Quality Excellence for Suppliers of Telecommunications Forum (QuEST Forum)

TL 9000 Quality Management System

Measurements Handbook Appendix A

Release 4.0

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Appendix A Product Category Tables – Release 4.0

The Product Category Tables listed below are part of the TL 9000 standard. This is Release 4.0 of Appendix A of the Measurements Handbook. It may be used effective February 1, 2007 for submitting TL 9000 data dated January 2007 forward and must be used for submitting data dated July 2007 forward until superseded by the next revision.

Each revision is an approved release by the QuEST Forum and is identified by a release number. The latest release of these tables and their effective dates are available via the TL 9000 website and shall be used in conjunction with registrations per the rules noted in 4.1.1.

Organizations shall classify their products and report measurements according to the product categories listed in Table A-1. The Measurement Applicability Table (Normalized Units), Table A-2, lists specific measurements that apply to each category as well as the normalized units and other information necessary for compiling measurement reports.

a) List of Tables

b) Rules for Classification of Products

1) The definitions of product categories in Table A-1 shall be used by organizations in categorizing their products.
2) An organization shall not classify a product in multiple product categories. Therefore, any product from an organization must be classified in exactly one product category.
3) General-purpose products, such as computers, shall be classified by specific function, e.g., signaling, when provided as a system designed for that function. Otherwise, they shall be classified in a separate category, for example, Common Systems-Computers, designed for the general-purpose product.
4) A product shall be classified according to its primary function. For example, a digital transmission facility product with performance monitoring will be classified as a transmission product instead of an operations and maintenance product.
5) The standard for classification is the product category, not the possible uses for the product. For example, if a product classification falls in the Outside Plant category, all products that are consistent with that category will be classified as such, even if the exact same product is sometimes used in the customer premises and even if a particular organization's product is sold primarily into the customer premises market.

c) Principles for Construction of the Product Category Table

1) Product categories shall be defined so that they can be clearly assigned within a hierarchy of classification.
2) There are well-established rules for classification.
3) Product categories should not be separated artificially if they can be logically aggregated.
4) Product categories should have clear definitions, which lend themselves to unambiguous interpretation.
5) For each category, the level to which measurements may be aggregated shall be defined.
6) Each product category specification shall consist of standard elements.
7) The placement of the product in the hierarchy will reflect the dominant use of the product.
8) Terminology used shall reflect standard technical meanings; wherever possible aligned to relevant standards such as ITU-T, ETSI, ANSI, etc.

Table A-1 Product Category Definitions

Table A-1 Product Category Definitions			
Category Code	Category Name	Definition	Examples
1	***Switching***	***Equipment for the physical or virtual interconnection of communication channels in response to a signaling system. The switching category is broadly defined to include packet or circuit switched architectures.***	
1.1	Circuit Switch	Equipment for the **termination of subscriber lines and/or trunk lines and the dynamic interconnection of these ports** or channels in a digital transmission facility. A circuit switch establishes a dedicated circuit, as opposed to a virtual circuit, in response to a signal. Stored Program Control (SPC) is the most common type of switching equipment used at end offices and tandem offices. These systems use either analog or digital switching. The switching system used must have the capability to send, receive and be actuated by signals, e.g., access line signals, or inter-office in-band or common-channel signaling. This category includes all circuit switches regardless of transmission medium, i.e., wireline or wireless.	• End-office • Tandem • Tandem access • Remote • Service switching point (SSP) • Mobile switching center (MSC)
1.2	***Packet Switch***	***Equipment for switching or routing data on virtual, as opposed to dedicated, circuits. The service is packet switched in that the customer's data are transported as a sequence of data blocks (packets) that do not exceed a specified size. This packetization permits data from many data conversations to share a given transmission facility economically through statistical multiplexing. Such data conversations are known as virtual circuits, which are full duplex and connection-oriented.***	

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Table A-1 Product Category Definitions			
1.2.1	Legacy Packet Products	Equipment **providing X.25 packet or frame relay switch capability**. This includes Public Packet Switched Network (PPSN) equipment. The frame relay equipment is switching equipment that operates at Open Systems Interconnection (OSI) Level 2 (hardware) to move variable-length Frame Relay frames over virtual circuits from source to destination.	• X.25 packet switch • Access concentrator/PAD • Frame relay switch
1.2.2	Access Multi-service	Equipment that switches **packetized data** from source to destination that **includes the capability to connect to the circuit switched traffic network.** The packet data may include variable length IP (Internet Protocol) and/or fixed length ATM packets. These systems include circuit switched trunks/network interfaces (DS1, E1, T1, DS#, STM-1, OC-x, VC-12, etc.), tributary interfaces and line/customer side interfaces (POTS, ISDN, xDSL, GigE, PBX, DS1/E1, etc.).	• Access switch • ATM switch • Gateway GPRS support node • Serving GPRS support node • Packet data serving node • Services edge router • Multi-service data switch • Wireless gateway • Trunk gateway • Access gateway • Multi-service gateway • Line gateway
1.2.3	Not currently used		
1.2.4	Not currently used		
1.2.5	Not currently used		
1.2.6	Not currently used		
1.2.7	Application Servers	Equipment that provides **IP based multimedia services**.	• Video over IP • Instant messaging • Voice features • Multi-media communications server • Media gateway

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1.2.8	Service and Network Controller (SNC)	Equipment that combines a Call Connection Agent (CCA) and possibly a signaling gateway (SG) and/or a service agent into one system. The CCA provides the necessary call processing functionality to support voice traffic on the core packet network including call control commands and communication with billing systems. A service agent supports supplementary services and generates TCAP messages to interact with Service Control Points for intelligent network services such as 800 and Local Number Portability. (Note: if the signaling gateway is not integrated with the CCA, the product belongs in product category 2.2 Common Channel Signaling.)	• Service and network controller (SNC) • Softswitch • Nextgen switch
1.2.9	***Routers***	***Equipment that transports and/or routes packet data from source to destination. This may include variable length IP (Internet Protocol) and/or fixed length ATM packets. This equipment is connected to multiple physical packet networks and routes or delivers packets between the networks. Routing generally uses software algorithms to optimize one or a combination of data-transport "measurements" such as delay, the use of reliable paths, "hops" between servers, etc. Routers do not include termination of PSTN traffic or any other connection to the circuit switched network.***	
1.2.9.1	Core	Packet **transport and routing** equipment primarily intended for use in the core of the packet network connecting other packet network elements together. This equipment is intended to provide high reliability and availability.	• IP core router • Broadband multi-service • Protocol converters
1.2.9.2	Edge	Packet **routing** equipment primarily intended for use at the edge of the packet network connecting customer premise equipment into the network.	• IP edge router

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2	*Signaling*	***Equipment for the provision of signaling, i.e., states applied to operate and control the component groups of a telecommunications circuit to cause it to perform its intended function. In generally, there are five basic categories of signals commonly used in the telecommunications network: supervisory signals, information signals, address signals, control signals, and alerting signals. This category includes those signaling products that function within the telecommunications network and excludes possibly similar products that normally provide enhanced services outside the network, or on the customer premises such as ACD, IVR, or voice messaging systems.***	

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2.1	Service Control (formerly Service Control Point (SCP))	A hardware and software system providing a signaling point that functions as a **database to provide information to another service control network element or Service Switching Point (SSP)**. Transaction Capabilities Application Part (TCAP) queries and responses are used to communicate with the network element as is done for 800 Data Base Service and Alternate Billing Service (ABS). These may support one or more services per network element and they may be deployed singularly as stand-alone nodes, as mated pairs, or as multiple replicates (more than 2) to increase their availability. They are associated with applications that consist of service-specific software and a database of customer-related information. This product category includes conventional Service Control Point (SCP) equipment, plus other platforms such as service nodes, intelligent peripherals, or service resource facilities, which may combine capabilities of a SCP, SSP or that may be used to provide Advanced Intelligent Network (AIN) functionality or other enhanced services within the network. It also includes Source Based Routing (SBR) which consists of a Routing Database (RDB); a logical routing directory component that an originating Call Server accesses to convert external routing information, such as a dialed telephone number, into internal destination IP routing information. The Routing Database may be based around DNS and ENUM technology; the ENUM server may be used to provide a translation from dialed digits to corresponding SIP URI, from which the Call Server may provide the IP address which is used by call control to send a SIP message to a subsequent call server, which may or may not be an entity in the same network domain.	• Service control point • Service nodes • Service resource facilities • Source based router

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Table A-1 Product Category Definitions			
2.2	Common Channel Signaling (formerly Signaling Transfer Point (STP))	Hardware/software signaling equipment with common channel signaling (CCS) functionality to support a variety of applications: CCS Signal Transfer/Router (i.e. STP - MTP, SCCP), CCS link terminations (i.e. end office, tandem office, wireless office, etc.), and CCS packet interconnect (MTP, IPS7).	• Signaling transfer point • Signaling relay point • End/Tandem/Wireless office standalone CCS7 NE • Signaling gateway
2.3	Home Location Register (HLR)	Equipment to **provide a permanent database used in wireless applications to identify a subscriber and to contain subscriber data related to features and services**. It stores information such as service profiles, location and routing information for roamers, service qualification, interface for moves, adds and changes. It communicates with other HLRs and provides access to maintenance functions such as fault information, performance data, and configuration parameters.	• Home location register
2.4	Service Logic (SL)	The set of software instructions stored in SCP for **handling TCAP messages**. (TCAP is the Transactional Capabilities Application Part of the CCS application protocol of ISDN providing the signaling function for network databases.) When triggered, these instructions execute the appropriate service logic for messages. Service Logic software may be provided by an entity other than the SCP supplier.	• Service logic
3	***Transmission Systems***	***Equipment for the connection of the switched and interoffice networks with individual customers. An integral part of the distribution network is the loop that connects the customer to the local central office (CO), thus providing access to the interoffice network.***	

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Table A-1 Product Category Definitions			
3.1	***Transmission Media and Structure (Outside Plant)***	***Products used to interconnect and physically support the various parts of the telecommunications network. This includes products typically referred to as belonging to the "outside plant" such as cables, supporting structures, and certain equipment items such as load coils along with other equipment types as noted below.***	
3.1.1	***Transmission Medium***	***Fiber optic cable, metallic cable, or other physical medium for the transmission of analog or digital communications.***	
3.1.1.1	***Metallic Products***	***Metallic as opposed to optical or wireless transmission media.***	
3.1.1.1.1	Metallic Conductor Cable	Metallic pairs of conductors housed in a protective cable.	• Metallic cable • Central office coaxial cable • Hybrid coaxial/twisted pair drop
3.1.1.1.2	Metallic Connectors	Devices used to terminate a metallic cable.	• Coaxial connectors • Coaxial distribution connectors
3.1.1.2	***Fiber Optic Cable Products***	***Optical, as opposed to metallic or wireless transmission media.***	
3.1.1.2.1	Fiber Optic Cable	Cables wherein light is propagated and any associated covering.	• Loose tube cable • Single tube bundled cables • Single tube ribbon cables • Tight buffered cables • Indoor fiber optic cables
3.1.1.2.2	Optical Connectors	Device used to terminate an optical cable.	• Optical connectors (e.g., SC, ST, MT, etc.)
3.1.1.3	***Transmission Sub-systems***	***Sub-systems embedded in the transmission medium other than cable or connectors***	
3.1.1.3.1	Active Sub-systems	Active sub-systems containing electronics.	• Coaxial drop amplifiers • Fiber optic data links

