Quality Excellence for Suppliers of Telecommunications Forum (QuEST Forum)

TL 9000 Quality Management System

Measurements Handbook Appendix A

Release 3.8

Appendix A Product Category Tables – Release 3.8

This document is a revision to Tables A-1, A-2 and A-3 of Appendix A of TL 9000 Quality Management System Measurements Handbook, Release 3.5. However, the tables shown here are subject to revision and may have changed. The latest version shall be used in conjunction with registrations.

Visit http://tl9000.org/tl9000/tl_changes.htm for the latest version.

Release 3.8 of the Product Category Tables may be used for submitting April, May and June 2006 TL 9000 measurement data if arrangements are made with the TL 9000 Administrator (TL9000admin@questforum.org). The software will directly support Release 3.8 for the July 2006 data submissions. All organizations are encouraged to use Release 3.8 for reporting TL 9000 data at that time. All data submitted for October 2006 and later must be reported under Release 3.8 until the next release. A summary of the changes in this version of the Tables is also available at the above web site.

Organizations shall classify their products and report measurements according to the listed product categories. 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) Product Category Definitions

Table A-1 contains definitions of product categories to be used by organizations in categorizing their products.

c) Rules for Classification of Products

1) An organization will not be required to report measurements for a given product in multiple product categories. Therefore, any product from a given organization must be classified in exactly one product category.

2) General-purpose products, e.g., computers, will be classified by specific function, e.g., signaling, when provided as a system designed for that function. Otherwise, they will be classified in a separate category, e.g., Common Systems-Computers, designed for the general-purpose product.
3) A product will 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.
4) 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.

d) 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.

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			
Category Code	Category Name	Definition	Examples
1.2.1	Public Packet Switched Network (PPSN)	Equipment for the **provision** of connection-oriented, **packet-switched communication services** designed to provide economical data transport based on internationally standardized packet protocols. The packet switch is the primary switching element of the network allowing efficient connectivity to many customers. The access concentrator concentrates traffic from lower-speed access lines for more efficient packet-switch port usage and performs any necessary protocol conversion via the Packet Assembler/Disassembler (PAD) function.	• X.25 packet switch • Access concentrator / PAD
1.2.2	Access Multi-service	Equipment that switches **packetized data** from source to destination. This may include variable length IP (Internet Protocol) and/or fixed length ATM packets. These systems may include termination of PSTN DSL, or cable traffic. In general, these systems offer a variety of Layer 2 and Layer 3 services (IP, FR, ATM).	• 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
1.2.3		Not currently used	
1.2.4	Frame Relay Switch	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. Data are moved without data integrity checks or flow control at up to T3 rates.	• Frame Relay Switch

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Table A-1 Product Category Definitions			
Category Code	Category Name	Definition	Examples
1.2.5	Broadband Multi-service	Equipment that **transports packets** between broadband network elements. This equipment supports two or more connection based and/or connectionless based protocols such as ATM, IP, FRA, Ethernet or MPLS. This equipment can be installed at the network edge or at the network core.	• Broadband Multi-service • Protocol converters
1.2.6	Packet Gateway	Systems that **terminate and/or multiplex aggregated** interfaces such as circuit switched trunks/network interfaces (DS1, E1, T1, DS#, STM-1, VC-12, etc.), tributary interfaces and line/customer side interfaces (POTS, ISDN, xDSL, GigE, PBX, DS1/E1, etc.), These systems do not provide resource management functions for the interfaces that they terminate. These do have the capability to set up and manage transport connections through the core network when instructed by the applications such as the Call Connection Agent (CCA). These systems are associated with a specific application that provides it with the necessary call control instructions. They do not provide the control instructions themselves.	• Trunk gateway • Access gateway • Multi-service Gateway • Line Gateway
1.2.7	Application Servers	Equipment that provides **IP based multimedia services**.	• Video over IP equipment • Instant Messaging • Voice features • Multi-media Communications Server • Media Gateway • IP Multimedia Subsystem (IMS)

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Table A-1 Product Category Definitions			
Category Code	Category Name	Definition	Examples
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 would belong under product category 2.2 Common Channel Signaling.)	• Service and Network Controller (SNC) • Softswitch • Nextgen Switch
1.2.9	Routers	Equipment that **routes packetized 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 deliver 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 typically do not include termination of PSTN traffic.	• IP Router
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. Generally speaking, there are five basic categories of "signals" commonly used in the telecommunications network. Included are 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 would normally provide enhanced services outside the network, or on the customer premises such as ACD, IVR, or voice messaging systems.***	

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Table A-1 Product Category Definitions			
Category Code	Category Name	Definition	Examples
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 will access in order 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 will 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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Category Code	Category Name	Definition	Examples
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.) CCS packet interconnect (MTP, IPS7)	• Signaling Transfer Point (STP) • 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 (HLR)
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 (SL)
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			
Category Code	Category Name	Definition	Examples
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

