

ACCESS SERVICES (Cont.)

SECTION 6 - ASYNCHRONOUS TRANSFER MODE (ATM) SERVICE

6.1 General

- 6.1.1 Asynchronous Transfer Mode (ATM) Service is a form of "fast packet" switching service for high speed networks which require flexible bandwidth, high-performance transport and switching for connectivity between and among widely distributed customer locations. ATM is a cell-based, connection-oriented, switching and multiplexing technology designed to be a fast, general purpose transfer mode for multiple services.
- 6.1.2 ATM Service conforms to protocol standards created by the ITU-T (Telecommunication Standardization Bureau of the International Telecommunications Union), formerly Consultative Committee for International Telegraph and Telephone (CCITT) and American National Standards Institute (ANSI), publications T1.511, T1.627 and T-1.630.
- 6.1.3 ATM is a high-bandwidth medium with low delay and has the capability to be switched or routed to a specific destination.
- 6.1.4 ATM Service is available where facilities and conditions permit.

6.2 Service Description

- 6.2.1 ATM is a data networking technology that uses byte cells which contains addressing, payload type and network priority information and a payload for data. The calls are transmitted through an ATM network in a "real time" (no delay in transmission) or "non-real time" sensitive manner on virtual channels.
- 6.2.2 ATM Service includes: the ATM Access Connection (AAC), the ATM Virtual Connection (AVC) and the ATM Customer Connection (ACC). The ATM Access Connection provides access to a Telephone Company wire center equipped with a ATM switch.
- 6.2.3 The ATM Access Connection combines an ATM compatible 1.544 Mbps or 44.736 Mbps digital transport facility with a port on an ATM switch. The ATM Access Connection includes the Telephone Company facility between the customer designated premises and the customer's serving wire center, the interoffice transport (if applicable) between the customer's serving wire center and a wire center equipped with an ATM switch, and the end user port. The end user port is a user-to-network interface which provides the line-side physical entry point into the Telephone Company ATM network and permits ATM compatible end user customer premises equipment (CPE) to originate or terminate an intralata access service. Connections between en user CPE and the Telephone Company ATM switch are available at speeds of 1.544 Mbps or 44.736 Mbps. Each end user port requires the identification of a corresponding terminating port. All end user ports must be in conformance with American national Standards Institute (ANSI) standards T1.606-1990, T1.606 Addendum 1-1991, T1.606a-1992, T1.617, Annex D-1992.

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SECTION 6 - ASYNCHRONOUS TRANSFER MODE (ADM) SERVICE (Cont.)

6.2 Service Description (Cont.)

- 6.2.4 The ATM Customer Connection (ACC) provides access from the Telephone Company Wire Center equipped with an ATM switch to the Customer Central Site.
- 6.2.5 The ATM Customer Connection (ACC) combines a high velocity port on an ATM switch with its equivalent digital transport facility. DS3 and OC3c ATM Service does not include lease line costs.
- 6.2.6 A Permanent Virtual Circuit (PVC) is established between two or more customer designated locations (CDLs). PVCs are logical circuits that define a specific path for data sent by the customer to another location.
- 6.2.7 Telephone Company ATM switches are responsible for guaranteeing the Quality of Service (QOS) ordered by the customer. QOS refers to priorities given to cell transmissions and sensitivity of calls to delay variation and loss within the network. ATM customers are responsible for selecting the level of service required.
- 6.2.8 A minimum of one AAC and one ACC connection is required for data to be transported between customer designated premises.
- 6.2.9 Acceptance Testing. At no additional charge, the Telephone Company will, at the customer's request, cooperatively test at the time of installation.

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SECTION 6 - ASYNCHRONOUS TRANSFER MODE (ATM) SERVICE (Cont.)

6.2 Service Description (Cont.)

6.2.10 There are five QOS categories:

- (A) Constant Bit Rate (CBR): Supports a constant or guaranteed rate to transport services requiring rigorous timing control and performance parameters (i.e., live video).
- (B) Variable Bit Rate-real time (VBR-rt): Supports bursty data traffic with average and peak traffic parameters which is transported immediately (i.e., LAN and video applications). The VBR-rt is described by values representing Sustainable Cell Rate (SCR) and a Peak Cell Rate (PCR). The SCR is the maximum average cell transmission rate on a given PVC. It allows the network to allocate sufficient network resources to guarantee network performance objectives. The SCR applies only to VBR traffic. The PCR is the maximum cell transmission rate (cells per second) per PVC.
- (C) Variable Bit Rate-non real time (VMR-nrt): Supports bursty data traffic with average and peak traffic parameters, however, the information is stored and transported at a later time (i.e., Frame Relay Service).
- (D) Available Bit Rate (ABR): ATM layer transfer characteristics provided by the network may change subsequent to connection establishment, suitable for bursty data applications (i.e., Switched Megabit Data Service [SMDS]).
- (E) Unspecified Bit Rate (UBR): ATM Service Category which does not specify traffic related service guarantees. No numerical commitments are made with respect to the cell loss ratio or as to the call transfer delay experienced by cells on the connection (i.e., data applications, messaging and telecommuting from home to office.)