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3.1.1.3.2	Passive Optical Sub-systems	Optical sub-systems containing no electronics. This includes passive optical modules containing two or more individual passive optical sub-systems or systems.	• Optical passive wavelength division multiplexer (PWDM) • Optical add drop multiplexers • Combined optical couplers/splitters/filters
3.1.1.3.3	Ancillary Sub-systems	Other transmission sub-systems not specifically covered in other transmission component categories. Typically passive.	• Surge protectors • Bonding and grounding hardware or ground wire • Taps • Electronic line filters
3.1.1.3.4	***Fixed Antenna Sub-systems***	***Sub-systems for the transmission and receipt of telecommunication signals through the air.***	
3.1.1.3.4.1	Radio Antenna Systems	A system for the transmission and receipt of terrestrial radio waves consisting of an antenna (dish or pole), supporting structure, LNA, transmit horn, coaxial cable and/or waveguide.	• Microwave antenna system • Fixed wireless antenna system
3.1.1.3.4.2	Satellite Antenna Systems	A system for the transmission and receipt of radio waves to and from satellites consisting of an antenna dish, supporting structure, LNA, transmit horn, and/or receiver/transmitter equipment.	• Satellite antenna system
3.1.1.3.4.3	Optical Transmission Antenna Systems	A system for the transmission and receipt of optical signals through free air consisting of an antenna, supporting structure, and/or receiver/transmitter equipment.	• Optical antenna system
3.1.2	***Physical Structure***	***Physical structures for the support of telephone transmission media.***	
3.1.2.1	Enclosures	Enclosures for network equipment located in the outside plant.	• Fiber optic splice enclosures • Optical network unit (ONU) enclosures • Organizer assemblies • Seal assemblies • Controlled environment vaults • Pedestals

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3.1.2.2	Support Structures	Products for the physical support of transmission media or enclosures.	• Telephone poles • Microwave/radio towers
3.1.2.3	Conduits	Channels for the containment of optical fiber or metallic cable.	• Innerduct • Multi-bore conduit • PVC pipe
3.2	***Transport Equipment***	***Equipment located in the central office or at the customer premises, but inside the network demarcation point, for the transmission of digital or analog communication over transmission media. This product category includes equipment for terminating, interconnecting, and multiplexing communications circuits.***	
3.2.1	***Cross Connect Systems***	***Equipment to provide a physical termination point for physical cables and individual conductors. They can be manual or automated, metallic or optical. Cross-connect systems, such as distributing frames, Digital Signal Cross Connects (DSXs) and Fiber Distributing Frames (FDFs) provide the following basic functions: cross-connection of network distribution facilities and equipment in the central office, electrical protection for conductive media, test access, temporary disconnection, and termination points for facilities and equipment.***	
3.2.1.1	Manual Cross Connect Systems	Equipment to provide a physical termination point for physical cables and individual conductors where changes in connections are performed manually. These can be metallic or optical systems such as distributing frames or Fiber Distributing Frames (FDFs) provide the following basic functions: cross-connection of network distribution facilities and equipment in the central office, electrical protection for conductive media, test access, temporary disconnection, and termination points for facilities and equipment.	• Digital signal cross connect panel (DSX) • Fiber distribution frame (FDF) • Feeder distribution interface (FDI)

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Table A-1 Product Category Definitions			
3.2.1.2	Digital Cross Connect Systems	Equipment to provide a physical termination point for physical cables and individual conductors where changes in connections are performed electronically. These systems provide electrical cross-connection of network distribution facilities and equipment in the central office, electrical protection for conductive media, test access, temporary disconnection, and termination points for facilities and equipment. They may interface to the network either optically or metallically.	• Digital cross-connect system (DCS) • Electronic DSX
3.2.1.3	Optical Cross Connect Systems	Equipment to provide a physical termination point for physical cables and individual conductors where changes in connections are performed using an all optical matrix according to an electronically alterable memory map. These systems provide cross-connection of network distribution facilities and equipment in the central office at an optical level.	• Active optical DSX
3.2.2	***Carrier Systems/ Multiplexers***	***Equipment for transmitting multiple communication channels over a single transmission facility. This category includes equipment for transmission over interoffice trunks, for example, from central to remote offices.***	
3.2.2.1	***Interoffice/ Long Haul***	***Equipment for transmission between central offices, between exchanges, or between carriers, as opposed to transmission between an end office and a remote location, typical of a loop carrier.***	
3.2.2.1.1	Metallic Carrier Systems	**Carrier** system that uses metallic transmission medium.	• Analog carrier (N-, L- carrier) • D4, D5 digital carrier
3.2.2.1.2	***Optical Carrier System***	***Carrier system that uses optical transmission medium.***	
3.2.2.1.2.1	SONET/SDH Transport Systems	Fully featured **digital transmission** system using optical medium	• OC-3, 12, 48, or 192 SONET equipment configurable as linear or ring • Similar for STM-x SDH equipment

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3.2.2.1.2.2	WDM/DWDM/ Optical Amplification	Shelf level systems used for multiplexing, de-multiplexing, or amplification of **optical signals.** Lack the built in protection, electrical conversion and other features of a SONET Transport System.	• Wavelength division multiplexer (WDM) • Dense wavelength division multiplexer (DWDM)
3.2.2.1.3	Microwave	Carrier system that employs fixed **microwave transmission**.	• 6, 8, 11, 18, or 40 gigahertz microwave radio
3.2.2.2	Loop Carrier	Equipment for deploying multiple **voice or digital channels** over fewer physical channels than would be otherwise required (a "pair gain" function). Loop carriers are typically digital systems that employ time-division multiplexing (TDM) but may include analog systems as well. Loop carrier systems consist of a Central Office Terminal (COT) located near the switching system, a Remote Terminal (RT) located near the customer to be served and a transmission facility connecting the COT to the RT. Individual communications circuits (such as POTS and Foreign Exchange (FX)) are accepted as separate inputs at the COT (RT), time-division multiplexed (in a digital loop carrier) by the loop carrier system and reproduced at the RT (COT). There is an analog-to-digital (A/D) conversion of analog inputs to the DLC and these signals, which are carried digitally within the DLC, undergo a digital-to-analog (D/A) conversion when output at the COT or RT. The transmission facility used by a loop carrier may be metallic cable pairs, repeated metallic cable pairs, or optical fibers.	• Digital loop carrier (DLC) • Universal digital loop carrier (UDLC) • Subscriber Line Concentrator (SLC) remote terminal • Integrated digital loop carrier • Analog loop carrier

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3.2.3	Line Terminating Equipment/ Distributing Frames	Equipment to provide the termination point for voice-grade and voice-grade compatible facilities and equipment in a central office. It is composed of protectors, connectors and terminal strips or blocks. Distributing frames are categorized as either conventional or modular.	• Tall conventional distributing frames • Low-profile conventional distribution frames (LPCDFs) • Conventional protector frames • Combined main distributing frame (CMDF) • Subscriber main distributing frame (SMDF) • Trunk main distributing frame (TMDF) • Intermediate distributing frame (IDF) • Tie-pair distributing frame (TPDF). • Office repeater bays
3.2.4	Digital Subscriber Line (DSL)	Equipment for the transport of high-speed digital data on the embedded copper plant. DSL typically operates over non-repeatered, POTS-like, conditioned unloaded loops out to Carrier Serving Area (CSA) ranges. This product category includes central office and remote concentrator units and supporting equipment. Simple regenerators or range extenders should be placed in another appropriate category such as 3.2.2.1.1 Metallic Carrier.	• ISDN • HDSL • ADSL • DDS
3.2.5	Fiber to the User	Equipment for the bi-directional transport of telecommunications signals over optical fiber between the central office, remote digital loop carrier or other network node and the end user.	• Fiber to the home (FTTH) • Fiber to the user (FTTU) • Passive optical networks (PON)
3.2.6	***Cable Transmission***	***Equipment for analog or digital transmission to the subscriber unique to co-axial cable based systems.***	

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3.2.6.1	Cable Modem Termination Equipment	Equipment to provide the **interface between cable modem subscribers and the network.**	• Cable modem server
3.2.6.2	Analog Cable Transmission Equipment	Equipment used in the **transmission of analog cable video signals.** This includes central office and remote based transmitters, receivers, and repeaters but not customer premise equipment.	• Analog CATV transmitters • Analog CATV repeaters • Analog CATV head end equipment
3.2.6.3	Digital Video Cable Transmission Equipment	Equipment used in the transmission and manipulation of MPEG formatted Video signals located at a cable head end and hub locations but not customer premise equipment.	• Digital video multiplexer • Digital video transrater • Digital video router • Digital video ad splicer • Cable video server • Digital video modulator
3.3	***Wireless Transmission***	***Equipment for analog or digital transmission to the subscriber unique to wireless services. This category does not include interoffice or long haul wireless carrier systems such as long haul microwave transmission***	
3.3.1	Base Station Equipment	Equipment that provides the **interface between wireless systems and the Public Switched Telephone Network (PSTN).** It provides, for example, electrical signaling isolation as well as switching, routing, billing, and features capabilities. It provides subsystems for vocoding and selecting hand off decision.	• BSC • BSS
3.3.2	Base Transceiver System (BTS)	Equipment that provides the **radio link to the mobile subscribers**. It is connected to the BSC though a backhaul interface between the BSC and BTS for both vocoded and overhead packet traffic. This includes terminals and repeaters.	• BTS • Wireless repeaters

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3.3.3	Pilot Beacon Unit (PBU)	Equipment whose primary purpose is to **transmit an ANSI J-STD-008 Pilot channel and ANSI J- STD-008 Sync channel and a partial ANSI J-STD-008 Paging channel.** The PBU is intended to notify a mobile unit of a change in CDMA coverage and can be used to assist in the execution of cellular CDMA-AMPS and inter-frequency CDMA-CDMA hand-off. It is designed with the capability for extended temperature and environmental operation ranges.	• Pilot beacon unit (PBU)
3.3.4	WLAN Base Station Equipment	Equipment that provides the **wireless data interface (such as IEEE 802.11) to wireless data network mobile subscribers.**	• Wireless mesh point • Wireless data access point • Wireless mesh network access point
3.3.5	Wireless Location Services	Equipment that provides location-based services for wireless networks. The primary function of this equipment is to **provide location information for emergency service calls such as E911** but may also be used for other location-based services.	• Mobile location center
4	***Operations & Maintenance***	***Equipment and systems for the management, upkeep, diagnosis and repair of the communications network.***	
4.1	***Test Systems***	***Equipment to support testing of the network. This category includes permanently installed equipment used to provide a centralized test capability or local test access, as opposed to portable equipment, as might be carried by a craftsperson.***	
4.1.1	Test Access Equipment	Equipment to provide test access to transmission circuits. Test access equipment is in series with the customer circuit at all times and therefore directly affects the circuit reliability. This equipment is designed with transmission equipment issues in mind. This equipment may have analog and perhaps a variety of digital (i.e., T1, E1) types.	• In-line test equipment