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Category Code	Category Name	Definition	Examples
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
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

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Category Code	Category Name	Definition	Examples
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
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.***	

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Category Code	Category Name	Definition	Examples
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)
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

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Category Code	Category Name	Definition	Examples
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
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

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Category Code	Category Name	Definition	Examples
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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Category Code	Category Name	Definition	Examples
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 will operate over nonrepeatered, POTS-like, conditioned unloaded loops out to Carrier Serving Area (CSA) ranges. This product category includes central office and remote units, regenerators or range extenders, and supporting equipment.	• ISDN • HDSL • ADSL • DDS

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Category Code	Category Name	Definition	Examples
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.***	
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	Cable Transmission Equipment	Equipment used in the **transmission of signals** over coaxial cable. This includes central office and remote based transmitters, receivers, and repeaters but not customer premise equipment.	• CATV transmitters • CATV repeaters • CATV head end equipment
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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Category Code	Category Name	Definition	Examples
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			
Category Code	Category Name	Definition	Examples
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			
Category Code	Category Name	Definition	Examples
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			
Category Code	Category Name	Definition	Examples
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 equipment**. 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

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Table A-1 Product Category Definitions			
Category Code	Category Name	Definition	Examples
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.***	
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.***	

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Table A-1 Product Category Definitions			
Category Code	Category Name	Definition	Examples
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
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 • Voice over IP terminal adapter • BPL modem

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Table A-1 Product Category Definitions			
Category Code	Category Name	Definition	Examples
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	Video Interface	Equipment for interfacing video signals from satellite, cable or broadband networks into the customer premise. These devices may also provide a Voice over IP interface.	• Set Top Box
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

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Table A-1 Product Category Definitions			
Category Code	Category Name	Definition	Examples
7	***Services***	***In addition to purchasing tangible hardware/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:*** ***1. The interface between the customer and the organization may be represented by personnel or equipment.*** ***2. Customer activities at the interface with the organization may be essential to the service delivery.*** ***3. Delivery or use of tangible products may form part of the service delivery.*** ***4. A service may be linked with the manufacture and supply of tangible product.*** ***5. 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.*** ***6. 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			
Category Code	Category Name	Definition	Examples
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

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Table A-1 Product Category Definitions			
Category Code	Category Name	Definition	Examples
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 Centers
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	Logistical Services	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
7.8	***Business Services***	***Services to provide general business support functions***	

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Category Code	Category Name	Definition	Examples
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/Temporary 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.	
7.10	e-Business Consulting	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 information/data systems and 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 would typically be used by other suppliers and not sold directly to service providers except as replacement parts.***	
8.1	Components	Individual self-contained active or passive devices without separable parts not included in another product category	• Crystals • ASICs • Relays • TECS • Bare PCBs

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Category Code	Category Name	Definition	Examples
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 would not make up the entire system.***	
8.2.1	Simple	Less than 11 components or 49 solder connections excluding connectors	• VCXOs • Bandpass filters • MW circulators
8.2.2	Medium Complexity	More than 10 components or 48 solder connections but less than 51 components or 241 solder connections excluding connectors.	• Multi die hybrids • DC/DC converter "bricks"
8.2.3	High Complexity	More than 50 components or 240 solder connections but less than 501 components or 2401 solder connections excluding connectors	• Medium sized printed circuit assemblies • Backplane assemblies
8.2.4	Very High Complexity	More than 500 components or 2400 solder 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	Electromechanical Assemblies	Devices or assemblies that are mechanical or electrical-mechanical in nature. Typically, the electromechanical assemblies will 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			
Category Code	Category Name	Definition	Examples
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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Category Code	Category Name	Definition	Examples
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 will 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

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Category Code	Category Name	Definition	Examples
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
9	***End-Customer Products***	***End-user consumer and business customers will 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 service

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Table A-1 Product Category Definitions			
Category Code	Category Name	Definition	Examples
9.2	Wireless	Products offered to business/public customers and to consumers, to support mobile communications and service needs	• Mobile voice • Paging • Small Message Svce (SMS) • GPRS/3G message/visuals • WAP protocol services
9.3	Transport Networks	Products provided to business customers or other operators, to allow them to communicate 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			
Category Code	Category Name	Definition	Examples
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 the network is being operated for.	• VPN MPLS Services • Metropolitan Network Svcs • 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 & Dial VPNs • Security, e.g., Firewalls • Certification • Internet Service Provider (ISP)

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Category Code	Category Name	Definition	Examples
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 allow other licensed operators or carriers to allow them to operate networks or services, without necessarily owning 100% of their operating network.***	
9.7.1	Infrastructure	Products to provide network infrastructure on a lease or rent 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 or 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

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Note 2 Product Categories listed in RED and *italicized* will be used for possible Data Aggregation only. Measurements must be submitted per the lower Product Category listing.

