Appendix A Product Category Tables – Release 3.5

This appendix is current with the release of this Handbook. However, the tables in this appendix are subject to revision and may have changed. The latest release of the tables in this appendix and their effective dates are available via the QuEST Forum website (www.questforum.org) and shall be used in conjunction with registrations per the rules noted in 4.1.1.

Organizations shall classify their products and report measurements according to the 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

Table A-1 Product Category Definitions
Table A-2 Measurement Applicability Table (Normalized Units)
Table A-3 Network Element Impact Outage Definitions
Table A-4 Transmission Standard Designations and Conversions
Table A-5 Optical and Electrical Equivalency
Table A-6 Measurements Summary Listing

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 Switch	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 include termination of PSTN traffic.	• Access switch • ATM switch
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
1.2.5	Packet Network Element	Equipment to **transport data and signaling messages** between Voice Over Packet Network Elements. These may support Internet Protocol (IP) routed flows and/or ATM virtual connections. The Call Connection Agent uses an IP or an ATM interface to the packet NE for the transport of signaling information and to control traffic.	• Packet Network Element
1.2.6	Trunk Gateway	Systems that **terminate circuit switched trunks in the PSTN and virtual circuits in the packet network** providing functions such as packetization. These systems do not provide resource management functions for the trunks that they terminate. These do have the capability to set up and manage transport connections through the core network when instructed by the Call Connection Agent (CCA). These systems are associated with a specific CCA that provided it with the necessary call control instructions.	• Trunk gateway

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Table A-1 Product Category Definitions			
Category Code	Category Name	Definition	Examples
1.2.7	Access Gateway	This equipment supports the line side interface to a packet network backbone. It provides **access to the packet network for traditional PSTN devices such as standard telephones and PBX systems**. The systems are associated with a specific Call Connection Agent (CCA) that provides the necessary call control instructions. On receiving the appropriate commands from the CCA, the access gateway provides functions such as audible ringing, power ringing, and miscellaneous tones. These systems have the functionality to set up a transport connection through the core packet network when instructed by the CCA.	• Access gateway
1.2.8	Service and Network Controller (SNC)	Equipment that combines a Call Connection Agent (CCA), signaling gateway (SG) and possibly 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.** The SG interconnects the packet network to the PSTN signaling network. It terminates SS7 links from the PSTN CCS networks and thus provides the MTP Level 1 and Level 2 functionality. The SG communicates with the CCA to support the end to end signaling for calls with the PSTN. Each SG is associated with a specific CCA. 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.	• Service and Network Controller (SNC) • Softswitch • Nextgen Switch

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Category Code	Category Name	Definition	Examples
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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Category Code	Category Name	Definition	Examples
2.1	Service Control Point (SCP)	A signaling point that functions as a **database to provide information to another SCP or Service Switching Point (SSP)**. Transaction Capabilities Application Part (TCAP) queries and responses are used to communicate with the SCP as is done for 800 Data Base Service and Alternate Billing Service (ABS). SCPs may support one or more services per SCP and SCPs may be deployed singularly as stand-alone nodes, as mated pairs, or as multiple replicates (more than 2) to increase their availability. SCPs, connected to STPs, are associated with applications that consist of service-specific software and a database of customer-related information. This product category includes conventional 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.	• Service Control Point • Service nodes • Service resource facilities
2.2	Signaling Transfer Point (STP)	A signaling point with the function of **transferring signaling messages** from one signaling link to another and considered exclusively from the viewpoint of the transfer. An STP is a specialized routing signaling point (SP). It is an SS7-based packet switch that transfers SS7 messages to and from other SPs and is always deployed in mated pairs for reliability. The STP uses the Message Transfer Part (MTP) and the Signaling Connection Control Part (SCCP) of the SS7 protocol to screen and route messages destined for other nodes in the SS7 network. It functions as an SS7 network routing hub, interfacing with SPs only through SS7 links and not voice or data trunks. Within the Local Exchange Carrier (LEC) CCS network structure, STPs are architecturally referred to as either Local STPs (LSTPs) or Regional STPs (RSTPs).	• Signaling Transfer Point (STP)