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Table A-1 Product Category Definitions			
4.1.2	Test Equipment, Embedded	Equipment to perform tests on transmission circuits. This equipment is designed with transmission equipment issues in mind. Test equipment is NOT generally in series with the customer circuit and may be connected to a variety of access equipment and network elements with integral access features. This equipment may have analog and perhaps a variety of digital (i.e., T1, E1) types. Failure of this equipment doesn't bring down customer circuits; however, it inhibits the ability to maintain the network and to restore lost service.	• Monitoring equipment • Parallel test equipment
4.1.3	Test Support Software	Computer software that runs on a general purpose computer (office environment) and perhaps the maintenance network that the computer uses to **communicate with the CO access and test equipment.**	• Network test software
4.2	***Operations Support Systems***	***Systems that provide TMN (Telecommunication Management Network) compliant, flexible, scaleable, and interoperable solutions to automate service activation, service assurance, and network capacity management processes to worldwide existing and emerging network services and equipment providers.***	
4.2.1	On-line Critical	Real time **network management systems**, demanding high availability, typically 24 hours a day and 7 days per week.	• Network traffic management • Surveillance of 911 • Fire alarms
4.2.2	On-line Non-critical	Real time **network management systems** with lower availability demands than on-line critical systems.	• Provisioning • Dispatch • Maintenance
4.2.3	Off-line	Traditional **business systems** that are run off line sometimes in batch mode, typically overnight, and do not have high availability expectations.	• Inventory • Billing records • Service creation platform

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Table A-1 Product Category Definitions			
4.3	Ancillary Operations and Maintenance	**Tools, test equipment,** and other **specialized products** used to support the operations and maintenance of the communications network but not part of the permanent network.	• Optical splicers • Single fiber fusion splicers • Mass fiber fusion splicers • Mechanical splicers • Portable test equipment • Optical connector tools • Cleavers
5	***Common Systems***	***Any of a variety of specialized generic, shared equipment to support network elements. Common systems include power systems and the Network Equipment-Building System (NEBS) that provides space and environmental support for network elements. These systems are located in central offices and remote building locations.***	
5.1	Synchronization	Equipment for operating digital systems at a common clock rate **(frequency synchronization).** This category includes primary reference sources and other timing signal generators that produce a timing signal traceable to Universal Coordinated Time (UTC).	• Stratum 1, 2, 3E domestic, TNC, LNC and Type 1 International • GPS timing receivers, cesium, loran, or CDMA RF pilot timing reference generators.

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Table A-1 Product Category Definitions			
5.2	General Purpose Computers	A category reserved for computer complexes (one or more interconnected machines) that perform **general business function**s but that do not provide any telephony transmission or storage service to telecom customers, or that may provide such services, but are not sold to the customer as part of a system designed exclusively for that purpose. The purposes to which such machines may be put include but are not limited to: • Accounting systems • Billing systems • Legal systems • Ordering systems • Business Information systems • HR functions • Engineering and support functions • Marketing and Sales functions	• Terminals • PCs • Workstations • Mini, mid, mainframes
5.3	Power Systems	Equipment for the provision of **power to network equipmen**t. Power systems provide two principal functions: the conversion of the commercial AC power source to DC voltages required by the network equipment and the generation and distribution of emergency (reserve) power when the commercial power is interrupted. This category also includes the ringing plant, a redundant plant that supplies the ringing voltage, frequency, tones, and interrupter patterns.	• AC rectifiers/battery chargers • Battery systems • Uninterruptible power supplies (UPS) • DC to AC inverters • DC to DC bulk converters • AC and DC switch gear • Ring generator • Power distribution panels
6	***Customer Premise and Enhanced Services***	***Equipment installed beyond the network demarcation point. Although commonly installed on the subscriber's premises, equipment with essentially identical function installed in the service provider's facility may also be classified as customer premises equipment.***	

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Table A-1 Product Category Definitions			
6.1	Enhanced Services Platforms (Intelligent Peripherals)	Hardware/Software systems that provide an environment in which service-specific application programs can execute and an infrastructure by which those application programs can provide enhanced services. Although each enhanced services platform has a corresponding service creation environment, that creation environment may be packaged separately and may execute on a different platform. This includes: • equipment used to allow menu **navigation and information retrieval**, often from legacy databases external to the IVR platform itself, • equipment for **storage and retrieval of voice and/or fax messages**, • unified/universal messaging systems that provide a subscriber the means, from a given device, to manipulate messages originated on like or different devices, and • Advanced Intelligent Network (AIN) nodes that add **voice band capabilities** to the AIN functional suite via communication with the SCP either directly or via message handoffs through the SSP running in the SCP through the invocation of IP related Service Independent Building Blocks (SIBBs).	• Interactive voice response IVR • Voice mail systems • Unified/universal messaging • Intelligent peripheral (AIN IP)
6.2	***Terminal Equipment***	***Equipment connected to the network demarcation point that provides a service to the subscriber. Terminal equipment includes telephone sets, whether wireline, cordless, cellular, PCS, or other voice terminals, fax machines, answering machines, modems, data service units (DSUs), or ISDN terminal adapters.***	
6.2.1	***Voice Terminals***	***Conventional, wireless, cellular, PCS, or other voice terminal equipment.***	
6.2.1.1	Wireline Telephone Sets	Telephone sets connected to conventional wireline (POTS) circuits.	• POTS telephone sets • Cordless telephones

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Table A-1 Product Category Definitions			
6.2.1.2	Wireless Subscriber User Terminals	The subscriber user terminal made to transmit and receive voice and/or data communication using Telecommunication Infrastructure equipment not requiring hard lines as a means of transport. User terminals may be of any functional technology available for public use.	• Wireless single mode user terminal • Wireless mobile user terminal • Wireless stationary user terminal • Wireless multi-mode user terminal • Wireless multi-purpose user terminal • Wireless Global user terminal
6.2.2	Fax Equipment	Equipment for sending or receiving facsimile (fax) over conventional voice-grade lines.	• Stand alone fax machines • Combined fax/printers/copiers
6.2.3	Data Modems	Equipment for digital communications over copper lines (standard 4-wire, co-axial or power).	• DSL modem • V.90 modem • Cable modem • VoIP terminal adapter • BPL modem
6.2.4	Digital Data Service Units	Equipment for the interconnection of data terminal equipment (DTE) with a digital communications service. Such equipment typically provides a network interface and one or more DTE interfaces and may be configurable.	• DDS CSU/DSU • ISDN CSU/DSU • ISDN terminal adapter • T1 CSU DSU
6.2.5	Passive Optical Network Termination Units	Equipment installed at the subscriber site for connection to a passive optical network.	• Optical Network Termination (ONT)
6.2.6	Multi-play Equipment	Equipment used to provide consumer interface for voice, data, and video equipment. The device may also incorporate a wireless option	• DSL/VoIP/Cable combined box • DSL/VoIP/Cable/Router (wired and/or wireless combination box • DSL/VoIP/Satellite combined box • DSL/VoIP/Satellite/Router (wired and/or wireless) combination box • Set top box

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Table A-1 Product Category Definitions			
6.2.7	CPE Router	Packet routing equipment designed primarily for home or small office use to connect consumer computing, video, and IP phone equipment to the IP network. This equipment may have wireless network capability.	• 4 port router • Wireless home router
6.3	Automatic Call Distribution (ACD) Systems	Equipment for the **distribution of incoming calls** to any of a number of destinations based on some programmed logic. ACD systems are typically used in Customer Support service or sales centers.	• Automatic call distribution (ACD) system
6.4	Private Branch Exchange (PBX)	Equipment to provide **circuit switched voice and fax communications** services, optimized for medium to large sized customer sites. Now is evolving to utilize ATM and IP networks and support multimedia communications.	• Private branch exchange (PBX)
6.5	Small Communications System (Key Telephone System)	Equipment to provide **circuit switched voice and fax communications services**, optimized from small to medium sized customer sites. This is now evolving to utilize IP networks.	• Electronic key system • Simple attendant system
6.6	Network Security Devices	Equipment that provides security solutions for enterprises and service providers. This includes hardware and/or software security applications to protect against Worms, Trojans, Viruses and other malware.	• Fixed and dial virtual private networks (VPNs) • Firewalls • Intrusion detection and prevention • Content security

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Table A-1 Product Category Definitions			
7	*Services*	*In addition to purchasing tangible hardware or software products, customers may also acquire service from an organization. Services include activities such as network engineering, installation and commissioning, product maintenance, network operation, etc., where the organization is responsible for the conduct of the activity in accordance with customer defined requirements. Services may be thought of as the result generated by activities at the interface between the organization and the customer and by the organization's internal activities to meet the customer needs.* *NOTES:* • *The interface between the customer and the organization may be represented by personnel or equipment.* • *Customer activities at the interface with the organization may be essential to the service delivery.* • *Delivery or use of tangible products may form part of the service delivery.* • *A service may be linked with the manufacture and supply of tangible product.* • *A contracted service is one where a legal agreement is reached between the customer and the organization to provide a service. Contracted services are services offered for sale to companies outside of the organization's company or its subsidiaries.* • *An internal service is a service activity performed for internal customers within the same company as the organization.*	
7.1	*Network Installation & Provisioning*	*Contracted or internal services to install and/or provision equipment within the network.*	

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Table A-1 Product Category Definitions			
7.1.1	Installation	Contracted or internal services to position, configure, remove, and/or adjust a hardware/software product within the network.	• New equipment installation • Expansion installation • Upgrade installation • Equipment removal
7.1.2	Provisioning	Contracted or internal services to provision end-user services or end-use equipment.	• Provisioning • Set-up
7.2	***Engineering Service***	***Contracted service to provide engineering activities.***	
7.2.1	Network Engineering Service	Contracted or internal service to provide engineering activities such as the layout, configuration, positioning, connecting, and adjusting of product modules to create a system. This activity may also include the writing of associated engineering documentation.	• Network or site engineering
7.2.2	Software Development Service	Contracted service to develop and/or test software programs or sub-routines.	• Contracted software development
7.2.3	Hardware Development Service	Contracted service to develop and/or test electronic subassemblies, circuit packs, sub-systems or systems.	• Contracted board design
7.2.4	Telecom Network Integration Service	Contracted or internal service to manage the selection and integration of products into a network.	• Network integration
7.2.5	Metrology and Calibration	Contracted or internal service to provide measurement standards and/or test equipment calibration.	• Metrology • Calibration
7.2.6	Telecom Test Laboratory	Contracted or internal service for verification, certification and/of network compatibility testing.	• Verification lab • Certification lab • Network compatibility lab

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Table A-1 Product Category Definitions			
7.3	Maintenance Service	Contracted or internal service to maintain network equipment and/or systems. These services are limited to activities typically considered part of the service provider's standard maintenance efforts such as Network Operations Center (NOC) operations, Plug-in Inventory Control (PIC) center operations, network field maintenance activities, etc. These exclude warranty and standard maintenance activities performed in support of a particular product by the product OEM.	• Network operations center (NOC) • Field maintenance • System troubleshooting • FRU replacement
7.4	Repair Service	Contracted service to repair customer's equipment and/or systems.	• Repair of returned FRUs or systems
7.5	Customer Support Service	Contracted service to process customer requests. This service may include call answering, response to general inquiries, information requests, and information sharing. When the customer support service center also handles product problem reports, those problem reports shall be included in the appropriate product category measurements and not in this category.	• Call center • Web-based support • Dispatch center
7.6	***Purchasing Services***	***Services for the procurement of material, equipment and services***	
7.6.1	Procurement Services	Contracted services for the procurement of reuse and new equipment.	• Refurbishment/retest
7.6.2	Sourcing/ Purchasing Services	Services provided by internal organizations for the procurement of products on behalf of their parent organizations. These activities may include preparation of contracts, product and/or supplier qualification, and ongoing supplier management.	• Purchasing department • Supply chain organization
7.7	***Manufacturing Services***	***Services for the manufacture or distribution of assemblies and equipment***	
7.7.1	Small assemblies	Contracted service for the manufacture of small electronic or electromechanical assemblies having no more than ten major components.	• Contract manufacturer
7.7.2	Printed Circuit Board Assembly	Contracted service for the manufacture of electronic printed circuit board assemblies.	• Contract PCB manufacturer