Note 3 Bolded text in the product category definition indicates the primary function of the product category. This is the function to use for outage measurements.

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, with the exception of OTD for Customer Support Service (category 7.5) where resolution time is the service quality measurement. 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 for all products. Use Table A-2 to determine the normalization units and applicability of the rest of the 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) Software measurements are based on the three most dominant releases. % = 100 x Quantity Defective / Total Quantity. "%" is applicable to "Software Only" measurements.

iii) "**NA**" means the measurement is not applicable for the product category.

iv) "**None**" means that no common normalization factor has been identified for the product category; however, data shall be submitted for the measurement.

v) 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.

vi) A system, for the purposes of TL 9000 normalization factor calculation, is defined as a collection of hardware and/or software items located at more than one physical location where all items are required for proper operation. No single item can function by itself.

vii) 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

vii) 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					
				Network Element Impact				
Code	**Description**	Problem Reports H,S,V	Service Impact H,S	Primary Function H,S	CCS H,S	Admin H,S	Return Rate H	Software Measures S
TL 9000 Measurement Symbols (see Table A-6)		NPR	SO	SONE	SOCCS	SONA	FR	SWIM
1	***Switching***							
1.1h	Circuit Switch – all non-remotes including host systems	Network Element	Termination	Network Element	Network Element	NA	Termination	Yes
1.1r	Circuit Switch – remotes only	NA	Termination	Network Element	NA	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 "N/A" 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	Public Packet Switched Network (PPSN)	Network Element	Network Element	NA	NA	NA	Termination	Yes
1.2.2	Access Multi-service	Network Element	Network Element	Network Element	NA	NA	Network Element	Yes
1.2.3	Not currently used							
1.2.4	Frame Relay Switch	Network Element	Network Element	NA	NA	NA	Termination	Yes
1.2.5	Broadband Multi-service	Network Element	Network Element	Network Element	NA	NA	Network Element	Yes

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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			Outage Measurements					
				Network Element Impact				
Code	**Description**	Problem Reports H,S,V	Service Impact H,S	Primary Function H,S	CCS H,S	Admin H,S	Return Rate H	Software Measures S
TL 9000 Measurement Symbols (see Table A-6)		NPR	SO	SONE	SOCCS	SONA	FR	SWIM
1.2.6	Packet Gateway	Network Element	Maximum Configured Call Capacity	Network Element	NA	NA	Network Element	Yes
1.2.7	Application Servers	Network Element	Network Element	Network Element	NA	NA	Network Element	Yes
1.2.8	Service and Network Controller	Network Element	Maximum Configured Call Capacity	Network Element	Network Element	NA	Network Element	Yes
1.2.9	Routers	Network Element	Network Element	NA	NA	NA	Network Element	Yes
2	***Signaling***							
2.1	Service Control {Formerly Service Control Point (SCP)}	Network Element	Network Element	Network Element	NA	NA	Network Element	Yes
2.2	Common Channel Signaling {formerly Signaling Transfer Point (STP)}	Network Element	Network Element	Network Element	NA	NA	Network Element	Yes
2.3	Home Location Register (HLR)	Network Element	Network Element	Network Element	NA	NA	Network Element	Yes
2.4	Service Logic (SL)	Network Element	Network Element	Network Element	NA	NA	Network Element	Yes

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Table A-2 Measurement Applicability Table (Normalized Units)

Product Category			Outage Measurements					
				Network Element Impact				
Code	Description	Problem Reports H,S,V	Service Impact H,S	Primary Function H,S	CCS H,S	Admin H,S	Return Rate H	Software Measures S
TL 9000 Measurement Symbols (see Table A-6)		NPR	SO	SONE	SOCCS	SONA	FR	SWIM
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	NA
3.1.1.1.2	Metallic Connectors	Units shipped	NA	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	NA
3.1.1.2.2	Optical connectors	Units shipped	NA	NA	NA	NA	NA	NA
3.1.1.3	***Transmission Sub-systems***							
3.1.1.3.1	Active Sub-systems	Unit	NA	NA	NA	NA	Unit	NA
3.1.1.3.2	Passive Optical Sub-systems	Unit	NA	NA	NA	NA	Unit	NA
3.1.1.3.3	Ancillary Sub-systems	Unit	NA	NA	NA	NA	Unit	NA
3.1.1.3.4	***Fixed Antenna Systems***							
3.1.1.3.4.1	Radio Antenna Systems	Network Element	NA	NA	NA	NA	Network Element	NA

