its harmonics.

humidity, relative—The ratio of the amount of water vapor the air contains to the maximum amount it could hold at the same temperature and pressure, expressed in percent.

hybrid—(1) Made up of several different components or a mixture of technologies. (2) A circuit required to convert 4-wire operation to 2 wire, while maintaining isolation of the 4-wire circuit.

I

ignition noise—Interference produced by sparks or other ignition discharged in a vehicle.

image—One of the two groups of sidebands generated in the process of modulations, so called because one is the reverse (mirror image) of the other with respect to operating frequency.

image frequency—In heterodyne frequency converters, an undesired input frequency which can beat with the local oscillator to

produce the intermediate frequency and thus appear in the receiver output.

image rejection—The action of a receiver in suppressing the image frequency.

impedance—The total resistance that a circuit offers to the flow of alternating current. Impedance is a combination of resistance and reactance. The ohm is used as a unit of impedance measurement.

impedance match—The condition in which the impedance of one component is the same as the component to which it is connected or attached.

impedance, characteristic—The importance of characteristic impedance lies in the fact that when a transmission line is terminated, as with an antenna, in an impedance matching its own, then all of the energy or power flowing along the line is radiated by the antenna. If the impedance of the termination (antenna) is not matched to the transmission line, a portion of the energy will be reflected at the mismatch resulting in a lower output from the antenna.

Improved Mobile Telephone Service (IMTS)—A mobile radio telephone offering of a telephone company.

impulse—A surge of electricity having a single polarity.

indicator—A device used to inform of a condition or change in condition.

induced—Produced as a result of exposure to a changing electric or magnetic field.

Industrial Radio Service—An FCC-designated radio service.

in-band signaling—The transmission of signaling tones within the frequency band of the channel.

insertion loss—The loss introduced when a device or line section is interposed between two elements of a circuit.

insulation—Any nonconductive material used to prevent the leakage of electricity from a conductor, such as rubber, glass, mica, etc.

integrated circuit—A complete circuit consisting of transistors, capacitors, resistors, diodes, etc. which is formed on a single semiconductor substrate.

Integrated Circuit Oscillator Module (ICOM)—A frequency determining circuit used in General Electric radios containing a crystal oscillator circuit and other circuits used to generate the oscillator frequency.

interface—A concept involving the specification of the interconnection between two equipments or systems. The specification includes the type, quantity, and function of the interconnection circuits and the type and form of the signals to be interchanged via these circuits.

interference—Interference in a signal transmission path is either extraneous power which tends to interfere with the reception of the desired signals or the distribution of signals which results in loss of signal or distortion of information.

intermittent—Not continuously present; disappearing and reappearing.

intermittent duty cycle—A duty cycle of 1 minute on 4 minutes off, or 20% per electronic industries association (EIA).

intermodulation—The combination of two signals beating together to form a third unusable signal which interferes with the reception of the desired signal. In a radio receiver the method of expressing in dB below the desired signal, the receiver's rejection of the unwanted signal to its acceptance of correct signals.

intrinsically safe—A laboratory (UL) rating for equipment considered approved to operate in areas in which hazardous concentrations of flammable gases exist.

inverter—(1) Any of several devices used to convert direct current to alternating current (2) a single input, single output device which changes the polarity of (inverts) a signal when passing it from input to output. A negative signal at the input produces a positive signal at the output and vice versa. A differential EKG amplifier has a normal and an inverting input.

ionosphere—The upper portion of the earth's atmosphere beginning at about 50 miles above the surface of the earth the cause of radio signals being bent, and returned to earth.

isolator—A passive RF device which permits transmission in only one direction, absorbing energy in the opposite direction.

J

jack—A connecting device ordinarily used to make electrical contact with mating contacts of a plug.

jacket—The outer covering on an insulated wire or cable.

jamming—The deliberate radiation, re-radiation or reflection of electromagnetic

energy with the object of impairing the use of electronic devices, equipment or systems.

jumper—A short length of conductor used to bridge electrical connections.

junction box—A metal or other container into which wires or cables are led and connected.

K

key—A push-to-operate switch used for operating a transmitting circuit in a radio system

key telephone equipment—An instrument that has the capability of multiple line terminations. Each line is accessed by depressing an association button (key).

keypunch—A machine controlled by a typewriter like keyboard which enables an operator to punch holes in predescribed places in a hollerith code.

kilo—A prefix meaning one thousand.

kbits—Thousands of bits per second.
kilohertz(kHz)—Equal to 1000 cycles per second. Replaces the term kilocycle.

klystron—An electron tube in which the electrons are periodically bunched by electric fields. Used as an RF oscillator for microwave equipment.

knockout—A metal disc punched in the side of a metal terminal junction box or cabinet which can be punched out to allow entry of a cable or conduit.

L

land line—A generic term which refers to the public-switched telephone system.

lag—The difference in phase angle expressed in electrical degrees between the voltage and current which produced it.

land-mobile—An abbreviation for land to mobile communications such as between base stations and mobile radios or from mobile radio to mobile radio.

Land Mobile Radio Service—A mobile radio service defined by the Federal Communications Commission-FCC Rules and Regulations Part 90.