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Table A-1 Product Category Definitions			
7.7.3	Cable Assembly	Contracted service for the manufacture of internal and/or external connectorized metallic or fiber optic cable assemblies.	• Contract cable manufacturer
7.7.4	Electromechanical Assembly	Contracted service for the manufacture of electromechanical or mechanical assemblies. Typically these assemblies contain printed circuit board assemblies, backplanes, cables, shelves and/or cabinets. These assemblies may be complex and could include fully equipped and populated racks or enclosures.	Contract manufacturing of • Fan assemblies • Cabinets • Equipment shelves
7.7.5	***Logistical Services***	***Services for the storage and distribution of products and materials***	
7.7.5.1	Logistical Services, Third Party	Contracted service for the distribution of products between suppliers and customers. This includes logistical services such as warehousing, transportation and delivery or general distribution services where the order for the product is placed with the distributor and not the original supplier.	• Warehousing • Electronic parts distributors • System distributors
7.7.5.2	Logistical Services, Internal	Internal services for the storage and distribution of material within the organization or to its customers. This includes logistical services such as receiving, warehousing, transportation, shipping, and delivery.	• Logistics department • Shipping and receiving department
7.8	***Business Services***	***Services to provide general business support functions***	
7.8.1	Financial Services	Contracted or internal service to provide financial support functions such as pricing, accounts payable, accounts receivable, payroll and human resources databases.	• Finance
7.8.2	Contract/Temp-orary Staffing	Contracted service to provide short term staffing.	• “Temp” agency
7.8.3	Training	Contracted or internal service to develop and/or conduct employee or customer training.	• Training
7.8.4	Fleet Logistics	Contracted or internal service to operate and maintain the vehicles used by a telecom company.	• Fleet logistics • Motor pool
7.9	General Support Service	Contracted or internal service that is not included in another product category.	

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Table A-1 Product Category Definitions			
7.10	Consulting Service	Contracted services offered on an assignment basis, with or without association to specific products or services, to support business/public organizations in the deployment or support of quality/information/data systems as well as other web-based applications.	• Consulting
7.11	Customer Assistance	Services offered to all customer types, to provide service support and information, to aid in the finding of call recipients and in making calls.	• Directory assistance • Yellow pages • Operator assistance
8	***Components and Sub-assemblies***	***Individual components or assemblies provided for use in telecommunications systems excluding those already covered by a specific product category in another product family. These items are typically used by other suppliers and not sold directly to service providers except as replacement parts.***	
8.1	***Hardware Components***	***Individual self-contained active or passive devices without separable parts not included in another product category***	
8.1.1	Discrete semiconductors	Components typically performing a single function in electronic circuits, the purpose of which is switching, amplifying, or rectifying and transmitting signals.	• Diodes • Transistors • Optoelectronic devices
8.1.2	Integrated circuits	A single structure containing many circuits and functions on a chip. These devices typically contain a considerable amount of intellectual property.	• ASIC's • FPGA's • Microprocessors
8.1.3	Passive Components	Components that are used to store electrical charges, to limit or resist electrical current, and for filtering, surge suppression, measurement, timing, and tuning.	• Resistors • Capacitors • Inductors
8.1.4	Electro-mechanical	Electromechanical devices not covered by another Product Category such as 3.1.1.1.x, 3.1.1.2.x, 8.1.1, 8.1.2, 8.1.3, 8.5.2.1, or 8.5.2.2	• Relays • Bare PCB's • Switches

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Table A-1 Product Category Definitions			
8.2	***Electronic Assemblies***	***A device made up of a number of components for use in a telecommunications system. This device is a portion of the completed system, but does not comprise the entire system.***	
8.2.1	Simple	Less than 11 components or 49 electrical connections excluding connectors	• VCXOs • Bandpass filters • MW circulators
8.2.2	Medium Complexity	More than 10 components or 48 electrical connections but less than 51 components or 241 electrical connections excluding connectors.	• Multi die hybrids • DC/DC converter “bricks”
8.2.3	High Complexity	More than 50 components or 240 electrical connections but less than 501 components or 2401 electrical connections excluding connectors	• Medium sized printed circuit assemblies • Backplane assemblies
8.2.4	Very High Complexity	More than 500 components or 2400 electrical connections excluding connectors	• Single board computers
8.3	Cable Assemblies	Internal and/or external connectorized metallic or fiber optic cable assemblies	• Telco • D-Sub • Coax • Harnesses
8.4	Electro-mechanical Assemblies	Devices or assemblies that are mechanical or electrical-mechanical in nature. Typically, the electromechanical assemblies contain PCBAs, backplanes, cables and/or cable assemblies. These assemblies may be complex and could include fully equipped and populated racks or enclosures.	• Fan assembly • Rack assemblies • Cabinets • Equipment shelves

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Table A-1 Product Category Definitions			
8.5	***Optical Fiber and Devices***	***This category of products includes optical fiber utilized in the manufacture of telecommunications cabling media and devices, opto-electronics components modules and subassemblies deployed in optical networks and ancillary electronic devices. They are used specifically to support the functioning of optical networks and are typically supplied to optical cablers or optical equipment system integrators. They are generally not sold directly to telecommunication service organizations.***	
8.5.1	Optical Fiber	A filament of transparent dielectric material, usually glass or plastic and usually circular in cross section that guides light.	• Single Mode Fiber • Multimode Fiber
8.5.2	***Optical Devices***	***Devices that are used specifically to support the functioning of optical networks***	
8.5.2.1	Optoelectronic Devices	A device that is responsive to, or that emits or modifies electro-magnetic radiation, in the visible, infrared, and/or ultraviolet spectral regions. JEDEC Standard No. JESD 77-B 2/2000.	• Lasers (VCSELs, LEDs, DFBs, FP) • Laser diodes • Photodetectors • Photo diodes • OSAs (ROSAs and TOSAs)
8.5.2.2	Passive Optical Devices	A class of optical devices that either channels or filters an optical signal among ports in a non-variable predetermined fashion. It does not contain an optical source, detector or optoelectronic transducer of any kind and does not require external power. TIA/EIA 6200000 of 12/94 or Telcordia 1209.	• Isolators • Filters • Splitters • Mirrors • Lenses • Passive multiplexer • Passive demultiplexer

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Table A-1 Product Category Definitions			
8.5.2.3	Optical Subassemblies	Stand-alone or "drop-in" products that perform a complete optical operation and may contain passive and/or optoelectronic devices. These subassemblies generally contain passive optical devices (8.5.2.1), active optical devices (8.5.2.2) and/or other types of components such as heaters, TECS, and standard electronic devices (8.1). These subassemblies are then used as part of an electronic assembly (8.2.x).	• Optical transmitter • Optical transceivers • Optical receiver • External modulator (packaged with a laser) • Fiber optic amplifiers/EDFAs • Repeaters • Transponders • Optical MEMs
8.6	***Software Components and Tools***	***Software programs, routines or sub-routines for use within other software programs or systems or for use in the development of other programs or systems.***	
8.6.1	Component Software	Software programs, routines or sub-routines sold for use in other software programs or systems.	• Protocol stacks • Operating systems • Sort routines • Database programs • Interface programs • Drivers
8.6.2	Software Development Tools	Software programs for use in the development or testing of other programs or systems.	• Compilers • Configuration management • Problem tracing and management • Complexity measurement tools • Website tools • Multimedia tools • Static analysis tools • Simulators • Measurement tools • Code coverage tools • Porting and conversion tools/services

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Table A-1 Product Category Definitions			
9	***End-Customer Products***	***End-user consumer and business customers acquire a vast variety of products from a service provider organization. These may be supplied on a buy, lease or rental basis and comprise components from hardware through to complex solutions or outsourced facilities management of a customer organization's entire telecommunications facilities.***	
9.1	Voice	Products offered to business/public customers and to consumers, to support voice communications and supplementary services.	• Fixed voice access • Local services calls • Long distance and international calls • Chargecard/calling cards • Voice over IP (VoIP)
9.2	Wireless	Products offered to business/public customers and to consumers, to support mobile communications and service needs.	• Mobile voice • Paging • Small message service (SMS) • GPRS/3G message/visuals • WAP protocol services
9.3	Transport Networks	Products provided to business customers or other operators, to allow them to connect two or more physical sites as a communications network, either through multiple point-to-point services, or via a multi-point network.	• International private leased circuit • Analogue private circuit • Managed bandwidth • X25 packet switching • Unbundled local loop

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Table A-1 Product Category Definitions			
9.4	Private Networks	Products designed and provided to allow business and/or public customer organizations to provide communications connections using specific network platforms or protocols, or to operate internal communications networks, whether for voice and/or data use. This may include a private network operated by an organization entirely internal to the company.	• VPN MPLS services • Metropolitan network services • Local area network (LAN) • Wide area network (WAN) • Virtual LAN (VLAN) • LAN extension (Gigabit Ethernet) • IP VPN • Frame relay services • Cell/ATM services • Short haul data services • Switched multi-megabit data • IP connectivity
9.5	Internet Access	Products offered to business, public organizations and to consumers, to provide them with access to Internet services and networks, at speeds and levels of availability appropriate to their needs.	• Fixed access – ISDN, DSL • Dial solutions • Fixed and dial VPNs • Security, e.g., firewalls • Certification • Internet service provider (ISP)
9.6	e-Business and Content Hosting	Chargeable products offered separately or as part of a solution to customers with data, Internet/Intranet and information systems needs.	• Hosting – dedicated, managed storage, co-location • Managed firewalls • Content distribution • Applications – eCRM, supply chain, e-learning, e-government • Subscription services – video, audio, or data
9.7	***Bulk Transport***	***Products provided to other licensed operators or carriers to allow them to operate networks or services, without necessarily owning 100% of their operating network.***	

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Table A-1 Product Category Definitions			
9.7.1	Infrastructure	Products to provide network infrastructure on a lease or rental basis, on long or short-term contracts.	• Wavelength • Dark fiber • Duct • Satellite services
9.7.2	Wholesale	Products provided to allow operators to trade traffic on a correspondent basis or to offer services without having to maintain a network of their own.	• Wholesale voice • Wholesale long distance • Wholesale IP • Outbound voice • Inbound voice
9.8	Video Broadcast Services	Products to provide broadcast video to subscribers	• Cable TV • Satellite TV • Video over fiber • IP TV

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Table A-2 Measurement Applicability Table (Normalized Units)

a) Measurements Without Normalization Factors
The measurements Fix Response Time (FRT), Overdue Fix Responsiveness (OFR), and On-Time Delivery (OTD) are applicable and required for ALL product categories. The measurements FRT, OFR and OTD do not require product specific normalization. In the interest of saving space, they are not listed in the following table, but data must be submitted for each of these three measurements in all product categories. Table A-2 defines the normalization units and applicability of the other measurements.

b) Other Rules and References

i) Where the normalization factor is traffic capacity based, such as DS1, OC-1, DSL or Terminations, the calculation shall be based on the true usable traffic capacity. Equipment within the system used to provide protection for the main traffic path shall not be included, as it does not add usable capacity to the system.

ii) The column headings in Table A-2 are general descriptions covering several sub-measurements in some cases. For cross-references to the detailed descriptions of the measurements elsewhere in this document, refer to the measurement and sub-measurement symbols in Table A-6.

iii) For some product categories it may not be clear what is to be considered a unit. The following is added as an aid for the listed categories:

7.6.1 – total quantity of items procured

7.9 – total quantity of items provided or supported

8.6.1 – copies/licenses issued

8.6.2 – simultaneous licensed users

iv) An optical channel, for the purposes of TL 9000 normalization factor calculation, is defined as an individual wavelength of light.

c) Measurement Summary Listing
Table A-6 is a listing of the measurements included in this handbook with the symbols used in data reporting, the applicability to hardware, software, and/or services (H, S, V), and a reference to the table in this handbook with data reporting details. The symbols listed here are referenced by the normalization unit and applicability table to clarify the general descriptions used as column headings.

