

# NEWTON'S TELECOM DICTIONARY

23<sup>rd</sup>  
Edition

Harry Newton



New York

## NEWTON'S TELECOM DICTIONARY

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email: [Harry@HarryNewton.com](mailto:Harry@HarryNewton.com)  
book site: [www.NewtonsTelecomDictionary.com](http://www.NewtonsTelecomDictionary.com)  
personal web site: [www.HarryNewton.com](http://www.HarryNewton.com)

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Gail Saari, Layout and Production Artist  
Saul Roldan and Damien Casteneda, Cover design

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For suggestions, corrections, updates, special offers, please send an email to  
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I promise you I won't give your name to anybody. Nobody. Promise.

*Harry Newton*

if it is entered from a specific telephone extension.

**RFC** Request For Comment. The development of TCP/IP standards, procedures and specifications is done via this mechanism. RFCs are documents that progress through several development stages, under the control of IETF, until they are finalized or discarded. RFC### documents Internet "Request For Comment" documents (i.e., RFC822, RFC1521, etc.). The contents of an RFC may range from an official standardized protocol specification to research results or proposals. A set of papers in which the Internet's standards, proposed standards and generally agreed-upon ideas are documented and published. RFCs are the official document series of Internet Architecture Board (IAB) and are achieved permanently. They are never deleted. See the RFCs below.

**RFC 1144** This RFC (Request For Comment) will provide overhead compression for the TCP/IP protocol down to 5 octets. It does this by anticipating that the next packet in a file transfer sequence will have the same address as the previous and will have the same sequence number plus one. This compression technique will be useful where SDLC encapsulation, or other bridging protocol encapsulation, is being used with low-speed PVCs (Private Virtual Circuits.) In these cases, the slight increase in processing power to perform the compression is more than balanced by the increase in application performance and throughput.

**RFC 1294** This Request For Comment is Inverse ARP, which allows the automatic discovery of the addresses on the router at each end of another router's DLCs. Right now, the RFC only applies to IP, but some equipment vendors have already expanded the protocol support to include Novell, AppleTalk, Vines, and DECnet. The benefit of the RFC is to simplify network configuration.

**RFC 1315** This Request For Comment is the frame relay MIB (management information database), which standardizes what management information is made available on frame relay devices and where/how that information is accessed. This simplifies the process of integrating frame relay devices into your network monitoring and management process and programs.

**RFC 1490** This Request For Comment, RFC 1294, now renumbered RFC 1490, is for multiprotocol encapsulation. The bottom line benefits are to increase interoperability between frame relay devices from different vendors. This means that you can use one vendor's routers (or other equipment type) at some locations, and a different vendor's equipment at other locations. This ability to mix and match allows you to pick the best and most cost-effective tool for the job.

**RFC 1577** Under control of the IETF, Request For Comments (RFCs) are documents used to develop standards, procedures and specifications for TCP/IP. RFC 1577 is the document for classical IP.

**RFC 1695** Definitions of Managed Objects for ATM Management or ATM MIB.

**RFC 1918** This Request For Comment describes IP address space for building private networks, which is nowadays being used quite often for NAT. The reserved address spaces are: 10.0.0.0-10.255.255.255 (10/8 prefix), 172.16.0.0-172.31.255.255 (172.16/12 prefix) and 192.168.0.0-192.168.255.255 (192.168/16 prefix)

**RFC 2338** This Request For Comment describes the Virtual Router Redundancy Protocol (VRRP). See VRRP for lots of detail.

**RFC 822** This standard specifies a syntax for text messages that are sent among computer users on the ARPA Net (the precursor network to the Internet), within the framework of "electronic mail". The standard supersedes the one specified in ARPANET Request for Comments #733, "Standard for the Format of ARPA Network Text Messages". In this context, messages are viewed as having an envelope and contents. The envelope contains whatever information is needed to accomplish transmission and delivery. The contents compose the object to be delivered to the recipient. This standard applies only to the format and some of the semantics of message contents. It contains no specification of the information in the envelope. A distinction should be made between what the specification REQUIRES and what it ALLOWS. Messages can be made complex and rich with formally-structured components of information or can be kept small and simple, with a minimum of such information. Also, the standard simplifies the interpretation of differing visual formats in messages; only the visual aspect of a message is affected and not the interpretation of information within it. Implementors may choose to retain such visual distinctions. The formal definition is divided into four levels. The bottom level describes the meta-notation used in this document. The second level describes basic lexical analyzers that feed tokens to higher-level parsers. Next is an overall specification for messages; it permits distinguishing individual fields. Finally, there is definition of the contents of several structured fields. Messages consist of lines of text. No special provisions are made for encoding drawings, facsimile, speech, or structured text. No significant consideration has been given to questions of data compression or to transmission and storage efficiency, and the standard tends to be free with the number of bits consumed. For example, field names are specified as free text, rather than special terse