LATA—Local access and transport area boundaries for telephone companies. The geographic area within which the local telephone company provides local and long distance service.

Law Enforcement Assistance Administration (LEAA)—An administration under the United States Department of Justice established by the Omnibus Crime Control and Safe Streets Act of 1968, restructured by the Justice Improvement Act of 1979 and abolished two years later.

leased line—A pair of wires or a circuit, usually leased or rented from a telephone company, designed for exclusive use between two fixed points for various communication control functions.

life cycle—A test performed on a material device to determine the length of time before failure.

line—A transmission line or power line. A system of one or more wires.

linear—Describing a device in which the signal output voltage is directly proportional

to the signal input voltage. A straight line relationship.

line, balanced—A two-wire line which has identical impedance from each wire.

line equalizer—A connection in series with a telephone line that will alter the frequency response characteristics of the line.

line, four-wire—A two-way transmission circuit using separate paths for transmit and receive functions.

line, loss—A transmission line, usually a coaxial cable, which is designed to have very high transmission loss per unit length used in tunnels, underground or buildings for radio communications systems.

line of sight—An unobstructed path between two points. Radio waves at those frequencies where signals travel in a straight line and are not reflected by the ionosphere.

line of sight distance—The straight-line distance from a radio station antenna to horizon. This represents the normal transmitting range of FM transmitting stations.

link—The portion of a radio relay system between adjacent radio stations.

load—(1) A device that receives power from a transmission system (2)The amount of electric power drawn by an electric or electronic device.

load, dummy—A device which can dissipate energy (into heat) without radiating it.

loading, antenna—Insertion of reactance in an antenna circuit to improve its

transmission characteristic in a given frequency band.

loading, ice—The stress imposed on an antenna or antenna structure caused by ice forming on its members.

loading, wind—The stress imposed on an antenna or antenna structure caused by wind.

lobe—One of the three-dimensional petals representing the radiation or reception efficiency of a directional antenna.

local government radio service—A service of radio communication defined by the FCC essential to official activities of states, possessions, and territories, including counties, towns, cities, and similar governmental subdivisions.

local service area—That area that can be called on the telephone without incurring multmessage units or a toll charge.

log—A list of radio stations showing frequency, location, power, and other data. Also a communication record for a station showing calls made, time, date and other data. A detailed record.

loop—(1) A short transmission line that connects a subscriber to a switchboard (2) A closed path in which a signal may circulate. This path may be within a piece of equipment, such as a repeater or carrier terminal, or may be a complete carrier circuit.

loop resistance—The resistance presented to the signaling portion of the terminating set by the wireline when the far end of the wireline is short circuited.

loss—A decrease in power suffered by a signal as it is transmitted from one point to another, usually expressed in decibels. Energy dissipated without accomplishing useful work.

loss, free space—The theoretical transmission loss between two radio antennas dependent only upon distance and frequency.

loss, path—The theoretical transmission loss between two radio antennas dependent only upon distance and frequency.

loss, path—The reduction or attenuation of signal strength that occurs between the transmitted strength and the received signal strength.

low band—A section of the VHF radio frequency spectrum from 25 to 50 MHz in which mobile radio equipment is licensed to operate.

low loss—Describing circuits and transmission line in which little energy is lost from the input to the output.

lower sideband—The lower of two frequencies or of two groups of frequencies produced by a modulation process.

lug, spade—A connector which has an open end to slip under a terminating screw.

M

marginal—Operating at the borderline of permissible limits.

matrix—An array of horizontal and vertical input or output leads with cross points at the intersections, used as a means of switching from any input to any output.

mean—The arithmetic middle point of a range of values, obtained by adding the highest and lowest values and dividing by two.

median—The point below which there are as many instances as there are above.

medical communications control console—An installation of communications control equipment, usually located at a hospital, which provides for control of the transmitting and receiving equipment necessary for the medical communications.

microwave—A term applied to radio waves in the frequency range of 1,000 MHz and upward. Microwave radio generally performs the same functions as telephone cables, and may be used for radio remote control purposes.

mobile—Term used to describe equipment designed for vehicular installation.

mobile relay station—A fixed station established for the automatic re-transmission of mobile service radio communications which originate on the transmitting frequency of the mobile stations and which are retransmitted on the receiving frequency of the mobile stations.

mobile repeater station—A mobile station in the mobile service authorized to retransmit automatically on a mobile service frequency communications originated by handheld or portable units or by other mobile or base stations directed to such hand-carried units.

mobile service—A service of radio communications between mobile and land stations, or between mobile stations.

mobile station—A two-way radio station in the mobile service intended to be used while in motion or during halts at unspecified points.

mobile telephone service (MTS)—Telephone service between a fixed mobile radio base station and several vehicles equipped with mobile radios.

mobile transmitter—A radio transmitter designed for installation in a vehicle, vessel, or aircraft and normally operated while in motion.

mobile unit—A two-way radio equipped vehicle or person. Also sometimes the two-way radio itself, when associated with a vehicle or person.

modem—Contraction of modulator-demodulator.