Table A-2 Measurement Applicability Table (Normalized Units)

Product Category			Outage Measurements			Software Measurements	
Code	Description	Problem Reports	Service Impact	Network Element Impact	Return Rate	Software Fix Quality	Software Problem Reports
		H,S,V	H,S	H,S	H	S	S
TL 9000 Measurement Symbols (see Table A-6)		NPR	SO	SONE	FR	SFQ	SPR
1	***Switching***						
1.1h	Circuit Switch – all non-remotes including host systems	Network Element	Termination	Network Element	Termination	Required	Same as NPR
1.1r	Circuit Switch – remotes only	NA	Termination	Network Element	NA	NA	NA
Note :	All organizations registering in 1.1 shall report data for 1.1h and 1.1r in one data submission. If there are no remote applications for their particular product, then "NA" shall be entered in the 1.1r data. Data for measurements indicated "NA" for 1.1r is to be reported in combination with the host data in 1.1h.						
Note :	For MSC, terminations should equate to configured channels.						
1.2	***Packet Switch***						
1.2.1	Legacy Packet Products	Network Element	Network Element	NA	Termination	Required	Same as NPR
1.2.2	Access Multi-service	Network Element	Network Element	Network Element	Network Element	Required	Same as NPR
1.2.3	Not currently used						
1.2.4	Not currently used						
1.2.5	Not currently used						
1.2.6	Not currently used						
1.2.7	Application Servers	Network Element	Network Element	Network Element	Network Element	Required	Same as NPR
1.2.8	Service and Network Controller	Network Element	Maximum Configured Call Capacity	Network Element	Network Element	Required	Same as NPR
1.2.9	***Routers***						
1.2.9.1	Core	Network Element	Network Element	NA	Network Element	Required	Same as NPR

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Note 3 **Product categories listed in RED or *italicized* will be used for possible data aggregation only. Measurements must be submitted per the lower product category listing.**

Note 4 **If the normalization factor contains the word "shipped", then the quantity shipped in the 12 months ending prior to the month being reported shall be used.**

Table A-2 Measurement Applicability Table (Normalized Units)

Product Category			Outage Measurements			Software Measurements	
Code	Description	Problem Reports	Service Impact	Network Element Impact	Return Rate	Software Fix Quality	Software Problem Reports
		H,S,V	H,S	H,S	H	S	S
TL 9000 Measurement Symbols (see Table A-6)		NPR	SO	SONE	FR	SFQ	SPR
1.2.9.2	Edge	Network Element	Network Element	NA	Network Element	Required	Same as NPR
2	***Signaling***						
2.1	Service Control {Formerly Service Control Point (SCP)}	Network Element	Network Element	Network Element	Network Element	Required	Same as NPR
2.2	Common Channel Signaling {formerly Signaling Transfer Point (STP)}	Network Element	Network Element	Network Element	Network Element	Required	Same as NPR
2.3	Home Location Register (HLR)	Network Element	Network Element	Network Element	Network Element	Required	Same as NPR
2.4	Service Logic (SL)	Network Element	Network Element	Network Element	Network Element	Required	Same as NPR
3	***Transmission***						
3.1	***Transmission Media and Structure (Outside Plant)***						
3.1.1	***Transmission Medium***						
3.1.1.1	***Metallic Products***						
3.1.1.1.1	Metallic Conductor Cable	Finished product meters shipped	NA	NA	NA	NA	NA
3.1.1.1.2	Metallic Connectors	Units shipped	NA	NA	NA	NA	NA
3.1.1.2	***Fiber Optic Cable Products***						
3.1.1.2.1	Fiber Optic Cable	Finished product meters shipped	NA	NA	NA	NA	NA
3.1.1.2.2	Optical connectors	Units shipped	NA	NA	NA	NA	NA
3.1.1.3	***Transmission Sub-systems***						
3.1.1.3.1	Active Sub-systems	Unit	NA	NA	Unit	NA	NA

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Table A-2 Measurement Applicability Table (Normalized Units)

Product Category		Problem Reports	Outage Measurements		Return Rate	Software Measurements	
Code	Description		Service Impact	Network Element Impact		Software Fix Quality	Software Problem Reports
		H,S,V	H,S	H,S	H	S	S
TL 9000 Measurement Symbols (see Table A-6)		NPR	SO	SONE	FR	SFQ	SPR
3.1.1.3.2	Passive Optical Sub-systems	Unit	NA	NA	Unit	NA	NA
3.1.1.3.3	Ancillary Sub-systems	Unit	NA	NA	Unit	NA	NA
3.1.1.3.4	***Fixed Antenna Systems***						
3.1.1.3.4.1	Radio Antenna Systems	Network Element	NA	NA	Network Element	NA	NA
3.1.1.3.4.2	Satellite Antenna Systems	Network Element	NA	NA	Network Element	NA	NA
3.1.1.3.4.3	Optical Antenna Systems	Network Element	NA	NA	Network Element	NA	NA
3.1.2	***Physical Structure***						
3.1.2.1	Enclosures	Units shipped	NA	NA	Unit	NA	NA
3.1.2.2	Support Structures	Units shipped	NA	NA	Unit	NA	NA
3.1.2.3	Conduits	Meters shipped	NA	NA	Unit	NA	NA
3.2	***Transport Equipment***						
3.2.1	***Cross Connect Systems***						
3.2.1.1	Manual Cross Connect Systems	Network Element	NA	NA	DS1	NA	NA
3.2.1.2	Digital Cross Connect Systems	Network Element	DS1	Network Element	DS1	Required	Same as NPR
3.2.1.3	Optical Cross Connect Systems	Network Element	OC1	Network Element	OC1	*Required*	Same as NPR
3.2.2	***Carrier Systems/Multiplexers***						
3.2.2.1	***Interoffice/Long Haul***						
3.2.2.1.1	Metallic Carrier System	Network Element	DS1	Network Element	DS1	Required	Same as NPR
3.2.2.1.2	***Optical Carrier System***						
3.2.2.1.2.1	SONET/SDH Transport Systems	Network Element	OC-1	Network Element	OC-1	Required	Same as NPR
3.2.2.1.2.2	WDM/DWDM/Optical Amplification	Network Element	Optical Channel	Network Element	Optical Channel	Required	Same as NPR
3.2.2.1.3	Microwave	Network Element	DS1	Network Element	DS1	Required	Same as NPR

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Table A-2 Measurement Applicability Table (Normalized Units)

Product Category		Problem Reports	Outage Measurements		Return Rate	Software Measurements	
Code	Description		Service Impact	Network Element Impact		Software Fix Quality	Software Problem Reports
		H,S,V	H,S	H,S	H	S	S
TL 9000 Measurement Symbols (see Table A-6)		NPR	SO	SONE	FR	SFQ	SPR
3.2.2.2	Loop Carrier	Network Element	DS1	Network Element	DS1	Required	Same as NPR
3.2.3	Line Terminating Equipment/Distributing Frames	Network Element	NA	NA	Termination	Required	Same as NPR
3.2.4	Digital Subscriber Line (DSL)	Network Element	DSL	Network Element	DSL	Required	Same as NPR
3.2.5	Fiber to the User	Network Element	Subscriber	NA	Subscriber	Required	Same as NPR
3.2.6	***Cable Transmission***						
3.2.6.1	Cable Modem Termination Equipment	Network Element	Network Element	NA	Network Element	Required	Same as NPR
3.2.6.2	Analog Cable Transmission Equipment	Network Element	Network Element	Network Element	Network Element	Required	Same as NPR
3.2.6.3	Digital Video Cable Transmission Equipment	Network Element	Network Element	Network Element	Network Element	Required	Same as NPR
3.3	***Wireless Transmission***						
3.3.1	Base Station Equipment	Network Element	Maximum Configured Call Capacity	Network Element	Unit	Required	Same as NPR
3.3.2	Base Transceiver System (BTS)	Network Element	Maximum Configured Call Capacity	Network Element	Unit	Required	Same as NPR
3.3.3	Pilot Beacon Unit (PBU)	Network Element	Network Element	Network Element	Unit	Required	Same as NPR
3.3.4	WLAN Base Station Equipment	Network Element	Network Element	Network Element	Unit	Required	Same as NPR
3.3.5	Wireless Location Services	Network Element	Network Element	Network Element	Unit	Required	Same as NPR
4	***Operations & Maintenance***						
4.1	***Test Systems***						
4.1.1	Test Access Equipment	Network Element	NA	NA	Unit	Required	Same as NPR
4.1.2	Test Equipment, Embedded	Network Element	NA	NA	Unit	Required	Same as NPR

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Table A-2 Measurement Applicability Table (Normalized Units)

Product Category			Outage Measurements			Software Measurements	
Code	Description	Problem Reports	Service Impact	Network Element Impact	Return Rate	Software Fix Quality	Software Problem Reports
		H,S,V	H,S	H,S	H	S	S
TL 9000 Measurement Symbols (see Table A-6)		NPR	SO	SONE	FR	SFQ	SPR
4.1.3	Test Support Software	System	System	NA	NA	Required	Same as NPR
4.2	***Operations Support Systems***						
4.2.1	On Line Critical	System	System	System	System	Required	Same as NPR
4.2.2	On Line Non-Critical	System	System	System	System	Required	Same as NPR
4.2.3	Off Line	System	System	System	System	Required	Same as NPR
4.3	Ancillary Operations and Maintenance	Unit	NA	NA	Unit	NA	NA
5	***Common Systems***						
5.1	Synchronization	Network Element	Network Element	NA	Network Element	NA	NA
5.2	General Purpose Computers	Network Element	Network Element	NA	Network Element	Required	Same as NPR
5.3	Power Systems	Network Element	Network Element	NA	Unit	NA	NA
6	***Customer Premises and Enhanced Services***						
6.1	Enhanced Services	Network Element	Network Element	Network Element	Network Element	Required	Same as NPR
6.2	***Terminal Equipment***						
6.2.1	***Voice Terminals***						
6.2.1.1	Wireline Telephone Sets	Units shipped	NA	NA	Unit	Required	Same as NPR
6.2.1.2	Wireless Subscriber User Terminals	Units shipped	NA	NA	Unit	Required	Same as NPR
6.2.2	Fax Equipment	Units shipped	NA	NA	Unit	Required	Same as NPR
6.2.3	Data Modems	Units shipped	NA	NA	Unit	Required	Same as NPR
6.2.4	Digital Data Service Units	Units shipped	NA	NA	Unit	Required	Same as NPR
6.2.5	Passive Optical Network Termination Units	Units shipped	NA	NA	Unit	Required	Same as NPR