codes. A general "memo" framework is used. That is, a message consists of some information in a rigid format, followed by the main part of the message, with a format that is not specified in this document. The syntax of several fields of the rigidly-formatted ("headers") section is defined in this specification; some of these fields must be included in all messages. The syntax that distinguishes between header fields is specified separately from the internal syntax for particular fields. This separation is intended to allow simple parsers to operate on the general structure of messages, without concern for the detailed structure of individual header fields. In short, a message consists of header fields and, optionally, a body. The body is simply a sequence of lines containing ASCII characters. It is separated from the headers by a null line (i.e., a line with nothing preceding the CRLF— carriage return, life feed). [www.faqs.org/rfcs/rfc822.html](http://www.faqs.org/rfcs/rfc822.html)

**RFD** Request For Discussion. A period of time during which comments on a particular subject are solicited. An Internet term.

**RFF** Radio Frequency Fingerprinting. A process in which the radio signal information and characteristics produced by the transmitter are captured and analyzed by the receiver for purposes of detecting a cloned device from accessing the network. Bursts of control data are captured and analyzed using complex signaling techniques; the data is compared to the characteristics of the legitimate transmitter in order to determine whether access should be granted or denied. Primarily used in secure military applications, the technique has been evolving since WWII; it is being considered for application in cellular telephony.

**RFI 1.** Request For Information. General notification of an intended purchase of equipment or equipment and lines sent to potential suppliers to determine interest and solicit general descriptive product materials, but not prices or a formal request. See RFQ for a detailed explanation.

**2.** Radio Frequency Interference. All computer equipment generates radio frequency signals. The FCC regulates the amount of RFI a computing device can leak past its shielding. A Class A device is sufficient for office use. A Class B is a more stringent classification for home equipment use. See EMI and Radio Frequency Interference.

**RFID** Radio Frequency Identity. RFIDs are tiny chips and wireless radio antennas that can be embedded into products and used for various identification purposes. The first application I read of was the idea of embedding them into banknotes as another protection against counterfeiting. (Other security features on bank notes include holograms, foil stripes, special threads, microprinting, special inks and watermarks.) RFID is a contactless solution that works with proximity readers. There are two high level versions – those that actually store data and those that simply store a reference key for lookup on a host system. Both have specific applications. They also come in highly secure variations as well. The actual proximity varies with the type of RFID solution in use. For example, longer distance RFID are being used on some toll highways and toll bridges and tunnels. In and around New York, they're called EZ-Pass. Exxon/Mobil uses them to help its customers buy gas faster. They're called SpeedPass. RFIDs were also used in a local marathon in ankle bracelets that were attached to every competitor and were readable at various points of the race including the finish line. Some RFIDs need batteries – and that's their weakest link. The newer RFIDs don't need batteries, which means they don't have to be replaced regularly. See RFID Tag.

**RFID ink** An ink whose chemical properties cause it to emit a set of radio frequencies when struck by electromagnetic waves from an RFID reader. Since each chemical in the ink emits its own unique radio frequency, varying the combination of chemicals in the ink enables a large number of frequencies to be produced. One RFID ink has been manufactured that uses 70 different chemicals, each of which is assigned its own position in a 70-digit binary number. RFID ink is used to produce chipless RFID tags that are painted onto paper, wood and other materials. One company has tested a biocompatible RFID ink to create chipless RFID tags, which the company calls RFID tattoos, on cattle and laboratory rats.

**RFID tag** A microchip attached to an antenna that picks up signals from and sends signals to a reader. The tag contains a unique serial number, but may have other information, such as a customer's account number. Tags come in many forms, such smart labels that are stuck on boxes; smart cards and key-chain wands for paying for things; and a box that you stick on your windshield to enable you to pay tolls without stopping. RFID tags can be active tags, passive tags or semi-passive tags.