modular—A construction technique incorporating the use of standard size units for interchangeability.

modulate—To vary the amplitude (AM), frequency (FM), or phase of a high frequency wave or carrier in step with amplitude variations of another wave (the modulating wave). The carrier is usually a sine wave while the modulating wave is often a complex voice or EKG signal.

modulator—The electronic circuit that combines the modulating wave with the carrier wave. In radio transmitters the final audio-frequency stage which mates the audio signal with the carrier signal. In EKG telemetry, the circuit that combines the amplified EKG signal with the subcarrier (audio) signal for transmission by radio or telephone.

multi-channel system—A radio system which uses more than one radio channel. Also known as a multifrequency system.

multicoupler, receiver—A device which permits several radio receivers to use the same antenna. Usually a broadband amplifier with several output ports.

multi-frequency operation—Employing radio equipment capable of operation on two or more frequencies.

multijurisdictional system—A system covering more than one political boundary or agency.

multipath—The propagation phenomenon which results in signals reaching a radio receiving antenna by two or more paths usually resulting in a degradation of the original signal.

multiplex—Transmitting two or more signals over the same medium. In EKG telemetry equipment, the ability to transmit electrocardiograph(EKG) signals and voice signals concurrently over the same transmitter.

multiplex, frequency division—A multiplex system in which the total transmission bandwidth is divided into narrower bands each used for a single separate channel.

multiplex, time division—A method of multiplexing in which the total frequency spectrum available is used by each channel, but only for part of the time. A sharing of transmission ability, first by one parameter, then by another.

multi-tone—A method of signaling that involves two or more tone signals produced simultaneously or sequentially.

mute—To silence or reduce sound level.

N

netting—The process of adjusting a system's transmitters and receivers to the same operating frequencies.

net loss—The algebraic sum of the gains and losses between two terminals of a circuit.

network—An orderly arrangement of stations interconnected through communications channels in order to form a coordinated entity.

nine-one-one(9-1-1)—A three-digit emergency telephone number accepted and promulgated by the telephone industry as the nationwide emergency number.

Nxx—The first three digits of a local telephone number that uniquely identifies that central office switching location within its area code number for nationwide long distance call routing.

noise—Interference characterized by undesirable random voltages caused by an internal circuit defect or from some external source. Any extraneous signal tending to interfere with the proper and easy perception of those signals which are intended to be received.

noise blanker—A device used in mobile radio applications which senses the presence of undesired noise on the desired channel and causes the desired signal to be interrupted for the time period that the undesired noise signal is present. The time period is controlled and measured in milliseconds so that the interruption of the desired signal is not audible.

noise level—Volume of noise usually expressed in decibels.

noise limiter—A circuit that cuts off the noise peaks that are stronger than the highest peak of the desired signal being received.

nomograph—A chart having three or more scales across which a straightedge can be placed to provide a graphical solution for a particular problem. In mobile radio, nomographs may be used to determine frequency spread, estimated radio range, antenna height, etc.

O

octave—The interval between two frequencies having a ratio of two to one.

ohm—An electrical unit of resistance.

ohm's law—The current in an electric circuit is directly proportional to the electromotive force in the circuit. In the form $E=I*R$, where E is the electromotive force (voltage), I is the current (amperage), and R is the resistance of the circuit (ohms).

omnidirectional—Equally effective in all directions.

open—A break in circuit continuity

outage—A disruption of communications from any cause, whether planned or accidental.

out-of-band signaling—Transmission of signals by frequencies outside of the voice band.

overload—A load greater than a device is designed to handle.

P

paging—A one-way communications service from a base station to mobile or fixed receivers that provide signaling or information transfer by such means as tone, tone-voice, tactile, optical readout, etc.

pair—Two wires of a signal circuit generally applied to telephone wherein one wire is designated “tip” and the second wire “ring”.

passive—A device which does not contribute energy to the signal it passes.

passive repeater—A device intentionally interposed in a microwave transmission path to redirect or reflect energy.

patch—A means of connecting one system to another. A patch may be between radio systems, or radio to telephone, as in a radio/phone patch.

path, signal—The route by which intelligence is conveyed from transmitter to receiver or through a circuit.

personal radio—A small portable radio intended to be carried by hand or on the person of the user.

PERT—Program Evaluation and Review Technique. A management tool for comparing actual with scheduled program progress.

phase—The position at any instant which the periodic wave occupies in its cycle of 360°

phone patch—An interconnection between radio and telephone communications circuits which permits direct voice interchange between telephone lines and radio system.

pigtail—A splice made by twisting together the bared ends of two conductors.

plug-in—Describing any device having terminals so it can be connected by simply pushing it into a suitable socket or connector.

portable—An easily transportable radio.

primary power—A reliable source of electrical power normally serving as the principle source of energy to equipment, such as the commercial 120 volt a-c power main.

private automatic branch exchange (PBX)—A telephone switchboard with many stations not individually identifiable to the telephone company's switching network requiring an operator.

private line (PL)—Motorola's trademarked name for continuous tone controlled squelch system, CTCSS.