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Table A-2 Measurement Applicability Table (Normalized Units)

Product Category			Outage Measurements					
				Network Element Impact				
Code	**Description**	Problem Reports H,S,V	Service Impact H,S	Primary Function H,S	CCS H,S	Admin H,S	Return Rate H	Software Measures S
TL 9000 Measurement Symbols (see Table A-6)		NPR	SO	SONE	SOCCS	SONA	FR	SWIM
3.1.1.3.4.2	Satellite Antenna Systems	Network Element	NA	NA	NA	NA	Network Element	NA
3.1.1.3.4.3	Optical Antenna Systems	Network Element	NA	NA	NA	NA	Network Element	NA
3.1.2	***Physical Structure***							
3.1.2.1	Enclosures	Units shipped	NA	NA	NA	NA	Unit	NA
3.1.2.2	Support Structures	Units shipped	NA	NA	NA	NA	Unit	NA
3.1.2.3	Conduits	Meters shipped	NA	NA	NA	NA	Unit	NA
3.2	***Transport Equipment***							
3.2.1	***Cross Connect Systems***							
3.2.1.1	Manual Cross Connect Systems	Network Element	NA	NA	NA	NA	DS1	NA
3.2.1.2	Digital Cross Connect Systems	Network Element	DS1	Network Element	NA	Network Element	DS1	Yes
3.2.1.3	Optical Cross Connect Systems	Network Element	OC1	Network Element	NA	Network Element	OC1	Yes
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	NA	NA	DS1	Yes

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Table A-2 Measurement Applicability Table (Normalized Units)

Product Category			Outage Measurements					
				Network Element Impact				
Code	**Description**	Problem Reports H,S,V	Service Impact H,S	Primary Function H,S	CCS H,S	Admin H,S	Return Rate H	Software Measures S
TL 9000 Measurement Symbols (see Table A-6)		NPR	SO	SONE	SOCCS	SONA	FR	SWIM
3.2.2.1.2	***Optical Carrier System***							
3.2.2.1.2.1	SONET/SDH Transport Systems	Network Element	OC-1	Network Element	NA	Network Element	OC-1	Yes
3.2.2.1.2.2	WDM/DWDM/Optical Amplification	Network Element	Optical Channel	Network Element	NA	Network Element	Optical Channel	Yes
3.2.2.1.3	Microwave	Network Element	DS1	Network Element	NA	NA	DS1	Yes
3.2.2.2	Loop Carrier	Network Element	DS1	Network Element	NA	Network Element	DS1	Yes
3.2.3	Line Terminating Equipment/Distributing Frames	Network Element	NA	NA	NA	NA	Termination	Yes
3.2.4	Digital Subscriber Line (DSL)	Network Element	DSL	Network Element	NA	NA	DSL	Yes
3.2.5	Fiber to the User	Network Element	Subscriber	NA	NA	NA	Subscriber	Yes
3.2.6	***Cable Transmission***							
3.2.6.1	Cable Modem Termination Equipment	Network Element	Network Element	NA	NA	NA	Network Element	Yes
3.2.6.2	Cable Transmission Equipment	Network Element	Network Element	NA	NA	NA	Network Element	Yes
3.3	***Wireless Transmission***							

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Table A-2 Measurement Applicability Table (Normalized Units)

Product Category			Outage Measurements					
				Network Element Impact				
Code	Description	Problem Reports H,S,V	Service Impact H,S	Primary Function H,S	CCS H,S	Admin H,S	Return Rate H	Software Measures S
TL 9000 Measurement Symbols (see Table A-6)		NPR	SO	SONE	SOCCS	SONA	FR	SWIM
3.3.1	Base Station Equipment	Network Element	Maximum Configured Call Capacity	Network Element	NA	NA	Unit	Yes
3.3.2	Base Transceiver System (BTS)	Network Element	Maximum Configured Call Capacity	Network Element	NA	NA	Unit	Yes
3.3.3	Pilot Beacon Unit (PBU)	Network Element	Network Element	Network Element	NA	NA	Unit	Yes
3.3.4	WLAN Base Station Equipment	Network Element	Network Element	Network Element	NA	NA	Unit	Yes
3.3.5	Wireless Location Services	Network Element	Network Element	Network Element	NA	NA	Unit	Yes
4	***Operations & Maintenance***							
4.1	***Test Systems***							
4.1.1	Test Access Equipment	Network Element	NA	NA	NA	NA	Unit	Yes
4.1.2	Test Equipment, Embedded	Network Element	NA	NA	NA	NA	Unit	Yes
4.1.3	Test Support Software	System	System	NA	NA	NA	NA	Yes
4.2	***Operations Support Systems***							

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Table A-2 Measurement Applicability Table (Normalized Units)