**RFID tattoo** A chipless RFID tag made out of a biocompatible ink that is injected into tissue to create a unique tattoo that can be read by a non-line-of-sight RFID reader. Possible applications include tagging livestock, laboratory animals, pets, and cuts of meat. See also RFID ink.

**RFID virus** As a proof of concept, researchers in the Netherlands have developed a virus that is spread via RFID. The virus is encoded in the firmware of an RFID tag. When the tag is scanned by an RFID reader, the malicious code is picked up by the reader and delivered to a back-end application server or database, where it executes.

## Transaction Capabilities Application Part • transfer time

**Transaction Capabilities Application Part** TCAP. The application layer protocol of SS7. Transaction capabilities in the SS7 protocol are functions that control non-circuit related information transferred between two or more signaling nodes. Definition from Bellcore in reference to its concept of the Advanced Intelligent Network.

**transaction detail** The detail of a transaction record.

**transaction engines** If you sell on your site, you need an application that allows the customer to configure an order and pay by credit card or other means. These systems let you manage product and buyer information, and usually link to third parties that process the credit-card transactions. These are called transaction engines.

**Transaction Internet Protocol** TIP. The Transaction Internet Protocol protocol ensures that multivendor transaction monitors will work with one another to complete transactions over the Internet (RFC 2371). TIP came from a joint Microsoft/Tandem effort. I excerpted the following from a Microsoft Market Bulletin.

Two companies (Microsoft and Tandem) team have combined to publish a specification for a two-phase commit protocol to make it easier for businesses to do transaction processing across the Internet. Two-phase commit is the commonly-used application protocol used by high-end system software – including Transaction Processing (TP) Monitors and databases – to coordinate the work of multiple applications on different computers as a single unit, or transaction. Businesses want to link existing transaction processing systems together across the Internet using two-phase commit protocols, but existing implementations of two-phase commit are too complex for use on the Internet. TIP is designed to solve this problem, defining a simple protocol that existing vendors of TP Monitors and databases can easily implement into their products, solving the problem of transaction coordination across the Internet. Microsoft will implement TIP in the Distributed Transaction Coordinator (DTC), Microsoft's transaction manager that first shipped with SQL Server 6.5. DTC currently supports other open two-phase commit protocols, including OLE Transactions, the X/Open's XA protocol, and has future plans to support SNA LU 6.2 Sync Level 2. Windows NT Server 5.0 will provide native support for TIP. Tandem will support TIP in its NonStop systems. Both the reference implementation and the TIP specification can be downloaded directly from [www.microsoft.com/pdc](http://www.microsoft.com/pdc) or [www.tandem.com/menu\\_pgs/swr\\_pgs/swrnews.htm](http://www.tandem.com/menu_pgs/swr_pgs/swrnews.htm). Microsoft and Tandem have submitted the TIP specification to the Internet Engineering Task Force, who have published it at <http://ds.internic.net/internet-drafts/draft-tyon-tp-nodes-00.txt>.

**transaction file** A collection of transaction records. A transaction data entry program allows for the creation of new transaction files used to update the data base.

**transaction link** Rockwell's link from its Galaxy ACD to an external computer. See Open Application Interface.

**transaction tracking** Your software keeps track of each transaction as it happens. And if a component of your network fails, your transaction tracking software backs out of the incomplete transaction. This allows you to maintain your database's integrity. You may, however, lose the single transaction you were working on when your network got sick.

**transaction processing** A processing method in which transactions are executed immediately when they are received by the system, rather than at some later time as in batch-processing systems. Airline reservation databases and automatic teller machines are examples of transaction-processing systems.

**transactional integrity** A term that describes how your computing/telecom system handles making sure that the transaction you just made is solid and clean and that the next time you want to get to the results of the transaction you can. "Transactional integrity" becomes critical when you're storing bits and pieces of your transactions on different media, in different places. For example, you might want to store your data on a magnetic hard drive and your associated images on a separate optical drive.

**Transborder Data Flow** TDF. Transborder data flows are movements of machine-readable data across international boundaries. TDF legislation began in the 1970s and has been put into effect by many countries in an attempt to protect personal privacy of citizens. This term has particular meaning as it relates to electronic commerce or EDI and is becoming more and more relevant with the use of the Internet as a means to conduct global business.