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Table A-2 Measurement Applicability Table (Normalized Units)							
Product Category			**Outage Measurements**			**Software Measurements**	
Code	**Description**	Problem Reports	Service Impact	Network Element Impact	Return Rate	Software Fix Quality	Software Problem Reports
		H,S,V	H,S	H,S	H	S	S
TL 9000 Measurement Symbols (see Table A-6)		NPR	SO	SONE	FR	SFQ	SPR
6.2.6	Multi-play Equipment	Units shipped	NA	NA	Unit	Required	Same as NPR
6.2.7	CPE Router	Units shipped	NA	NA	Unit	Required	Same as NPR
6.3	Automatic Call Distribution (ACD) Systems	Network Element	Network Element	NA	Network Element	Required	Same as NPR
6.4	Private Branch Exchange (PBX)	Network Element	Network Element	NA	Network Element	Required	Same as NPR
6.5	Small Communications System (Key Telephone System)	Network Element	Network Element	NA	Network Element	Required	Same as NPR
6.6	Network Security Devices	Network Element	Network Element	NA	Network Element	Required	Same as NPR

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Table A-2 Measurement Applicability Table (Normalization Units)							
Product Category							
Code	**Description**	Problem Reports H,S,V	Outage Frequency V	Return Rate H	Service Quality V		
					SQ		
TL 9000 Measurement Symbols (see Table A-6)		NPR	EIO	FR	Numerator	Denominator	Notes/Comments
7	***Services***						
7.1	***Network Installation and Provisioning***						
7.1.1	Installation	Job	Job	NA	Non-conforming audits	Audits	Audits performed at "installation" shall include organization caused installation engineering defects and installation defects. A nonconforming audit is one that fails to satisfy specified acceptance requirements.
7.1.2	Provisioning	Job	NA	NA	Defective Transactions	Transactions	Transaction is a provisioning task for a customer
7.2	***Engineering Service***						
7.2.1	Network Engineering Service	Job	Job	NA	NA		
7.2.2	Software Development Service	Contracted Items Delivered	NA	NA	NA		
Note:	The contracted items delivered are likely to be the same items tracked for the OTD measure.						
7.2.3	Hardware Development Service	Contract	NA	NA	NA		
7.2.4	Telecom Network Integration	Contract	NA	NA	NA		
7.2.5	Metrology and Calibration	Contract	NA	NA	Defective Transactions	Transactions	
7.2.6	Telecom Test Laboratory	Contracted Test	NA	NA	NA	NA	

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Note 4 **If the normalization factor contains the word "shipped", then the quantity shipped in the 12 months ending prior to the month being reported shall be used.**

Table A-2 Measurement Applicability Table (Normalization Units)							
Product Category							
Code	**Description**	Problem Reports H,S,V	Outage Frequency V	Return Rate H	Service Quality V		
					SQ		
TL 9000 Measurement Symbols (see Table A-6)		NPR	EIO	FR	Numerator	Denominator	Notes/Comments
7.3	Maintenance Service	Units maintained	NA	NA	Maintenance Callbacks	Maintenance Visits	Maintenance visits or callbacks shall not be counted if it is determined that they were attributable to incorrect information supplied by the customer as mutually agreed between parties. A maintenance visit is a site visit to a customer's location for the purpose of performing maintenance. A maintenance callback is a site visit to a customer's location for the purpose of maintenance rework.
7.4	Repair Service	Units repaired	NA	NA	Defective Repaired Units	Units repaired	Failure of any unit during the repair warranty period or within six months of return to the customer, whichever is longer, shall be counted as a defective repair unit.
7.5	Customer Support Service	Support requests	NA	NA	Unsatisfactory Support Request Responses	Support Requests	Customer Support Center activities that become customer originated problem reports are not included in this measure.
7.6	***Purchasing Services***						
7.6.1	Procurement Services	Unit	NA	Unit	NA		
7.6.2	Sourcing/Purchasing Services	Transactions	NA	NA	Defective Transactions	Transactions	
7.7	***Manufacturing Services***						
7.7.1	Small assemblies	Units shipped	NA	Unit	NA		

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Table A-2 Measurement Applicability Table (Normalization Units)							
Product Category							
Code	**Description**	Problem Reports H,S,V	Outage Frequency V	Return Rate H	Service Quality V		
					SQ		
TL 9000 Measurement Symbols (see Table A-6)		NPR	EIO	FR	Numerator	Denominator	Notes/Comments
7.7.2	Printed Circuit Board Assembly	Units shipped	NA	Unit	NA		
7.7.3	Cable Assembly	Units shipped	NA	Unit	NA		
7.7.4	Electromechanical Assembly	Units shipped	NA	Unit	NA		
7.7.5	***Logistical Services***						
7.7.5.1	Logistical Services, Third Party	Order	NA	NA	NA		
7.7.5.2	Logistical Services, Internal	Order	NA	NA	NA		
7.8	***Business Services***						
7.8.1	Financial Services	Transaction	NA	NA	Defective Transactions	Transactions	
7.8.2	Contract/Temporary Staffing	Position filled	NA	NA	Defective Transactions	Transactions	
7.8.3	Training	Course	NA	NA	Defective Transactions	Courses	
7.8.4	Fleet Logistics	Vehicle	NA	NA	Defective Transactions	Vehicles	
7.9	General Support Service	Unit	NA	NA	Defective Transactions	Transactions	
7.10	e-Business Consulting	Assignment	NA	NA	NA	NA	
7.11	Customer Assistance	Transaction	NA	NA	NA	NA	

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Note 3 **Product categories listed in RED or *italicized* will be used for possible data aggregation only. Measurements must be submitted per the lower product category listing.**

Note 4 **If the normalization factor contains the word "shipped", then the quantity shipped in the 12 months ending prior to the month being reported shall be used.**

Table A-2 Measurement Applicability Table (Normalized Units)					
Product Category					
Code	**Description**	Problem Reports H,S,V	Return Rate H	Software Measures S	
TL 9000 Measurement Symbols (see Table A-6)		NPR	FR	SFQ	SPR
8	***Components and Subassemblies***				
8.1	***Components***				
8.1.1	Discrete semiconductors	Units shipped	NA	NA	NA
8.1.2	Integrated circuits	Units shipped	NA	NA	NA
8.1.3	Passive Components	Units shipped	NA	NA	NA
8.1.4	Electromechanical	Units shipped	NA	NA	NA
	Important information for the categories noted.	***Formerly the products in 8.2.1, 8.2.2, 8.2.3, 8.2.4, 8.3, and 8.4 were provided by two types of organizations:*** ***a) Organizations that design and develop the product for general sale on the open market. The activities of these organizations include full support of the product before and after the sale*** ***b) Contract manufacturing organizations that build these products for another company. The receiving company is responsible for support of the product.*** ***The type b organizations were moved to Section 7 – Services and are no longer included in the Section 8 categories. This is to better reflect that contract manufacturing is a service. Including these activities in the Components and Subassemblies Section 8 led to confusion.***			
8.2	***Electronic Assemblies***				
8.2.1	Simple	Units shipped	Unit	NA	NA
8.2.2	Medium Complexity	Units shipped	Unit	NA	NA
8.2.3	High Complexity	Units shipped	Unit	NA	NA
8.2.4	Very High Complexity	Units shipped	Unit	NA	NA
8.3	Cable Assemblies	Units shipped	Unit	NA	NA
8.4	Electromechanical Assemblies	Units shipped	Unit	NA	NA
8.5	***Optical Fiber and Devices***				

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Table A-2 Measurement Applicability Table (Normalized Units)					
Product Category					
Code	**Description**	Problem Reports H,S,V	Return Rate H	Software Measures S	
TL 9000 Measurement Symbols (see Table A-6)		NPR	FR	SFQ	SPR
8.5.1	Optical Fiber	Finished product meters shipped	NA	NA	NA
8.5.2	***Optical Devices***				
8.5.2.1	Opto-electronic Devices	Units shipped	Unit	NA	NA
8.5.2.2	Passive Optical Devices	Units shipped	Unit	NA	NA
8.5.2.3	Optical Subassemblies	Units shipped	Unit	NA	NA
8.6	***Software Components and Tools***				
8.6.1	Software Components	Unit	NA	NA	NA
8.6.2	Software Development Tools	Unit	NA	NA	NA

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Note 4 **If the normalization factor contains the word "shipped", then the quantity shipped in the 12 months ending prior to the month being reported shall be used.**

Table A-2 Measurement Applicability Table (Normalized Units)								
Product Category								
Code	**Description**	Problem Reports H,S,V	Service Impact Outages H,S,V	Software Measures S		Service Quality V		
						SQ		
TL 9000 Measurement Symbols (see Table A-6)		NPR	SO	SFQ	SPR	Numerator	Denominator	Notes/ Comments
9	***End-Customer Products***							
9.1	Voice	Active Phone Numbers	Terminations	NA	NA	Defective Calls	Call Attempts	
9.2	Wireless	Network Capacity (Mobile)	Network Capacity (Mobile)	NA	NA	Dropped Calls	Total Call Minutes	
9.3	Transport Networks	Trunk	Trunk	NA	NA	NA		
9.4	Private Networks	10 MB Bandwidth	10 MB Bandwidth	NA	NA	NA		
9.5	Internet Access	Subscriber Port	Subscriber Port	Required	Same as NPR	NA		
9.6	e-Business & Content Hosting	Hosted Customer Sites	Hosted Customer Sites	Required	Same as NPR	Maintenance Callbacks	Maintenance Visits	
9.7	***Bulk Transport***							
9.7.1	Infrastructure	Channel	Channel	NA	NA	NA		
9.7.2	Wholesale	Channel	Channel	NA	NA	NA		
9.8	Video Broadcast	Subscriber	Subscriber	NA	NA	NA		

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Note 3 **Product categories listed in RED or *italicized* will be used for possible data aggregation only. Measurements must be submitted per the lower product category listing.**

Note 4 **If the normalization factor contains the word "shipped", then the quantity shipped in the 12 months ending prior to the month being reported shall be used.**

Table A-3 Network Element Impact Outage Definitions

Table A-3 Network Element Impact Outage Definitions			
Product Category		Total Outage	Partial Outage
Number	**Name**		
All		A failure that results in the loss of functionality of the entire Network Element.	The loss of part of the capability or services of the network element but not all of the capability or services. Events, which qualify as total outages, are not counted as partial outages.
All	All where NE outage applicable	Unless otherwise stated below, an unscheduled event must be longer than 15 seconds to be considered an NE Impact outage	Unless otherwise stated below, an unscheduled event must be longer than 15 seconds to be considered an NE Impact outage
All	All where NE outage applicable	Unless otherwise stated below, a scheduled event must be longer than 15 seconds to be considered an NE Impact outage	Unless otherwise stated below, a scheduled event must be longer than 15 seconds to be considered an NE Impact outage
All	All where NE outage applicable		**Unless otherwise stated below, in cases of the loss of the primary function of the NE, the weighting of the duration of a partial outage shall be determined by the percent of the NE affected by the outage.**
All	All where NE outage applicable		**Unless otherwise stated below, the partial outage weight for all special services, functions or features are to be negotiated between the organization and the customer.**
1.1	Circuit Switch	Varies according to switch type as noted in the following	Default weight for loss of access to emergency services (i.e. 911) is 25%