propagation, electromagnetic—The travel of electromagnetic waves through a medium, or the travel of a sudden electric disturbance along a transmission line. Also called wave propagation.

protect—To equip with devices for safeguarding from damage by excessive voltages, current, or physical abuse.

public safety agency—A functional division of a public agency which provides fire fighting, police, ambulance, emergency medical, or other emergency services.

public safety answering point (PSAP)—The initial answering location of a 9-1-1 call and other calls for assistance.

public safety telecommunicator—An individual trained to communicate by electronic means with persons seeking emergency assistance and with agencies and individuals providing such assistance.

pull box—A box with a removable cover installed in a conduit run to facilitate pulling wire or cable into the conduit.

pulse—A signal of short duration.

pulsed tone—A system of selective signaling using a keyed on-off tone signal.

push-to-talk or press-to-talk (PTT)—In radio or telephone systems, that method of communication over a speech circuit in which transmission occurs from only one station at a time, the talker being required to keep a switch operated while he is talking. The keying button used to operate a radiotelephone transmitter.

Q

quarter-wave antenna—An antenna electrically equal to one-fourth of the wavelength of the signal to be transmitted or receive.

quartz—An element consisting of pure silicon dioxide. The original piezoelectric material widely used to control the frequency of oscillators.

quartz crystal—A thin square or rectangular slice of quartz which will vibrate at a frequency determined by its thickness.

quiet channel—The RCA Corporation's trademarked name for continuous tone controlled squelch system (CTCSS).

quieting—Reduction of system noise.

quick-call—Motorola communications Company trademarked name for a system of selective calling, normally using two pairs of two tones each in sequence. Quick Call II uses a pair of sequential tones similar to General Electric's Type 99 tone system.

R

rack mounting—A method of mounting equipment in which metal panels supporting the equipment are attached to pre-drilled steel channel rails or racks. The dimensions of the panels, the spacing of the rails and the size of the mounting screws are standardized.

rack unit—In mobile radio generally a rack mounting 19 in. between rails and a height of 1.75 in. per unit.

radio—The transmission and reception of signals by means of electromagnetic waves without a connecting wire.

radio-frequency power—The power associated with any signal consisting of electromagnetic radiation which is used for telecommunications.

radio interference—Undesired disturbance of radio reception. Man-made interference is generated by electric devices, with the resulting interference signals either being radiated through space as electromagnetic waves or traveling over power lines or other conducting media. Radio interference is also due to natural sources such as atmospheric phenomena, such as lightning. Radio transmitters themselves may additionally interfere with each other.

radio network—A number of radio stations, fixed and mobile, in a given geographical area which are jointly administered or which communicate with

each other by sharing the same radio channel or channels.

radio common carrier (RCC)—An enterprise that is licensed by the FCC and the Public Utilities Commission to provide radio communications service to the public.

radio receiver—An instrument which amplifies radio frequency signals, separates the intelligence signals from the rf carrier, amplifies the intelligence signal additionally, and converts the intelligence signal to its original form.

radio relay system (radio relay)—A point-to-point radio transmission system in which the signals are received and retransmitted by one or more intermediate radio stations.

radio transmitter—A radio-frequency power source which generates radio waves for transmission through space.

radome—A dome shaped cover for a parabolic antenna which protects the antenna from the elements and their attenuating effects.

range—Distance over which a radio signal can be transmitted for effective reception or the distance at which a usable signal can be received.

receiver—An electronic device used to detect and amplify transmitted radio signals.

receiver, paging—A small, light, pocket sized receiver used for alerting individuals when they are away from their normal communication instruments.

referral methods—The calling party to a public safety answering point is referred to a secondary telephone number.

refraction—The change of direction experienced by a wave of any form of radiated energy when passing from one medium to another having a different dielectric constant or index of refraction.

regional EMS system—An emergency medical service area (trade, catchment, market, patient flow, geographic or governmental) that provides essentially all of the definitive emergency medical care for all emergencies and for the most critically ill and injured patients within the area.

relay—Transmission forwarded through an intermediate station.

relay station—Radio stations that rebroadcast signals the instant they are received, so that the signal can be passed on to another station outside the range of the originating transmitter.

reliability—The ability of an item to perform a required function under stated conditions for a stated period of time.

remote base station—A base station located away from the operating console, to take advantage of improved coverage offered by a better geographical location.

remote control—The operation of a device from a distance either electrically or by radio waves.

remote control equipment—The apparatus used for performing monitoring, controlling, supervisory control, or a combination of these functions at a distance by electrical means.

repeater—A combination of apparatus for receiving either one-way or two-way

communication signals and delivering corresponding signals which are either amplified or reshaped or both.

repeater station—An operational fixed station established for the automatic re-transmission of radio communications received from any station in the mobile service.

repeater station, re-modulating—A microwave repeater station in which the signal is demodulated to the original baseband frequencies and re-injected onto the modulator for transmission to the distant station.

resource management center—A center responsible for the allocation of those resources essential to the most effective and efficient resolution, or management or both, of the immediate problem. In most communities these resources include police, fire and emergency medical services. The resource management center is most effective when its responsibilities encompass the whole of public safety response.

ringback—In a public safety answering center, permits the answering point to ring the hung-up telephone on a held circuit. The feature is useful when calling a party has failed to provide all necessary information to the answering point before hanging up.

ringdown—A type of signaling employed in manual operation telephone (as compared to dial) which utilizes a continuous or pulsing a-c signal transmitted over the line.