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Table A-1 Product Category Definitions			
Category Code	Category Name	Definition	Examples
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 instructions stored in SCP for **handling TCAP messages**. (TCAP is the Transactional Capabilities Application Part of the CCS7 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.***	
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.***	

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Category Code	Category Name	Definition	Examples
3.1.1.1.1	Metallic Conductor Cable	Metallic pairs of conductors housed in a protective cable	• Metallic cable • Central office coaxial cable • Hybrid coaxial/twisted pair drop
3.1.1.1.2	Metallic Connectors	Devices used to terminate a metallic cable.	• Coaxial connectors • Coaxial distribution connectors
3.1.1.2	***Fiber Optic Cable Products***	***Optical, as opposed to metallic or wireless transmission media.***	
3.1.1.2.1	Fiber Optic Cable	Cables wherein light is propagated and any associated covering.	• Loose tube cable • Single Tube Bundled Cables • Single Tube Ribbon Cables • Tight Buffered Cables • Indoor Fiber Optic Cables
3.1.1.2.2	Optical Connectors	Device used to terminate an optical cable	• Optical connectors (e.g. SC, ST, MT etc.)
3.1.1.3	***Transmission Sub-systems***	***Sub-systems embedded in the transmission medium other than cable or connectors***	
3.1.1.3.1	Active Sub-systems	Active sub-systems containing electronics	• Coaxial drop amplifiers • Fiber optic data links

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Category Code	Category Name	Definition	Examples
3.1.1.3.2	Passive Optical Sub-systems	Optical sub-systems containing no electronics. This includes passive optical modules containing two or more individual passive optical sub-systems or systems.	• Optical Passive Wavelength Division Multiplexer [PWDM] • Optical Add drop multiplexers • Combined optical Couplers/splitters/ filters
3.1.1.3.3	Ancillary Sub-systems	Other transmission sub-systems not specifically covered in other transmission component categories. Typically passive.	• Surge protectors • Bonding and grounding hardware or ground wire • Taps • Electronic Line Filters
3.1.1.3.4	***Fixed antenna sub-systems***	***Sub-systems for the transmission and receipt of telecommunication signals through the air.***	
3.1.1.3.4.1	Radio Antenna Systems	A system for the transmission and receipt of terrestrial radio waves consisting of an antenna (dish or pole), supporting structure, LNA, transmit horn, coaxial cable and/or waveguide.	• Microwave antenna system • Fixed wireless antenna system
3.1.1.3.4.2	Satellite Antenna Systems	A system for the transmission and receipt of radio waves to and from satellites consisting of an antenna dish, supporting structure, LNA, transmit horn, and/or receiver/transmitter equipment.	• Satellite antenna system
3.1.1.3.4.3	Optical Transmission Antenna Systems	A system for the transmission and receipt of optical signals through free air consisting of an antenna, supporting structure, and/or receiver/transmitter equipment.	• Optical antenna system
3.1.2	***Physical Structure***	***Physical structures for the support of telephone transmission media.***	

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Category Code	Category Name	Definition	Examples
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 employing 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, or 18 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)
3.4	***Not Currently Used***		
3.4.1	Packet Network Element	See 1.2.5	
3.4.2	Trunk Gateway	See 1.2.6	
3.4.3	Access Gateway	See 1.2.7	
3.4.4	Service and Network Controller	See 1.2.8	
3.4.5	Routers	See 1.2.9	
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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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 for a TSP but that do not provide any telephony transmission or storage service to subscribers or other TSP 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)	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 ireline, 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 ireline (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 voice-grade lines	• DSL modem • V.90 modem • Cable modem
6.2.4	Digital Data Service Units	Equipment for the interconnection of data terminal equipment (DTE) with a digital communications service. Such equipment typically provides a network interface and one or more DTE interfaces and may be configurable.	• DDS CSU / DSU • ISDN CSU / DSU • ISDN terminal adapter • T1 CSU DSU