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Table A-3 Network Element Impact Outage Definitions			
Product Category		Total Outage	Partial Outage
Number	**Name**		
1.1, cont'd	End Office (host or remote) and Tandem	Loss of origination and termination capability in all lines.	**Partial outages includes:** • Switch Isolation • Remote operating in isolation (default weight is 50%) • Loss of origination or termination capability in more than 64 terminations • Loss of access to one or more critical services • Loss of stable calls • System congestion problem that results in call blocking greater than 0.3% of call attempts • 85% or more of the service subscribers experience a dial tone delay or 3 seconds or greater • Loss of CCS (default weight is 50%)
1.1, cont'd	Combined Tandem/ End Office	Loss of origination and termination capability in all terminations.	Same as End Office
1.1, cont'd	Hybrid Voice Over Packet (HVOP)	Loss of capability to originate and terminate all traffic.	Partial TDM outage – same as End office above Partial Packet outage - • loss of an aggregate service bandwidth over 5% of the provisioned bandwidth **for more than 10 seconds** • interface switchovers that last **longer than 60 milliseconds** • Loss of access to one or more critical services • System congestion problem that results in call blocking greater than 0.3% of call attempts • Loss of stable connections • Total loss of a non-critical service • Total loss of one or more OA&M functions (default weight is 5%) • Total loss of visibility from the Element Management System (EMS) (default weight is 10%)

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Table A-3 Network Element Impact Outage Definitions			
Product Category		Total Outage	Partial Outage
Number	**Name**		
1.1, cont'd	MSC/ISC	Loss of all capacity for origination and/or termination of voice and data traffic.	• Loss of greater than 10% of the provisioned capacity for origination and/or termination of combined voice and/or data traffic. • Loss of access to one or more critical services • Loss of stable connections • Total loss of a non-critical service • Total loss of one or more OA&M functions (default weight is 5%) • Total loss of visibility from the Element Management System (EMS) (default weight is 10%)
1.2.2	Access Multi-service	Total network element outage is constituted by any of the following events: • Loss of all ability to transport packets between all interface points including loss of stable connections for a period **longer than one second**; • Total network element isolation **for more than 10 seconds** • Loss of all services for **longer than 10 seconds** • For a connection based network element, total loss of ability to set up or tear down connections for a period **longer than 10 seconds**.	• Loss of capability to originate and terminate more than 64 lines or trunks (DS0) • Loss of an aggregate service bandwidth over 5% of the provisioned bandwidth **for more than 10 seconds** or loss of more than 4MB of service bandwidth **for more than 5 minutes** • System congestion problem that results in call blocking greater than 0.3% of call attempts • System congestion which impacts greater than 5% of all session set-up attempts • Loss of all stable calls or sessions • 85% or more of the service subscribers experience a session delay of 3 seconds or greater for a period **longer than 30 seconds** Interface switchovers lasting **longer than 60 milliseconds** • Total loss of one or more but not all services (such as ISDN capability, DS1, POTS, etc.) **for more than 10 seconds** • Total loss of one or more OA&M functions (default weight is 5%) • Total loss of visibility from Element Management System (default weight is 10%)

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Table A-3 Network Element Impact Outage Definitions			
Product Category		Total Outage	Partial Outage
Number	**Name**		
1.2.7	Application Servers	Total loss of ability to provide IP based multimedia services	• Loss of more than 5% of the IP based multimedia services • Loss of stable service sessions • Total loss of one or more but not all services • System congestion which impacts greater than 5% of all session set-up attempts • 85% or more of the service subscribers experience a session delay of 3 seconds or greater for a period longer than 30 seconds • Interface switchovers lasting **longer than 60 milliseconds** • Total loss of one or more OA&M functions (default weight is 5%) • Total loss of visibility from Element Management System (default weight is 10%)
1.2.8	Service and Network Controller	Total loss of capability to originate and terminate all traffic	Includes any of the following: • Loss of capability to originate and terminate more than 5% of the packet traffic • Loss of access to one or more critical services • Loss of all stable calls or sessions • System congestion which results in call blocking of greater than 0.3% of all call attempts • 85% or more of the service subscribers experience a dial tone delay of 3 seconds or greater for a period longer than 30 seconds • Total loss of a non-critical service • Total loss of one or more OA&M functions (default weight is 5%) • Total loss of visibility from Element Management System (default weight is 10%) • Loss of CCS (default weight is 50%)

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Table A-3 Network Element Impact Outage Definitions			
Product Category		Total Outage	Partial Outage
Number	**Name**		
1.2.9.1	Core (Routers)	Total network element outage is constituted by any of the following events: • Loss of all ability to transport packets between all interface points including loss of stable connections for a period **longer than one second** • Total network element isolation for **more than 10 seconds** • Loss of all services for **longer than 10 seconds** For a connection based network element, total loss of ability to set up or tear down connections for a period **longer than 10 seconds.**	• Loss of an aggregate service bandwidth over 5% of the provisioned bandwidth **for more than 10 seconds** or loss of more than 4MB of service bandwidth **for more than 5 minutes** • Interface switchovers lasting **longer than 60 milliseconds** • Total loss of a service(s) for **more than 10 seconds** • Total loss of one or more OA&M functions (default weight is 5%) • Total loss of visibility from Element Management System (default weight is 10%)
1.2.9.2	Edge (Routers)	Total network element outage is constituted by any of the following events: • Loss of all ability to transport packets between all interface points including loss of stable connections for a period **longer than one second** • Total network element isolation for **more than 10 seconds** • Loss of all services for **longer than 10 seconds** For a connection based network element, total loss of ability to set up or tear down connections for a period **longer than 10 seconds.**	• Loss of an aggregate service bandwidth over 5% of the provisioned bandwidth **for more than 10 seconds** or loss of more than 4MB of service bandwidth **for more than 5 minutes** • Interface switchovers lasting **longer than 60 milliseconds** • Total loss of a service(s) for **more than 10 seconds** • Total loss of one or more OA&M functions (default weight is 5%) • Total loss of visibility from Element Management System (default weight is 10%)
2.1	Service Control (Formerly Service Control Point (SCP))	Loss of all links and/or all applications within the single network element (node). When considering just the Service Logic portion of the SCP, loss of the ability to process any queries.	Loss of one or more applications or the loss of 20% or more of the links on the single network element (node). When considering just the Service Logic portion of the SCP, loss of ability to process a query

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Table A-3 Network Element Impact Outage Definitions			
Product Category		Total Outage	Partial Outage
Number	**Name**		
2.2	Common Channel Signaling (formerly Signaling Transfer Point (STP))	Loss of all CCS capability within the single network element (node).	Loss of more than 24 channels or 4 links, whichever is less on the single network element (node)
2.3	Home Location Register (HLR)	Total inability to respond to any Transactional Capabilities Application Part (TCAP) of CCS7 message. This failure results solely from a non-hardware related fault, since any hardware related problems are measured as part of the SCP.	Not reported
2.4	Service Logic	Loss of the SCP ability to process all queries due to a Service Logic fault.	An event caused by a Service Logic fault where the SCP loses the ability to process one or more queries. This includes events for which a single service or group of services loses the ability to process queries. It also includes events, such as degraded performance, for which some or all services lose the ability to process one or more queries.
3.2.1.2	Digital Cross Connect Systems	Loss of all network element service capabilities for **more than 60 milliseconds.**	Includes any of the following: • Loss of network element service capabilities affecting at least 5 DS1 equivalent network signals for **more than 60 milliseconds.** • Total loss of one or more OA&M functions (default weight is 5%) • Total loss of visibility from the Element Management System (EMS) (default weight is 10%)
3.2.1.3	Optical Cross Connect Systems	Loss of all network element service capabilities for **more than 60 milliseconds.**	Includes any of the following: • Loss of network element service capabilities affecting at least 5 DS1 equivalent network signals for **more than 60 milliseconds.** • Total loss of one or more OA&M functions (default weight is 5%) • Total loss of visibility from the Element Management System (EMS) (default weight is 10%)

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Table A-3 Network Element Impact Outage Definitions			
Product Category		Total Outage	Partial Outage
Number	**Name**		
3.2.2.1.1	Metallic Carrier System	Loss of all network element service capabilities for **more than 60 milliseconds.**	Loss of network element service capabilities affecting at least 5 DS1 equivalent network signals for **more than 60 milliseconds.**
3.2.2.1.2.1	SONET/ SDH Transport Systems	Loss of all network element service capabilities for **more than 60 milliseconds.**	Includes any of the following: • Loss of network element service capabilities affecting at least 5 DS1 equivalent network signals for **more than 60 milliseconds.** • Total loss of one or more OA&M functions (default weight is 5%) • Total loss of visibility from the Element Management System (EMS) (default weight is 10%)
3.2.2.1.2.2	WDM/ DWDM/ Optical Amplifier	Loss of all wavelengths for **more than 60 milliseconds.**	Includes any of the following: • Loss of one or more wavelengths for **more than 60 milliseconds.** • Total loss of one or more OA&M functions (default weight is 5%) • Total loss of visibility from the Element Management System (EMS) (default weight is 10%)
3.2.2.1.3	Microwave	Loss of all network element service capabilities for **more than 60 milliseconds.**	Loss of network element service capabilities affecting at least 5 DS1 equivalent network signals for **more than 60 milliseconds.**
3.2.2.2	Loop Carrier	Loss of all network element service capabilities for **more than 60 milliseconds.**	Includes any of the following: • Loss of 3 or more DS1 equivalents **for more than 60 milliseconds** • Loss of 72 or more subscriber lines • Total loss of one or more OA&M functions (default weight is 5%) • Total loss of visibility from the Element Management System (EMS) (default weight is 10%)
3.2.4	Digital Subscriber Line (DSL)	Loss of capability to provide connectivity for all traffic for more than 10 seconds or total NE isolation for more than 10 seconds	Loss of capability to provide connectivity for16 subscribers for a period **longer than 10 seconds**
3.3.1	Base Station Controller (BSC) and Base Station System (BSS)	Total loss of voice and data traffic capability	Loss of greater than 10% of the provisioned capacity for origination and/or termination of voice and/or data traffic.

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Table A-3 Network Element Impact Outage Definitions			
Product Category		Total Outage	Partial Outage
Number	**Name**		
3.3.2	Base Transceiver System (BTS)	Total loss of voice and data traffic capability	Loss of greater than 10% of the provisioned capacity for origination and/or termination of voice and/or data traffic.
3.3.4	WLAN Base Station Equipment	Total loss of an Access Point (AP) or Network Access Point (NAP)	Loss of greater than 10% of the provisioned capacity for origination and/or termination of voice and/or data traffic.
3.3.5	Wireless Location Services	Total loss of ability to provide location-based services	• More than 5% of the of the location-based services • Loss of all stable service sessions • Total loss of one or more services but not all services for more than 10 seconds • Loss of one of more OA& M functions (default weight is 5%) • Total loss of visibility from the Element Management System (EMS) (default weight is 10%)
4.2.1	On Line Critical	Complete loss of all FCAPS (Fault Configuration Accounting Performance Security) functionality for **more than 1 minute.**	Loss of some FCAPS functionality for **more than 1 minute.** Partial outage time is weighted by % of users impacted and by amount of functionality lost by the outage.
4.2.2	On Line Non-Critical	Complete loss of all FCAPS (Fault Configuration Accounting Performance Security) functionality for **more than 1 minute.**	Loss of some FCAPS functionality for **more than 1 minute.** Partial outage time is weighted by % of users impacted and by amount of functionality lost by the outage.
6.1	Enhanced Services	Loss of all functionality	Loss of one or more applications or loss of more than 20% of the end mail boxes in use or loss of more than 25% of the ports

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Note: Table A-4 and A-5 are included for convenience only.