S

schematic diagram—A diagram or drawing which shows electrical connections of a radio or other electrical device by means of

symbols which are used to represent the components.

search lock monitor—A receiving channel scanning scheme which lock the receiver on the first channel received.

selective call—A system for alerting individual or groups of stations by means of coded signals.

selectivity—The ability to select one particular signal from other signals at nearby frequencies. This specification is important in urban areas where radio spectrum congestion exists. The more negative the dB rating, the better the specification.

selective routing—A routing of telephone call to terminate at a PSAP determined by the location of the calling telephone. This is accomplished by using a computer to process the calling telephone number.

sensitivity—The characteristic of a radio receiver which determines the minimum input signal strength required for a given signal output. In FM, sensitivity is the signal level required to produce a given ratio of signal to noise. The more sensitive a receiver is, the weaker the signal it can receive.

service channel—In a microwave system, a voice channel fused for maintenance and fault location. Also called order wire.

service life—The life expectancy of equipment under normal conditions of use.

side tone—The signal that reaches a telephone receiver from the transmitter of the same set by way of a local path within the set.

Signal—The form of a radio wave in relation to the frequency serving to convey intelligence in communication.

signal-to-noise ratio—The ratio of the intensity of the desired signal to that of the undesired noise signal, usually expressed in decibels.

signal strength—A measure of the field intensity caused by a radio transmitter at a particular location within its operating range. Usually expressed as microvolts, or millivolts of signal.

simplex—1) —single frequency operation whereby all base stations and mobiles operate on one common frequency, (2) operation on two different frequencies in a system that can communicate in two directions, but not simultaneously, such as when a base station and a mobile radio operate on reversed pairs of frequencies without duplexing.

simplex channel—a communication channel providing transmission in one direction only at any given time. For comparison see duplex channel.

simplex operation—A method of radio operation in which communication between two stations takes place in only one direction at a time. This includes ordinary transmit-receive operation, press-to-talk operation, voice-operated transmit, and other forms of manual or automatic switching from transmit to receive. Also called simplex.

SINAD —The ratio of signal plus noise plus distortion to the noise plus distortion; expressed in decibels. An EIA standard method of measuring receiver sensitivity. Basically a measure of RF signal strength that will result in a readable signal.

siren—An acoustical or electromechanical device used as a warning signal on emergency vehicles.

solid state—Denoting the use of semiconductors instead of vacuum tubes or relays.

Special Emergency Radio Service (SERS)

—That portion of radio communications frequency resources authorized by the FCC for use in the alleviation of emergency situations endangering life or property. See FCC Part 90.

spectrum—A continuous range of frequencies arranged in order of wavelength or frequency within which waves have some common characteristics, such as audio spectrum, radio spectrum, etc. The entire range of electromagnetic radiation extending from the longest known radio waves to the shortest known cosmic rays.

spurious response—The response of a radio receiver to an undesired frequency.

squelch—A circuit function that acts to suppress the audio output of a receiver when noise power exceeding a predetermined level is present.

squelch, carrier—A squelch system that responds to the presence of an RF carrier signal.

squelch circuit—A circuit that reduces or lowers the noise that would otherwise be heard in a radio receiver between transmissions.

stability, frequency—The ability of a radio transmitter to maintain any predetermined frequency, such as its assigned frequency.

Measured in percent of the carrier. The lower the percentage the better the stability.

standing wave ratio (SWR) —A measure of the amount of lost transmitting power due to impedance differences between the transmission line and the antenna. The ratio of reflected to incident waves that exists at some particular point on a transmission line.

statewide EMS system—A network of EMS systems, integrated and coordinated at the state level.

strip chart recorder—An electromechanical device used to make paperchart recordings of EKG information. Usually it uses a heat-sensitive paper and a heated stylus.

subcarrier—A frequency sensitive device used to generate a modulated wave which in turn is applied as a modulating wave to modulate another carrier. For EMS telemetry the subcarrier frequency is 1400 Hz.

supergroup—In microwave systems groups of 60 channels each, occupying a particular range of frequencies.

switched network—A complex of diversified channels and equipment that automatically routes communications between the calling and called person or data equipment. The public telephone system.

synchronization—The process of making the carrier at the receiving end of a line or system match the frequency of the carrier at the transmitting end.

synthesizer, frequency—A highly precise crystal oscillator with frequency dividers

used to provide the precise radio frequency. A typical synthesizer can be set to small frequency increments and have an accurate output at the desired output frequency.

system—A combination of two or more stations in such a way as to provide communications.