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

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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 supplier and the customer and by supplier internal activities to meet the customer needs.*** ***NOTES:*** ***The interface between the customer and the supplier may be represented by personnel or equipment,*** ***Customer activities at the interface with the supplier may be essential to the service delivery,*** ***Delivery or use of tangible products may form part of the service delivery,*** ***1. A service may be linked with the manufacture and supply of tangible product, and*** ***2. A contracted service is one where a legal agreement is reached either by the customer or by the organization with a third party to provide a service. Contracted services are services offered for sale to companies outside of the organization's company or its subsidiaries.***	
7.1	Installation Service	Contracted service to position, configure, remove, and/or adjust a product.	• New equipment installation • Expansion installation • Upgrade installation • Equipment removal

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Table A-1 Product Category Definitions			
Category Code	Category Name	Definition	Examples
7.2	***Engineering Service***	***Contracted service to provide engineering activities.***	
7.2.1	Network Engineering Service	Contracted 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
7.3	Maintenance Service	Contracted service to maintain customer's equipment and/or systems. These services are limited to activities typically considered part of the Telco'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***	

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Table A-1 Product Category Definitions			
Category Code	Category Name	Definition	Examples
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		Reserved for future use	
7.9	General Support Service	Contracted service that is not included in another product category.	
7.10	e-Business Consulting	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.	• Consulting • Systems Integration
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.***	

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

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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 • Broadcast Circuit • 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.	• 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

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Table A-1 Product Category Definitions			
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, Mngd Storage, Co-location • Managed Firewalls • Content Distribution • Applications – eCRM, Supply Chain, e-Learning, e-Government
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

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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.

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.							
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 Switch	Network Element	Virtual Circuit	Network Element	NA	NA	Termination	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	Packet Network Element	Network Element	Network Element	Network Element	NA	NA	Network Element	Yes
1.2.6	Trunk Gateway	Network Element	Network Element	Network Element	NA	NA	Network Element	Yes

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Note 2 **Measurements FRT, OFR & OTD are applicable and must be reported for all product categories except OTD for 7.5.**

Note 3 **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 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
1.2.7	Access Gateway	Network Element	Network Element	Network Element	NA	NA	Network Element	Yes
1.2.8	Service and Network Controller	Network Element	Network Element	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 Point (SCP)	Network Element	Network Element	Network Element	NA	NA	Network Element	Yes
2.2	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
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	None	NA	NA	NA	NA	NA	NA

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Note 2 **Measurements FRT, OFR & OTD are applicable and must be reported for all product categories except OTD for 7.5.**

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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
3.1.1.1.2	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	None	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
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***							

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Table A-2 Measurement Applicability Table (Normalized Units)

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				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
3.2.1	***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
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	NA	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

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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
3.2.3	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	Network Element	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***							
3.3.1	Base Station Equipment	Network Element	Network Element	Network Element	NA	NA	Unit	Yes
3.3.2	Base Transceiver System (BTS)	Network Element	Network Element	Network Element	NA	NA	Unit	Yes
3.3.3	Pilot Beacon Unit (PBU)	Network Element	Network Element	Network Element	NA	NA	Unit	Yes
4	***Operations & Maintenance***							
4.1	***Test 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
4.1.1	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	Network Element	Network Element	NA	NA	NA	NA	Yes
4.2	***Operations Support Systems***							
4.2.1	On Line Critical	Network Element	Network Element	Network Element	NA	NA	Network Element	Yes
4.2.2	On Line Non-Critical	Network Element	Network Element	Network Element	NA	NA	Network Element	Yes
4.2.3	Off Line	Network Element	Network Element	Network Element	NA	NA	Network Element	Yes
4.3	Ancillary Operations and Maintenance	Unit	NA	NA	NA	NA	NA	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

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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
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
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
6.3	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	Installation Service	Job	Job	Audits	NA
7.2	***Engineering Service***				
7.2.1	Network Engineering Service	Job	Job	NA	NA
7.2.2	Software Development Service	Contract	NA	NA	NA
7.2.3	Hardware Development Service	Contract	NA	NA	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	Reserved for future use				
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***	***Problem reports on products in category 8 are not reported by severity. Please see Section 5 for exact rules for N PR, FRT, and OFR reporting.***		
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	None	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	System	System	NA
9.2	Wireless	System	System	NA
9.3	Transport Networks	Trunk	Trunk	NA
9.4	Private Networks	System	System	NA
9.5	Internet Access	System	System	Yes
9.6	e-Business & Content Hosting	System	System	Yes
9.7	***Bulk Transport***			
9.7.1	Infrastructure	Trunk	Trunk	NA
9.7.2	Wholesale	System	System	NA