**transeiver** 1. Any device that transmits and receives. In sending and receiving information, it often provides data packet collision detection as well.

2. In IEEE 802.3 networks, the attachment hardware connecting the controller interface to the transmission cable. The transeiver contains the carrier-sense logic, the transmit/receive logic, and the collision-detect logic.

3. A device to connect workstations to standard thick Ethernet-style (IEEE 802.3).

**transeiver cable** In local area networks, a cable that connects a network device

such as a computer to a physical medium such as an Ethernet network. A transeiver cable is also called drop cable because it runs from a network node to a transeiver (a transmit/receiver) attached to the trunk cable. See Transeiver.

**transcoder** A device that combines two 1.544 megabit per second bit streams into a single 1.544 megabit per second bit stream to enable transmission of 44 or 48 voice conversations over a DS-1 medium.

**transcoding** A procedure for modifying a stream of data carried so that it may be carried via a different type of network. For example, transcoding allows H.320 video encoding, with and be transmitted across packet switched ethernet LAN.

**transcriptionist** A person who listens to a tape recording and types the words he hears. The word, transcriptionist, derives from the verb to transcribe. The most common employment of transcribers is in the medical industry, where busy doctors talk into tape recorders telling good and bad news of their patients. And even busier transcriptionists type those words into the patient's medical records, or whatever.

**transducer** A device which converts one form of energy into another. The diaphragm in the telephone receiver and the carbon microphone in the transmitter are transducers. They change variations in sound pressure (your voice) to variations in electricity, and vice versa. Another transducer is the interface between a computer, which produces electron-based signals, and a fiber-optic transmission medium, which handles photon-based signals.

**transfer** A telephone system feature which provides the ability to move a call from one extension to another. It is probably the most commonly used and misused feature on a PBX. Before you buy a PBX, check out how easy it is to transfer a call. If you have a single line phone, you should simply hit the touch hook, hear a dial tone and then dial the chosen extension number and hang up. This sounds easy in principle, but many people find it difficult since they associate the touch hook with hanging up the phone. Some companies have gotten around this by putting a "hook flash" button on the phone itself. Such a button is like having an autodial button which just makes the exact short tone you make when you quickly hit the hook flash button. An even better solution is an electronic phone with a button specially marked "transfer," or a button next to a screen which lights up "transfer." Failing to efficiently transfer a call is the easiest way to give your customers the wrong impression of your firm. Think of how many times have you called a company only to be told it wasn't the fellow's job and he will transfer the call, but "If we get cut off, please call Joe back on extension 2358." There are typically four types of Transfer: Transfer using Hold, Transfer using Conference, and Transfer with and without Announcement.

**transfer callback** A phone system feature. After a specified number of rings, an unanswered transferred call will return to the telephone which originally made the transfer.

**transfer delay** A characteristic of system performance that expresses the time delay in processing information through a data transmission system.

**transfer impedance** A measure of shield effectiveness.

**transfer mode** A fundamental element of a communications protocol, transfer mode refers to the functioning arrangement between transmitting and receiving devices across a network. There are two basic transfer modes: connection-oriented and connectionless. Connection-oriented network protocols require that a call be set up before the data transmission begins, and that the call subsequently be torn down. Further, all data are considered to be part of a data stream. Examples of connection-oriented protocols include analog circuit-switched voice and data, ISDN, X.25 and ATM.

Connectionless protocols, on the other hand, do not depend on such a process. Rather, the transmitting device gains access to the transmission medium and begins to transmit data address to the receiver, without setting up a logical connection across the physical network. LANs (e.g. Ethernet and Token Ring) make use of connectionless protocols, as does SMDS, which actually is an extension of the LAN concept across a MAN (Metropolitan Area Network). For more detail, see Connection Oriented and Connectionless Mode Transmission.

**transfer protocols** Protocols are all of the packaging that surround actual user data to tell the network devices where to send the data, who it comes from, and how to tell if it arrived. Transfer protocols are designed for the efficient moving of larger chunks of user data.