T

tandem trunking—An arrangement where a telephone-line connection has one or more intermediate points that are required or permitted usually on a controlled dial pulse basis before reaching the final destination (called) party.

tariff—A document filed by a communications company with Public Utilities Commission which lists the services offered the public and schedule of rates and charges.

tarnish—A discoloration or stain on the surface of metal caused by exposure to chemicals or the atmosphere. To dull or destroy the luster of metal.

tee—A three-way connection in the shape of the letter t.

telecommunications—All forms of electrical transmission of intelligence including: telegraph, telephone, radio, and television. Pertaining to the art and science of communication by these methods.

telemetry—The sensing and measuring of information at some remote location and transmitting the data to a convenient location to be read and recorded.

telpak—An acronym for “telephone package”, a schedule of bulk discount rates for multiple private line telephone services

such as AT&T long-lines series 500 tariff offering.

telephone line—A telephone line from a telephone company central office that is connected to key or non-key telephone equipment.

teletypewriter—An electromechanical device, similar to a typewriter, such that messages typed on the keyboard of the transmitter unit are converted into electrical signals, which when conveyed to the receiver unit, are printed on paper.

ten signals—A series of coded messages designed to reduce air transmission time and confusion in busy mobile radio systems.

thermal noise—Very small noise voltages that are present in all conductors, caused by the thermal agitation of charged particles within the conductor.

third harmonic—A frequency wave having three times the fundamental frequency value.

threshold—In an FM receiver, the point at which the peaks of the incoming RF signal exactly equal the peaks of the internally generated thermal noise power or the point above which increasing the input signal strength provides only a dB for dB improvement in the output signal-to-noise ratio.

tip—The ball-shaped contact on the cord (tip) of a plug. One of a pair of telephone wires (the other of which is called the ring).

tone—An audio or carrier of controlled amplitude and frequency used in a selective signaling system or for equipment control purposes.

tone code—A specified character of transmitted tone signals required to effect a particular selection or function.

tone coded squelch—A system whereby a superimposed tone is transmitted with the radio carrier to protect against nuisance type interference.

tone, Type 90—General Electric's name for a system of single tone signaling. The tones are generally between 1000 and 2400 Hz in two bands.

tone, Type 99—General Electric's name for its two-tone sequential selective signaling system. Sometimes called Sel-Call. The tones are generally between 520 and 953 Hz.

topographic map—An accurately scaled map having contour lines which show the elevation above sea level. Used in preparing profiles of radio propagation paths.

touch pad—A method of signaling or encoding and decoding address codes by the use of a simple numerical push-button keyboard.

Touchtone—A Bell System trademark used to describe their method of signaling and use of dual tone multifrequency (DTMF) tones.

tower, antenna—A tall antenna support structure used to support one or more antennas or when an antenna must be mounted high above the ground or other support formation such as a building.

traffic—Used for messages handling by a radio communications system.

transceiver—The combination of radio transmitting and receiving equipment in a common housing, usually for portable or mobile use, and employing common

circuit components for both transmitting and receiving.

transformer—An electrical device for voltage current transformation, or impedance matching or both.

transfer method—The PSAP interrogator determines the proper responding agency and connects the user to that agency. To perform the necessary dispatching in accordance with prearranged plans with cooperating agencies.

transient—A rapid, sometimes violent, fluctuation of voltage or current in a circuit usually of short duration caused by switching or changes in load.

transmitter—Apparatus for the production and modulation of radio frequency energy for the purpose of radio communication.

transmission line—A waveguide, coaxial line, or other system of conductors used to transfer signal energy efficiently from one location to another. In communications systems, the coaxial line between the base station and the antenna.

trunk—A circuit used for connecting a subscriber in a central office to all other services in/out of the switching equipment.

trunk line—A telephone line that terminates at a switchboard rather than a telephone.

TSPS—An electronic operating position system whereby operator-handled traffic is routed to its final destination via a central switching machine.

turret—A section of communications control console, containing switches, controls, meters, etc.

two-way radio—A radio that is able to transmit and to receive.

two-wire operation—Uses a single pair (two wires) for both transmitting and receiving.

U

Ultra High Frequency (UHF)—Frequencies between 300 and 3000 MHz.

ultrasonic—Describing frequencies higher than those which are audible. Generally above 20000 Hz.

unbalanced line—A transmission line in which the voltages on the two conductors are unequal.

Underwriters Laboratories, Inc.—A laboratory sponsored by the National board of Fire Underwriters which examines and tests devices, material and equipment whose action may affect casualty, fire, and life hazard.

unmodulated—Without modulation; the RF carrier signal alone as it exists during pauses in conversations.

upper sideband—The higher of two frequencies or groups of frequencies produced by a modulation process.

utility—A power, gas, or water service available to the public.

V

Van Allen belts—Radiation belts that surround the earth, consisting of electrons and protons at high energy levels.

varactor—A semiconductor diode used as a variable capacitor. Used as a harmonic generator, frequency multiplier, and amplifier.

vehicular repeater station—A mobile station in the mobile services authorized to retransmit automatically on a mobile service frequency, communications originated by hand carried portable units or by other mobile or base stations directed to such hand-carried units.

Versatone—General Electric company trade name for a solid state tuned tone determining element.

vertical antenna—A vertical steel tower, rod or shaft used as an antenna.

Very High Frequency (VHF)—Frequency between 30 and 300 MHz.