Product Category			Outage Measurements					
				Network Element Impact				
Code	**Description**	Problem Reports H,S,V	Service Impact H,S	Primary Function H,S	CCS H,S	Admin H,S	Return Rate H	Software Measures S
TL 9000 Measurement Symbols (see Table A-6)		NPR	SO	SONE	SOCCS	SONA	FR	SWIM
4.2.1	On Line Critical	System	System	System	NA	NA	System	Yes
4.2.2	On Line Non-Critical	System	System	System	NA	NA	System	Yes
4.2.3	Off Line	System	System	System	NA	NA	System	Yes
4.3	Ancillary Operations and Maintenance	Unit	NA	NA	NA	NA	Unit	NA
5	***Common Systems***							
5.1	Synchronization	Network Element	Network Element	NA	NA	NA	Network Element	NA
5.2	General Purpose Computers	Network Element	Network Element	NA	NA	NA	Network Element	Yes
5.3	Power Systems	Network Element	Network Element	NA	NA	NA	Unit	NA
6	***Customer Premises and Enhanced Services***							
6.1	Enhanced Services	Network Element	Network Element	Network Element	NA	NA	Network Element	Yes
6.2	***Terminal Equipment***							
6.2.1	***Voice Terminals***							
6.2.1.1	Wireline Telephone Sets	Units shipped	NA	NA	NA	NA	Unit	Yes
6.2.1.2	Wireless Subscriber User Terminals	Units shipped	NA	NA	NA	NA	Unit	Yes
6.2.2	Fax Equipment	Units shipped	NA	NA	NA	NA	Unit	Yes

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Table A-2 Measurement Applicability Table (Normalized Units)

Product Category			Outage Measurements					
				Network Element Impact				
Code	Description	Problem Reports H,S,V	Service Impact H,S	Primary Function H,S	CCS H,S	Admin H,S	Return Rate H	Software Measures S
TL 9000 Measurement Symbols (see Table A-6)		NPR	SO	SONE	SOCCS	SONA	FR	SWIM
6.2.3	Data Modems	Units shipped	NA	NA	NA	NA	Unit	Yes
6.2.4	Digital Data Service Units	Units shipped	NA	NA	NA	NA	Unit	Yes
6.2.5	Passive Optical Network Termination Units	Units shipped	NA	NA	NA	NA	Unit	Yes
6.2.6	Video Interface	Units shipped	NA	NA	NA	NA	Unit	Yes
6.3	Automatic Call Distribution (ACD) Systems	Network Element	Network Element	NA	NA	NA	Network Element	Yes
6.4	Private Branch Exchange (PBX)	Network Element	Network Element	NA	NA	NA	Network Element	Yes
6.5	Small Communications System (Key Telephone System)	Network Element	Network Element	NA	NA	NA	Network Element	Yes

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Table A-2 Measurement Applicability Table (Normalization Units)					
Product Category					
Code	**Description**	Problem Reports H,S,V	Outage Frequency V	Service Quality V	Return Rate H
TL 9000 Measurement Symbols (see Table A-6)		NPR	EIO	SQ	FR
7	***Services***				
7.1	***Network Installation & Provisioning***				
7.1.1	Installation	Job	Job	Audits	NA
7.1.2	Provisioning	Job	NA	Transaction	NA
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 will likely be the same items tracked for the OTS measure.				
7.2.3	Hardware Development Service	Contract	NA	NA	NA
7.2.4	Telecom Network Integration Service	Contract	NA	NA	NA
7.2.5	Metrology and Calibration	Contract	NA	Transaction	NA
7.3	Maintenance Service	Units maintained	NA	Maintenance Visits	NA
7.4	Repair Service	Units repaired	NA	Units repaired	NA
7.5	Customer Support Service	Support requests	NA	Support Requests	NA
7.6	***Purchasing Services***				
7.6.1	Procurement Services	Unit	NA	NA	Unit
7.6.2	Sourcing/Purchasing Services	Transactions	NA	Transactions	NA
7.7	Logistical Services	Order	NA	NA	NA
7.8	***Business Services***				
7.8.1	Financial Services	Transaction	NA	Transaction	NA
7.8.2	Contract/Temporary Staffing	Position filled	NA	Transaction	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	Service Quality V	Return Rate H
TL 9000 Measurement Symbols (see Table A-6)		NPR	EIO	SQ	FR
7.8.3	Training	Course	NA	Course	NA
7.8.4	Fleet Logistics	Vehicle	NA	Vehicle	NA
7.9	General Support Service	Unit	NA	Transactions	NA
7.10	e-Business Consulting	Assignment	NA	NA	NA
7.11	Customer Assistance	Transaction	NA	NA	NA