**transfer rate** The speed of data transfer – in bits, bytes or characters per second – between devices.

**transfer switch** Usually a switch which reverses two input-output combinations.

**transfer time** A power backup term. Transfer time can refer to either the speed to which an off-line UPS transfers from utility power to battery power, or to the speed with which an on-line UPS switches from the inverter to utility power in the event of an inverter failure. In either case the time involved must be shorter than the length of time that the

**wire speed** The rate at which bits can be transmitted over a circuit or link, which generally is considered to be a wired circuit comprising one or more metallic or glass conductors, but which also may be wireless. For example, the wire speed of Ethernet is 10 Mbps, 100 Mbps, or 1 Gbps. Ethernet standards specify the medium (e.g., Cat 3 or Cat 5 UTP, optical fiber, or RF (Radio Frequency) or Ir (Infrared) wireless); the maximum and minimum allowable distances; the bit encoding scheme; and other specifics of the "wire." Wire speed generally is more closely related to signaling speed than to actual transmission speed, or throughput. Actual throughput depends on many factors, including how many devices of what specific types and what specific capabilities are associated with the circuit. All devices impose some level of delay on the signal. The more complicated the processes performed by a given device, the greater the level of delay, and oftentimes the less efficiently the circuit potential is used (i.e., the greater the difference between throughput and wire speed). To put this in context, bridges are very simple devices which accomplish very simple processes and which, therefore, typically impose very little delay. As one moves up the food chain to switches, routers and gateways, the level of complexity increases, and the level of delay increases, as well. As wire speed is a fundamental imperative of system designers, the implementation of processes in silicon and the optimization of software components is of the utmost importance in order that system throughput match wire speed as closely as possible. See also Throughput.

**wire stripper** A tool which takes the insulation off a wire without hurting the inside metal conductor.

**wire tap** The attaching to a phone line of a piece of equipment whose job is to record all conversations on that phone line. Wire taps are illegal. Law enforcement agencies use them, but must receive authorization from a court to apply the tap. Such authorizations are given if the law enforcement agency argues that applying the tap will prevent crime or help bring a suspected criminal to justice. Wire taps are not authorized lightly. See also Tap and Trace.

**wire telephony** The transmission of speech over wires.

**wire wrap and solder** Soldering and wire wrap dominated early cable connections. Some old buildings still have large boards of wire wrapped or soldered connections. Wire wrap is still used in telephone company-related applications, but solder for cross-connections is obsolete and not seen today.

**Wired Equivalent Privacy** See WEP.

**wired for capacity** The wired-for capacity represents the upper limit of capacity for a particular configuration. To bring to a phone system to its "wired for capacity," all that's necessary is to fill the empty slots in the system's metal shelving (its cage) with the appropriate printed circuit boards. "Wired-for Capacity" is a marginally useful term, giving little indication of the type of printed circuit boards - trunk, line, special electronic line, special circuit, etc. - that can be installed. And many PBXs allow only their printed circuit boards to go into assigned slots. Your PBX cabinet might, for example, have plenty of empty space for extra printed circuit boards, but it may not have any more space for boards which service electronic phones. Thus, it is effectively maxed out.

**Wired For Management** WFM. See WFM.

**wired logic** A required logic function implemented in hardware, not software.

**wired love** A novel published in 1879 by Ella Cheever. It was about a long-distance romance between telegraph operators.

**wired radio** Radio programming delivered over wire (like Muzak) or cable.

**wireless** Without wires. Any system of transmitting and receiving information without wires. That system could be anything from your cellphone to your 802.11b-equipped laptop. It could be your wireless headset. See the following chart and also 802.11a, 802.11b, CDMA, cellular radio, GSM and the wireless definitions following.

**Wireless Access Controller** The first component in an in-building wireless phone system is the wireless access controller. It does many things. It provides access to the host network, be it a host PBX or the public switched telephone network (including Centrex). The access controller also manages the picocellular infrastructure of the wireless system through connections to the radio base stations. See also handoff.