Vibrasponder—Motorola Communications company trade name for a tone determining vibrating reed element.

voice grade—A communications circuit which is nominally 300 to 3000 Hz.

voltage standing wave ratio (VSWR)—The ratio of the maximum voltage to the minimum voltage along a transmission line. It is the measure of the mismatch between the load and the line.

volume control—A potentiometer voltage divider used to adjust the loudness of an audio circuit.

volume unit (VU)—A measure of the magnitude of sound from an electrical wave. Measured in decibels.

voting—Automatic selection of remote radio receiver. All incoming signals are compared for signal strength and the first signal found that meets or exceeds a preset level is selected and sent to the audio amplifier.

W

watt—The unit of power.

wattmeter—A meter to indicate the rate at which electrical energy is being used or produced.

wave—A propagated periodic disturbance such as a radio, light or sound wave.

waveguide—A transmission line comprising a hollow conducting tube within which electromagnetic waves may be propagated. Generally used in microwave communications systems.

wavelength—The distance measured along the direction of propagation between two points that are in phase on adjacent waves. A wavelength is the distance traveled by a wave in the time of one cycle. Electromagnetic waves included both light and radio waves and travel in space at approximately 300,000,000 m/s. To determine the exact length of a wave, divide 300,000,000 m by the frequency in hertz.

wave, radio—An electro-magnetic wave which travels through space at the speed of light.

wave, refracted—A radio wave that is bent (refracted) as it travels into a second medium of propagation, such as from the atmosphere to the ionized layers of the stratosphere.

weatherproof—So constructed or protected that exposure to the weather elements will not prevent proper operation.

weathertight—So constructed that exposure to a driven rain will not result in the entrance of water.

wire—A single metallic conductor.

ADDENDUM

Addendum

Interoperability Channel Naming

Names for Channels Coordinated/Managed by CalSIEC

April 4, 2008 - Subscriber Programming Shown

12.5 kHz) only with original FCC name shown

N = 12.5 kHz bandwidth

MW = 20 kHz bandwidth

W = 25 kHz

Rebanding/Narrowbanding (Legacy Names)					
	Rx FREQ	Rx CTCSS	Tx FREQ	Tx CTCSS	Bandwidth
VHF LOW BAND					
	39.4600	156.7	45.8600	156.7	W
	39.4600	156.7	Simplex	156.7	W
39.4800 is used by various agencies in California					
	45.8600	156.7	Simplex	156.7	W
	45.8800	156.7	Simplex	156.7	W
VHF HIGH BAND					
	155.7525	none	Simplex	none	N
	151.1375	none	Simplex	none	N
	154.4525	none	Simplex	none	N
	158.7375	none	Simplex	none	N
	159.4725	none	Simplex	none	N
	154.2800	none	Simplex	none	W
	154.2650	none	Simplex	none	W
	154.2950	none	Simplex	none	W
	155.4750	none	Simplex	none	W
	Rx FREQ	Rx CTCSS	Tx FREQ	Tx CTCSS	Bandwidth
	154.9200	none	Simplex	Varies	W
	154.9350	none	Simplex	Varies	W
	156.0750	none	Simplex	none	W
UHF					
	453.2125	none	458.2125	none	N
	453.2125	none	Simplex	none	N
	453.4625	none	458.4625	none	N
	453.4625	none	Simplex	none	N
	453.7125	none	458.7125	none	N

Post-Rebanding/Narrowbanding					
NPSTC Name	Short Name (6 char)	Rx FREQ	Rx CTCSS	Tx FREQ	Tx Bandwidth
VHF LOW BAND					
LLAW1	LLAW1	39.4600	156.7	45.8600	W
LLAW1D	LLAW1D	39.4600	156.7	Simplex	W
LFIRE2 (pend)	LFIRE2	39.4800	156.7	Simplex	W
LLAW3D	LLAW3D	45.8600	156.7	Simplex	W
LFIRE4	LFIRE4	45.8800	156.7	Simplex	W
VHF HIGH BAND					
VCALL10	VCAL10	155.7525	156.7	Simplex	N
VTAC11	VTAC11	151.1375	156.7	Simplex	N
VTAC12	VTAC12	154.4525	156.7	Simplex	N
VTAC13	VTAC13	158.7375	156.7	Simplex	N
VTAC14	VTAC14	159.4725	156.7	Simplex	N
VTAC17	VTAC17	161.8500	156.7	157.2500	N
VTAC17D	TAC17D	161.8500	156.7	Simplex	N
VTAC18	VTAC18	161.8250	156.7	157.2250	N
VTAC18D	TAC18D	161.8250	156.7	Simplex	N
VFIRE21	VFRE21	154.2800	156.7	Simplex	W
VFIRE22	VFRE22	154.2650	156.7	Simplex	W
VFIRE23	VFRE23	154.2950	156.7	Simplex	W
VFIRE24	VFRE24	154.2725	156.7	Simplex	W
VFIRE25	VFRE25	154.2875	156.7	Simplex	W
VFIRE26	VFRE26	154.3025	156.7	Simplex	W
VMED28	VMED28	155.3400	156.7	Simplex	W
VMED29	VMED29	155.3475	156.7	Simplex	W
VLAW31	VLAW31	155.4750	156.7	Simplex	W
VLAW32	VLAW32	155.4825	156.7	Simplex	W
NPSTC Name	Short Name (6 char)	Rx FREQ	Rx CTCSS	Tx FREQ	Tx Bandwidth
CALAW1	CALAW1	154.9200	none	Simplex	W
CALAW2	CALAW2	154.9350	none	Simplex	W
CALCORD	CACORD	156.0750	none	Simplex	W
UHF					
UCALL40	UCAL40	453.2125	none	458.2125	N
UCALL40D	CAL40D	453.2125	none	Simplex	N
UTAC41	UTAC41	453.4625	none	458.4625	N
UTAC41D	TAC41D	453.4625	none	Simplex	N
UTAC42	UTAC42	453.7125	none	458.7125	N