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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	SWIM
8	***Components and Subassemblies***			
8.1	Components	Units shipped	NA	NA
	Important information for the categories noted.	***Products in the following six categories (8.2.x, 8.3, and 8.4) are provided by two types of organizations. These are: a) Organizations that design and develop the product for general sale on the open market. The activities of these organizations will 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. Indication of which type applies (a or b) shall be included in the data submitted to the MRS for these six product categories.***		
8.2	***Electronic Assemblies***			
8.2.1 a&b	Simple	Units shipped	Unit	NA
8.2.2 a&b	Medium Complexity	Units shipped	Unit	NA
8.2.3 a&b	High Complexity	Units shipped	Unit	NA
8.2.4 a&b	Very High Complexity	Units shipped	Unit	NA
8.3 a&b	Cable Assemblies	Units shipped	Unit	NA
8.4 a&b	Electromechanical Assemblies	Units shipped	Unit	NA
8.5	***Optical Fiber and Devices***			
8.5.1	Optical Fiber	Finished product meters shipped	NA	NA

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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	SWIM
8.5.2	***Optical Devices***			
8.5.2.1	Opto-electronic Devices	Units shipped	Unit	NA
8.5.2.2	Passive Optical Devices	Units shipped	Unit	NA
8.5.2.3	Optical Subassemblies	Units shipped	Unit	NA
8.6	***Software Components and Tools***			
8.6.1	Software Components	Unit	NA	Yes
8.6.2	Software Development Tools	Network Element	NA	Yes

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
TL 9000 Measurement Symbols (see Table A-6)		NPR	SO	SWIM
9	***End-Customer Products***			
9.1	Voice	Active Phone Numbers	Terminations	NA
9.2	Wireless	Network Capacity	Network Capacity	NA
9.3	Transport Networks	Trunk	Trunk	NA
9.4	Private Networks	10 MB Bandwidth	10 MB Bandwidth	NA
9.5	Internet Access	Subscriber Port	Subscriber Port	Yes
9.6	e-Business & Content Hosting	Hosted Customer Sites	Hosted Customer Sites	Yes
9.7	***Bulk Transport***			
9.7.1	Infrastructure	Channel	Channel	NA
9.7.2	Wholesale	Channel	Channel	NA

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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
TL 9000 Measurement Symbols (see Table A-6)		NPR	SO	SWIM
9.8	Video Broadcast	Subscriber	Subscriber	Yes

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3) Network Element Impact Outage Definitions

Table A-3 Network Element Impact Outage Definitions

Product Category		Total Outage	Partial Outage
Number	**Name**		
All	All where NE outage applicable	Unless otherwise stated below, an unscheduled event must be longer than 30 seconds to be considered an NE Impact outage	Unless otherwise stated below, an unscheduled event must be longer than 30 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 30 seconds to be considered an NE Impact outage	Unless otherwise stated below, a scheduled event must be longer than 30 seconds to be considered an NE Impact outage
All			Partial outages are the loss of part of the capability or services of the network element but not all of the capability or services. Therefore events, which qualify as total outages, are not counted as partial outages.
1.1	Circuit Switch	Varies according to switch type as noted in the following	
	End Office (host or remote) and Tandem	Loss of origination and termination capability in all lines. **A scheduled event longer than 15 seconds is considered an outage.**	**Partial outages includes:** • Switch Isolation • Host caused remote isolation • 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
	Combined Tandem/End Office	Loss of origination and termination capability in all terminations. **A scheduled event longer than 15 seconds is considered an outage**.	Same as End Office

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Table A-3 Network Element Impact Outage Definitions			
Product Category		Total Outage	Partial Outage
Number	**Name**		
	Hybrid Voice Over Packet (HVOP)	Loss of capability to originate and terminate all traffic. **A scheduled event longer than 15 seconds is considered an outage**.	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 OA&M functions • Total loss of visibility from the Element Management System (EMS)
	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 OA&M functions • Total loss of visibility from the Element Management System (EMS)

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Table A-3 Network Element Impact Outage Definitions			
Product Category		Total Outage	Partial Outage
Number	**Name**		
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 • 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 • 85% or more of the service subscribers experience a session delay of 30 seconds or greater for a period **longer than 2 minutes** • 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** • Loss of OA&M capability **for more than 5 minutes** • Total loss of visibility from Element Management System **for more than 5 minutes** •

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Table A-3 Network Element Impact Outage Definitions			
Product Category		Total Outage	Partial Outage
Number	**Name**		
1.2.5	Broadband 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 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** • Loss of OA&M capability **for more than 5 minutes** • Total loss of visibility from Element Management System **for more than 5 minutes**
1.2.6	Packet Gateway	Total loss of capability to originate and terminate all traffic	• Loss of capability to originate and terminate more than 64 lines or trunks (DS0) • System congestion problem that results in call blocking greater than 0.3% of call set-up attempts • Loss of all stable calls • 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 one or more but not all services (such as ISDN capability, DS1, POTS, etc.) • Total loss of OA&M functions **for more than 5 minutes** • Total loss of visibility from Element Management System **for more than 5 minutes**