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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)	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 that affects more than 64 terminations • Loss of stable calls • System congestion problem that results in call blocking greater than 0.3% of call attempts
	Tandem	Loss of incoming and outgoing trunking capability. **A scheduled event longer than 15 seconds is considered an outage**.	Same as End Office above plus loss of 911 access.

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Table A-3 Network Element Impact Outage Definitions			
Product Category		Total Outage	Partial Outage
Number	**Name**		
	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
	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 that affects more than 64 terminations • 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.

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Table A-3 Network Element Impact Outage Definitions

Product Category		Total Outage	Partial Outage
Number	**Name**		
1.2.2	Access Switch	Loss of all switching capability on all trunks or the total isolation of the network element from the packet network	• Loss of capability to originate and terminate more than 64 lines • System congestion problem that results in call blocking greater than 0.3% of call attempts • Loss of all stable calls • Total loss of one or more but not all services (such as ISDN capability, DS1, POTS, etc.) • Total loss of a non-critical service • Total loss of OA&M functions • Total loss of visibility from Element Management System
1.2.5	Packet Network Element	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 an connection based network element, total loss of ability to set up or tear down connections for a period **longer than 10 seconds.**	Partial network element outages includes any of the following events: • Loss of an aggregate service bandwidth over 5% of the provisioned bandwidth **for more than 10 seconds** • 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**

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Table A-3 Network Element Impact Outage Definitions			
Product Category		Total Outage	Partial Outage
Number	**Name**		
1.2.6	Trunk Gateway	Total loss of capability to originate and terminate all traffic	• Loss of capability to originate and terminate more than 96 DS0's or equivalent • System congestion problem that results in call blocking greater than 0.3% of call attempts • Loss of all stable calls • Total loss of one or more but not all services (such as ISDN capability, DS1, POTS, etc.) • Total loss of a non-critical service • Total loss of OA&M functions • Total buloss of visibility from Element Management System
1.2.7	Access Gateway	Loss of origination and termination capability and loss of access to all lines and related services (POTS, ISDN, etc.)	• Loss of capability to originate and terminate more than 64 lines • System congestion problem that results in call blocking greater than 0.3% of call attempts • Loss of all stable calls • Total loss of one or more but not all services (such as ISDN capability, DS1, POTS, etc.) • Total loss of a non-critical service • Total loss of OA&M functions • Total loss of visibility from Element Management System

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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	Loss of capability to 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 that affect more than 64 terminations • Loss of all stable calls • System congestion which results in call blocking of greater than 0.3% of all call attempts • Total loss of a non-critical service • • Total loss of OA&M functions • Total loss of visibility from the Element Management System (EMS)
2.1	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	Signaling Transfer Point (STP)	Loss of all CCS capability within the single network element (node).	Loss of more than 24 channels or 4 links, whichever is less on the single network element (node)
2.3	Home Location Register (HLR)	Total inability to respond to any Transactional Capabilities Application Part (TCAP) of CCS7 message. This failure would be due solely to a non-hardware related fault, since any hardware related problems are measured as part of the SCP.	Not reported

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Table A-3 Network Element Impact Outage Definitions

Product Category		Total Outage	Partial Outage
Number	**Name**		
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.**
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**

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Table A-3 Network Element Impact Outage Definitions			
Product Category		Total Outage	Partial Outage
Number	**Name**		
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
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.
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, 48 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)

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
	Service Impact Supplier-attributable System Downtime		SO4	H,S		compared

Table A-6 Measurements Summary Listing.						
Para-graph	**Measurement** Sub-Measurement	Measur ement Symbol	Sub – measur ement Symbol	Applic-ability (H/S/V)	Reported Items (Table)	Compared or Research Data
6.1	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

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
	Manual Intervention Patches – Release N-2		MIP2	S		compared

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