453.7125	none	Simplex	none	N
453.8625	none	458.8625	none	N
453.8625	none	Simplex	none	N
460.0250	Varies	465.0250	Varies	W
460.0250	Varies	Simplex	Varies	W
484.2125	167.9	487.2125	146.2	W
484.2125	167.9	487.2125	167.9	W
484.2125	167.9	487.2125	156.7	W
484.2125	167.9	487.2125	173.8	W
484.2125	167.9	Simplex	167.9	W
484.2375	none	Simplex	156.7	W
487.2375	none	Simplex	156.7	W
800 MHz				
866.0125	156.7	821.0125	156.7	MW
866.0125	156.7	Simplex	156.7	MW
866.5125	156.7	821.5125	156.7	MW
866.5125	156.7	Simplex	156.7	MW
867.0125	156.7	822.0125	156.7	MW
867.0125	156.7	Simplex	156.7	MW
867.5125	156.7	822.5125	156.7	MW
867.5125	156.7	Simplex	156.7	MW
868.0125	156.7	823.0125	156.7	MW
868.0125	156.7	Simplex	156.7	MW
868.5125	none	823.5125	156.7	MW
868.5125	none	Simplex	156.7	MW
Rx		Tx		
FREQ	Rx CTCSS	FREQ	Tx CTCSS	Bandwidth
866.2000	none	821.2000	156.7	MW
866.2000	none	Simplex	156.7	MW
868.9875	156.7	823.9875	156.7	MW
868.9875	156.7	Simplex	156.7	MW
866.9125	156.7	821.9125	156.7	MW
866.9125	156.7	Simplex	156.7	MW

UTAC42D	TAC42D	453.7125	none	Simplex	1
UTAC43	UTAC43	453.8625	none	458.8625	1
UTAC43D	TAC43D	453.8625	none	Simplex	1
CALAW4	CALAW4	460.0250	156.7	465.0250	V
CALAW4D	CLAW4D	460.0250	156.7	Simplex	V
SCMA C	SCMA C	484.2125	167.9	487.2125	1
SCMA E	SCMA E	484.2125	167.9	487.2125	1
SCMA N	SCMA N	484.2125	167.9	487.2125	1
SCMA W	SCMA W	484.2125	167.9	487.2125	1
SCMA D	SCMA D	484.2125	167.9	Simplex	1
CALAW5D	CLAW5D	484.2375	156.7	Simplex	1
FDUMA	FDUMA	487.2375	156.7	Simplex	1
800 MHz					
8CALL90	CAL90	851.0125	156.7	806.0125	1
8CALL90D	CAL90D	851.0125	156.7	Simplex	1
8TAC91	TAC91	851.5125	156.7	806.5125	1
8TAC91D	TAC91D	851.5125	156.7	Simplex	1
8TAC92	TAC92	852.0125	156.7	807.0125	1
8TAC92D	TAC92D	852.0125	156.7	Simplex	1
8TAC93	TAC93	852.5125	156.7	807.5125	1
8TAC93D	TAC93D	852.5125	156.7	Simplex	1
8TAC94	TAC94	853.0125	156.7	808.0125	1
8TAC94D	TAC94D	853.0125	156.7	Simplex	1
CALAW8	CALAW8	853.5125	156.7	808.5125	1
CALAW8D	CLAW8D	853.5125	156.7	Simplex	1
NPSTC Name	Short Name (6 char)	Rx	Rx CTCSS	Tx	Tx
		FREQ		FREQ	
CALAW9	CALAW9	851.2000	156.7	806.2000	1
CALAW9D	CLAW9D	851.2000	156.7	Simplex	1
CAFIRE1	CFIRE1	853.9875	156.7	808.9875	1
CAFIRE1D	CFRE1D	853.9875	156.7	Simplex	1
CAFIRE2	CFIRE2	851.9125	156.7	806.9125	1
CAFIRE2D	CFRE2D	851.9125	156.7	Simplex	1

Only: Reno VHF Public Coast Service Area #34, including California counties of Alpine, Inyo, Lassen, Mono, Plumas and Sierra.

Only: Southern California UHF TV-Band sharing area (primarily LA County).

Only: NPSPAC Region 6 (48 Northern California counties).