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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** • Loss of OA& M capability **for more than 5 minutes** • Total loss of visibility from Element Management System for more than 5 minutes

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Table A-3 Network Element Impact Outage Definitions			
Product Category		Total Outage	Partial Outage
Number	**Name**		
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 OA&M functions **for more than 5 minutes** • Total loss of visibility from the Element Management System (EMS) **for more than 5 minutes**
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
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)

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Table A-3 Network Element Impact Outage Definitions			
Product Category		Total Outage	Partial Outage
Number	**Name**		
2.3	Home Location Register (HLR)	Total inability to respond to any Transactional Capabilities Application Part (TCAP) of CCS7 message. This failure would be due solely to 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.**	Loss of network element service capabilities affecting at least 5 DS1 equivalent network signals for **more than 60 milliseconds.**
3.2.1.3	Optical Cross Connect Systems	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.**
3.2.2.1.1	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.**	Loss of network element service capabilities affecting at least 5 DS1 equivalent network signals for **more than 60 milliseconds.**
3.2.2.1.2.2	WDM/DWDM/ Optical Amp.	Loss of all wavelengths for **more than 60 milliseconds.**	Loss of one or more wavelengths for **more than 60 milliseconds.**
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.**

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Table A-3 Network Element Impact Outage Definitions			
Product Category		Total Outage	Partial Outage
Number	**Name**		
3.2.2.2	Loop Carrier	Loss of all network element service capabilities for **more than 60 milliseconds.**	• Loss of 3 or more DS1 equivalents **for more than 60 milliseconds** • Loss of 72 or more subscriber lines
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 BSC capacity for origination and/or termination of voice and/or data traffic.
3.3.2	Base Transceiver System (BTS)	Total loss of voice and data traffic capability	Not reported
3.3.4	WLAN Base Station Equipment	Total loss of an Access Point (AP) or Network Access Point (NAP)	Not reported
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 OA& M capability for more than 5 minutes • Total loss of visibility from Element Management System for more than 5 minutes
4.2.1	On Line Critical	Complete loss of all FCAPS (Fault Configuration Accounting Performance Security) functionality for **more than 30 minutes.**	Loss of some FCAPS functionality for **more than 30 minutes.** Note: partial outage time is not weighted for this product type.
4.2.2	On Line Non-Critical	Complete loss of all FCAPS (Fault Configuration Accounting Performance Security) functionality for **more than 30 minutes.**	Loss of some FCAPS functionality for **more than 30 minutes.** Note: partial outage time is not weighted for this product type.

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Table A-3 Network Element Impact Outage Definitions			
Product Category		Total Outage	Partial Outage
Number	**Name**		
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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4) Equivalency Table A-4 is included for convenience only.

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

5) Equivalency Table A-5 is included for convenience only.

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)

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6) Measurement 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

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		NPR1	H,S		compared
	Major Problem Reports per Normalization Unit		NPR2	H,S		compared
	Minor Problem Reports per Normalization Unit		NPR3	H,S		compared
	Problem Reports per Normalization Unit		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 Installed System Delivery		OTIS	H,S,V		compared
	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