Table A-4 Transmission Standard Designations and Conversions

Table A-4 Transmission Standard Designations and Conversions				
Electrical	***Frequency***	***Equivalent***		
NORTH AMERICAN		***Terminations***	***DS1s***	***OC-1s***
DS0	64 Kb	1	1/24	1/672
DS1	1.544 Mb	24	1	1/28
VT 1.5	1.728 Mb	24	1	1/28
DS1C	3.152 Mb	48	2	1/14
DS2	6.312 Mb	96	4	1/7
DS3	44.736 Mb	672	28	1
STS-1	51.84 Mb	672	28	1
STS-3	155.52 Mb	2016	84	3
STS-12	622.08 Mb	8064	336	12
STS-48	2488.32 Mb	32256	1344	48
STS-192	9953.28 Mb	129024	5376	192
INTERNATIONAL (PDH)				
E1 – 2 Mbits/sec	2,048 Mb	30	1 ¼	5/112
E2 – 8 Mbits/sec	8,448 Mb	120	5	5/28
E3 – 34 Mbits/sec	34,368 Mb	480	20	5/7
E4 – 140 Mbits/sec	139,264 Mb	1920	80	2 6/7
565 Mbits/sec	636,000 Mb	7680	320	11 3/7

Table A-5 Optical and Electrical Equivalency

Table A-5 Optical and Electrical Equivalency			
Optical	Electrical	Frequency	Equivalent
NORTH AMERICAN (SONET)			
OC-1	STS-1	51.84 Mb	1 OC-1, 1 DS3, 28 DS1, 672 DS0
OC-3	STS-3	155.52 Mb	3 OC-1, 3 DS3, 84 DS1, 2,016 DS0
OC-12	STS-12	622.08 Mb	12 OC-1, 12 DS3, 336 DS1, 8,064 DS0
OC-48	STS-48	2,488.32 Mb	48 OC-1, 48 DS3, 1,344 DS1, 32,256 DS0
OC-192	STS-192	9,953.28 Mb	192 OC-1,192 DS3, 5,376 DS1, 129,024 DS0
OC-768	Not available	39,680 Mb	Not available
OC-1536		158,720Mb	Not available
INTERNATIONAL (SDH)			
STM-1o (OC-3)	STM-1e	155.52 Mb	1 E4, 4 E3, 64 E1, 1,920 Channels
STM-4o (OC-12)	STM-4e	622.08 Mb	4 E4, 16 E3, 256 E1, 7,680 Channels
STM-16o (OC-48)	STM-16e	2,488.32 Mb	16 E4, 64 E3, 1,024 E1, 30,720 Channels
STM-64o (OC-192)	STM-64e	9,953.28 Mb	64 E4, 192 E3, 4,096 E1, 122,024 Channels
Not applicable	VC-11 (VT1.5)	1.644 Mb (1.544 Mb)	1 DS1
Not applicable	VC-12 (E1)	2.240 Mb (2.048 Mb)	1 E1 (2 Mb)
Not applicable	VC-2 (VT6)	6.784 Mb (6.312 Mb)	
Not applicable	VC-3 (E3)	48.960 Mb (34.368 Mb)	1 E3 (34 Mb)
Not applicable	VC-4 (E4)	150.336 Mb (139.264 Mb)	1 E4 (140 Mb)

Table A-6 Measurements Summary Listing

Table A-6 is a listing of the measurements included in this handbook showing

1) the symbols used in data reporting,
2) the applicability to hardware, software, and/or services (H, S, V), and
3) a reference to the table with data reporting details.

The symbols listed here are also included in Table A-2, Measurement Applicability Table (Normalized Units), to clarify the general descriptions in the column headings.

Table A-6 Measurements Summary Listing

Para-graph	**Measurement** Sub-Measurement	Measur ement Symbol	Sub – measur ement Symbol	Applic-ability (H/S/V)	Reported Items (Table)	Compared or Research Data
5.1	Number of Problem Reports Formulas: Table 5.1-2	NPR		H,S,V	5.1-3, 5.1-4, 5.1-5	
	Critical Problem Reports per Normalization Unit per year		NPR1	H,S		compared
	Major Problem Reports per Normalization Unit per year		NPR2	H,S		compared
	Minor Problem Reports per Normalization Unit per year		NPR3	H,S		compared
	Problem Reports per Normalization Unit per year		NPR4	H,S,V		compared
5.2	Problem Report Fix Response Time Formulas: Table 5.2-2	FRT		H,S,V	5.2-3, 5.2-4	
	Major Problem Report Fix Response Time		FRT2	H,S		compared
	Minor Problem Report Fix Response Time		FRT3	H,S		compared
	Problem Report Fix Response Time		FRT4	H,S,V		compared
5.3	Overdue Problem Report Fix Responsiveness Formulas: Table 5.3-2	OFR		H,S,V	5.3-3, 5.3-4	
	Major Overdue Problem Report Fix Responsiveness		OFR2	H,S		compared
	Minor Overdue Problem Report Fix Responsiveness		OFR3	H,S		compared
	Overdue Problem Report Fix Responsiveness		OFR4	H,S,V		compared
5.4	On-Time Delivery Formulas: Table 5.4-2	OTD		H,S,V	5.4-3	
	On-Time Items Delivery		OTI	H,S		compared
	On-Time Service Delivery		OTS	V		compared
6.1	Service Impact Outage Formulas: Table 6.1-2, 6.1-3	SO		H,S	6.1-4	
	Service Impact All Causes System Outage Frequency		SO1	H,S		compared
	Service Impact All Causes System Downtime		SO2	H,S		compared
	Service Impact Supplier-attributable System Outage Frequency		SO3	H,S		compared
	Service Impact Supplier-attributable System Downtime		SO4	H,S		compared

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Table A-6 Measurements Summary Listing						
Para-graph	**Measurement** Sub-Measurement	Measur ement Symbol	Sub – measur ement Symbol	Applic-ability (H/S/V)	Reported Items (Table)	Compared or Research Data
6.2	Network Impact Outage Formulas: Table 6.2-2, 6.2-3	SONE		H,S	6.2-4	
	Network Element Impact Outage Frequency – Customer Attributable		NEO1	H,S		compared
	Network Element Impact Outage (Weighted) Downtime – Customer Attributable		NEO2	H,S		compared
	Network Element Impact Outage Frequency – Product-attributable		NEO3	H,S		compared
	Network Element Impact Outage (Weighted) Downtime – Product-attributable		NEO4	H,S		compared
6.3	Engineering or Installation Caused Outage Formulas: Table 6.3-2	EIO		V	6.3-3	
	Engineering Caused Outage Frequency		EOF	V		compared
	Installation Caused Outage Frequency		IOF	V		compared
7.1	Field Replaceable Unit Returns Formulas: Table 7.1-2	FR		H	7.1-3	
	Early Return Index		ERI	H		compared
	One-Year Return Rate		YRR	H		compared
	Long-Term Return Rate		LTR	H		compared
	Normalized One-Year Return Rate		NYR	H		compared
8.1	Corrective Fix Quality Formulas: Table 8.1-2	SFQ		S	8.1-3	
	Defective Corrective Fixes		SFQ	S		compared
8.2	Software Problem Reports Formulas: Table 8.2-2	SPR		S	8.2-3	
	Critical Software Problem Reports per Normalization Unit per year		SPR1	S		compared
	Major Software Problem Reports per Normalization Unit per year		SPR2	S		compared
	Minor Software Problem Reports per Normalization Unit per year		SPR3	S		compared
9.1	Service Quality Formulas: Table 9.1-2	SQ		V	9.1-3	
	Defective Service Transaction		SQ	V		compared

Table A-7 Data Submission Labels

Table A-7 is a listing of the labels used when submitting TL 9000 data to the Measurements Repository System.

Table A-7 Data Submission Labels				
Section	**Measurement**	**Data Table**	**Label**	**Item**
5.1	Number of Problem Reports – NPR			
		Table 5.1-3 Product Categories 1, 2, 3, 4, 5, 6, and 9	NPRa NPRs Np1 Np2 Np3	Annualization factor Normalization units Number of critical problem reports Number of major problem reports Number of minor problem reports
		Table 5.1-4 Product Category 7	NPRs Np4	Normalization units Number of problem reports
		Table 5.1-5 Product Category 8	NPRa NPRs Np4	Annualization factor Normalization units Number of problem reports
5.2	Problem Report Fix Response Time – FRT			
		Table 5.2-3 Product Categories 1, 2, 3, 4, 5, 6, and 9	Fr2c Fr2d Fr3c Fr3d	Number of major problem reports closed on time Number of major problem reports due to be closed Number of minor problem reports closed on time Number of minor problem reports due to be closed
		Table 5.2-4 Product Categories 7 and 8	Fr4c Fr4d	Number of problem reports closed on time Number of problem reports due to be closed
5.3	Overdue Problem Report Fix Responsiveness – OFR			
		Table 5.3-3 Product Categories 1, 2, 3, 4, 5, 6, and 9	Of2c Of2d Of3c Of3d	Number of overdue major problem reports closed Number of overdue major problem reports Number of overdue minor problem reports closed Number of overdue minor problem reports
		Table 5.3-4 Product Categories 7 and 8	Of4c Of4d	Number of overdue problem reports closed Number of overdue problem reports

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Table A-7 Data Submission Labels				
5.4	On-time Delivery – OTD			
		Table 5.4-3	DIa DId DVa DVd	Number of line items accepted on the CRD during the month reported Number of line items with a CRD during the month reported Number of services orders accepted on the CRD during the month reported Number of service orders with a CRD during the month reported
6.1	Service Impact System Outage – SO			
		Table 6.1-4	SOa SOs SOea SOda SOep SOdp	Annualization factor Normalization units Calculated outage frequency for all causes Calculated outage duration for all causes Calculated outage frequency for product attributable causes Calculated outage duration for product attributable causes
6.2	Network Element System Outage – SONE			
		Table 6.2-4	NEOa NEOs NEOec NEOdc NEOep NEOdp	Annualization factor Normalization units Outages for customer attributable causes Weighted outage duration for customer attributable causes Outages for product attributable causes Weighted outage duration for product attributable causes
6.3	Engineering or Installation Caused Outages – EIO			
		Table 6.3-3 – EOF	Neo Ne	Number of engineering caused outages Number of engineering jobs
		Table 6.3 – IOF	Nio Ni	Number of installation caused outages Number of installation jobs

Table A-7 Data Submission Labels				
7.1	Field Returns – FR			
		Table 7.1-3	FRa FRs FRri FRry FRrt FRsi FRsy FRst	Annualization factor Normalization units Number of returns from the ERI basis shipping period Number of returns from the YRR basis shipping period Number of returns from the LTR basis shipping period Number of FRUs shipped during the ERI basis shipping period Number of FRUs shipped during the YRR basis shipping period Number of FRUs shipped during the LTR basis shipping period
8.1	Software Fix Quality – SFQ			
		Table 8.1-3	DFc Fc	Number of defective software fixes in the month Total number of software fixes that became available for general release in the month
8.2	Software Problem Report – SPR			
		Table 8.2-3	SPRa SORs Sp1 Sp2 Sp3	Annualization factor Normalization units Number of critical software problem reports Number of major software problem reports Number of minor software problem reports
9.1	Service Quality – SQ			
		Table 9.1-3	SQd SQt	Service quality numerator as defined in Table A-2 Service quality denominator as defined in Table A-2

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