**Wireless Application Protocol Forum** In January, 1998, Ericsson, Motorola, Nokia and Unwired Planet announced the establishment of the Wireless Application Protocol Forum Ltd. This non-profit company will administer the worldwide WAP specification process and facilitate new companies contributing to WAP specification work. According to the press release announcing the establishment of the Forum, the Wireless Application Protocol (WAP) is targeted to bring Internet content and advanced services to digital cellular phones and other wireless terminals. WAP Forum aims to create a global wireless protocol specification that works across differing wireless network technology types, for adoption by appropriate industry standards bodies. Applications using WAP will be scaleable across a va-

riety of transport options and device types. A common standard offers potential economies of scale, encouraging cellular phone and other device manufacturers to invest in developing compatible products. Cellular and other wireless network carriers and content providers will be able to develop new differentiated service offerings as a way to attract new subscribers. Consumers will benefit through more and varied choices in mobile communications applications, advanced services and Internet access. In addition to the four founding partners, new members are now welcome to join WAP Forum. Members may contribute to the current specification work, participate in driving the continuing evolution of WAP and nominate and elect additional directors to the board of WAP Forum. In order to become members of WAP Forum, interested companies need to apply to join. All the details including the application form can be found at [www.wapforum.org](http://www.wapforum.org) and [www.xwap.com](http://www.xwap.com).

**Wireless Assisted Global Positioning System** WAGS. See GPS.

**wireless backhaul** Wireline links - typically T-1 lines (E-1 lines in Europe) - that wireless operators use to connect their wireless base stations back to their mobile switching centers.

**wireless cable** An oxymoron which means that TV signals are broadcast by microwave to antennas on customers' homes. The former name for wireless cable was MMDS, short for Multichannel Multipoint Distribution Service.

**wireless cable service** An oxymoron term if there ever was one, but it does have an industry definition: A wireless broadcast service providing cable-TV-like entertainment video channels, received at a subscriber's site by a small parabolic antenna or dish. It is an encompassing term, covering the specific services of Microwave Distribution Service (MMDS), Direct Broadcast Satellite (DBS) and Cellular Television. See also Fixed Wireless Local Loop.

**wireless card** Most laptops have a slot or two into which you can plug something called a PC card, or what was once called a PCMCIA card. You can plug in cards which connect you to a wireless network (local or long distance), which connect to digital RAM (e.g. from digital cameras) or cards that drive several external monitors. If the PC Card connects you to a wireless network (e.g. Wi-Fi), it's often called a wireless card.

**Wireless Competitive Access Providers** WCAPS. See Fixed Wireless Local Loop.

**Wireless Data Forum** WDF. A not-for-profit organization dedicated to publicizing successful wireless data applications and customer communities. WDF membership includes network service providers, wireless device and infrastructure equipment manufacturers and vendors, computer software and hardware developers, and information services content providers. [www.wirelessdata.org](http://www.wirelessdata.org).

**wireless data network** A radio-based network for data transmission. Cellular Digital Packet Data (CDPD) is an example.

**wireless digital standards** See Digital Wireless Standards.

Wireless Technologies Compared				
Formats	Power	Max range	Max speed	Frequency Band
802.11a	32mW	150-175 ft	54 Mbps	5.15 - 5.825 GHz
802.11b	32mW	300-350 ft	11 Mbps	2.4 - 2.483 GHz
802.11g	32mW	300-350 ft	54 Mbps	2.4 - 2.483 GHz
Bluetooth	1mW	33 ft	1 Mbps	2.4 - 2.483 GHz
Ultra-wideband*	155mW	33 or 300 ft	480 Mbps	3.1 - 10.6 GHz
WiMAX*	na	up to 30 miles	to 70 Mbps	10 - 60 GHz

\* Not fully defined yet

**Wireless E-911 Phase I / Phase II** Refers to the technology and services mandated by FCC Report and Order 96-264 pursuant to Notice of Proposed Rulemaking (NPRM) 94-102. The FCC requirement applies to all cellular and PCS service providers, and those Specialized Mobile Radio carriers that provide public voice service with telephone network interconnection.

Phase I defines delivery of a wireless emergency 911 call with call-back number and identification of the cell and sector from which the call originated. This allows the call to be routed to an appropriate public service answering point (PSAP) based on caller's general position. Without Phase I capabilities, wireless calls are routed to some default service agency, e.g., the state highway patrol. The required Phase I availability date was April 1998, but at this time (early 1999) many public service agencies have not upgraded their equipment to accept the Phase I information and still employ default, or non-selective, call routing.

Phase II defines delivery of a wireless 911 call with Phase I requirements, plus location of the caller within 125 meters 67% of the time. In addition, the call is routed to the ap-