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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
	Service Impact Supplier-attributable System Downtime		SO4	H,S		compared
6.1	Network Impact Outage Formulas: Table 6.1-6, 6.1-7	SONE		H,S	6.1-11	
	NE Impact Total Outage Frequency – Service Provider Attributable		NEO1	H,S		compared
	NE Impact Total Outage Downtime – Service Provider Attributable		NEO2	H,S		compared
	NE Impact Total Outage Frequency – Supplier-attributable		NEO3	H,S		compared
	NE Impact Total Outage Downtime – Supplier-attributable		NEO4	H,S		compared
	NE Impact Partial Outage Frequency – Service Provider Attributable		NEO5	H,S		compared
	NE Impact Partial Outage Downtime – Service Provider Attributable		NEO6	H,S		compared
	NE Impact Partial Outage Frequency– Supplier-attributable		NEO7	H,S		compared
	NE Impact Partial Outage Downtime – Supplier-attributable		NEO8	H,S		compared
6.1	Common Channel Signaling Outage Formulas – Table 6.1-6, 6.1-8	SOCCS		H,S	6.1-12	
	NE Impact CCS Outage Frequency – Service Provider Attributable		CCS1	H,S		compared
	NE Impact CCS Outage Downtime – Service Provider Attributable		CCS2	H,S		compared
	NE Impact CCS Outage Frequency – Supplier Attributable		CCS3	H,S		compared
	NE Impact CCS Outage Downtime – Supplier Attributable		CCS4	H,S		compared
6.1	Network Administration Outage Formulas – Table 6.1-6, 6.1-9	SONA		H,S	6.1-13	
	Impact Network Administration Frequency – Service Provider Attributable		NAO1	H,S		compared
	NE Impact Network Administration Downtime – Service Provider Attributable		NAO2	H,S		compared
	NE Impact Network Administration Frequency – Supplier Attributable		NAO3	H,S		compared
	NE Impact Network Administration Downtime – Supplier Attributable		NAO4	H,S		compared
6.2	Engineering or Installation Caused Outage Formulas: Table 6.2-2	EIO		V	6.2-3	
	Engineering Caused Outage Frequency		EOF	V		compared
	Installation Caused Outage Frequency		IOF	V		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
7.1	Field Replaceable Unit Returns Formulas: Table 7.1-2	FR		H	7.1-3	
	Early Return Index		ERI	H		research for Product Categories 1-6; compared for Product Categories 7-9
	One-Year Return Rate		YRR	H		research
	Long-Term Return Rate		LTR	H		research
	Normalized One-Year Return Rate		NYR	H		compared for Product Categories 1-6; research for Product Categories 7-9
8.1.4	Software Insertion and Maintenance See sections 8.1.5, 8.1.6, 8.1.7, and 8.1.8	SWIM		S	8.1.4-1	
8.1.5	Release Application Aborts Formulas: Table 8.1.5-2	RAA		S	8.1.5-4	
	Release Application Aborts – Release N		RAA0	S		compared
	Release Application Aborts – Release N-1		RAA1	S		compared
	Release Application Aborts – Release N-2		RAA2	S		compared
8.1.5	Release Application Problems Formulas: Table 8.1.5-3	RAP		S	8.1.5-5	
	Release Application Problems – Release N		RAP0	S		compared
	Release Application Problems – Release N-1		RAP1	S		compared
	Release Application Problems – Release N-2		RAP2	S		compared
8.1.6	Corrective Patch Quality Formulas: Table 8.1.6-2	CPQ		S	8.1.6-5	
	Defective Corrective Patches - Release N		CPQ0	S		compared
	Defective Corrective Patches - Release N-1		CPQ1	S		compared
	Defective Corrective Patches - Release N-2		CPQ2	S		compared
8.1.6	Feature Patch Quality Formulas: Table 8.1.6-3	FPQ		S	8.1.6-6	
	Defective Feature Patches – Release N		FPQ0	S		compared
	Defective Feature Patches – Release N-1		FPQ1	S		compared
	Defective Feature Patches – Release N-2		FPQ2	S		compared
8.1.6	Manual Intervention Patches Formulas: Table 8.1.6-4	MIP		S	8.1.6-7	
	Manual Intervention Patches – Release N		MIP0	S		compared
	Manual Intervention Patches – Release N-1		MIP1	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
	Manual Intervention Patches – Release N-2		MIP2	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
8.1.7	Patch Propagation Delay Formulas: Table 8.1.7-1	PPD		S	8.1.7-2	
	High impact corrective patches delayed for the month – Release N		PPDh0	S		compared
	High impact corrective patches delayed for the month – Release N-1		PPDh1	S		compared
	High impact corrective patches delayed for the month – Release N-2		PPDh2	S		compared
	Medium impact corrective patches delayed for the month – Release N		PPDm0	S		compared
	Medium impact corrective patches delayed for the month – Release N-1		PPDm1	S		compared
	Medium impact corrective patches delayed for the month – Release N-2		PPDm2	S		compared
	Low impact corrective patches delayed for the month – Release N		PPDl0	S		compared
	Low impact corrective patches delayed for the month – Release N-1		PPDl1	S		compared
	Low impact corrective patches delayed for the month – Release N-2		PPDl2	S		compared
8.1.8	Software Update Quality Formulas: Table 8.1.8-2	SWU		S	8.1.8-3	
	Defective Software Updates – Release N		SWU0	S		compared
	Defective Software Updates – Release N-1		SWU1	S		compared
	Defective Software Updates – Release N-2		SWU2	S		compared
9.1	Service Quality Formulas: Table 9.1-3	SQ		V		
	Conforming Installations/Engineering Audits		SQ1	V	9.1-4	compared
	Successful Maintenance Visits		SQ2	V	9.1-5	compared
	Successful Repairs		SQ3	V	9.1-6	compared
	Conforming Customer Support Service Resolutions		SQ4	V	9.1-7	compared
	Conforming Support Service Transactions		SQ5	V	9.1-8	research

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