Switched Virtual Circuits are not available at this time.

6.3 Service Provisioning

6.3.1 ATM Service can be provisioned over DS1, DS3 and OC3c access channels, where facilities permit. The access channels and any applicable transport provide connections from the customer's location(s) to the ATM port of the serving ATM switch within the Telephone Company's network. The appropriate rates for DS1, DS3 and OC3 apply accordingly. All other associated regulations, rates and charges apply in addition to the rates and charges associated with the ATM rate elements.

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SECTION 6 - ASYNCHRONOUS TRANSFER MODE (ATM) SERVICE (Cont.)

6.3 Service Provisioning (Cont.)

6.3.2 Ports are provisioned on a specified speed based upon the customer's request. The ATM ports will match the channel speed of the access channel. The actual throughput of customer traffic cannot exceed the bandwidth of the access channel and the port speed. Ports will be further defined and differentiated by the software definition requested and ascribed to the port. Software definition of ports must be selected by the customer. The possible port definitions are User to Network Interface (UNI), and Network to Network Interface (NNI). A UNI is an interface point between ATM end users and the Telephone Company ATM switch while a NNI is an interface between the Telephone Company's ATM switch and another provider's ATM switch, (i.e. IC or another telephone company).

6.3.3 ATM Service will be provisioned on a negotiated interval.

6.4 Obligations of the Telephone Company

6.4.1 The Telephone Company is responsible for service up to and including the network interface.

6.4.2 The Telephone Company shall provision service over facilities suitable for ATM transmission, where available, for the effective maximum data rates of a DS1 (1.544 Mbps), DS3 (45 Mbps) or an OC3c (155 Mbps).

6.4.3 During the Telephone Company's network maintenance and software updates period, it may be necessary to place the ATM Switch out of service. The Telephone Company will provide customers reasonable and timely notification to minimize impacts to the customer's service. The Telephone Company reserves the right to temporarily interrupt ATM Service at other times in emergency situations.

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SECTION 6 – ASYNCHRONOUS TRANSFER MODE (ATM) SERVICE (Cont.)

6.5 RESERVED FOR FUTURE USE

ACCESS SERVICES (Cont.)

SECTION 6 - ASYNCHRONOUS TRANSFER MODE (ATM) SERVICE (Cont.)

6.6 Rate Regulations

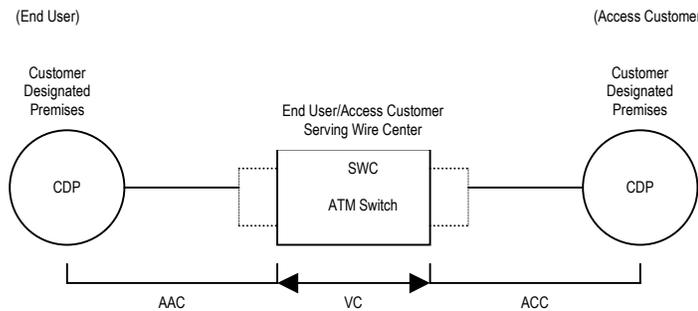
This section contains the specific regulations governing the rates and charges that apply for ATM Service.

6.6.1 Rate Categories

The following diagrams depict a generic view of the components of ATM Service.

ATM Service

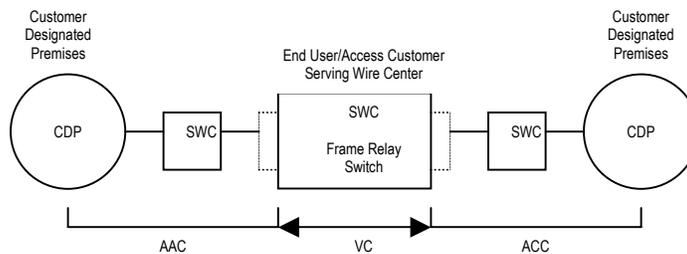
Customer=s Serving Wire Center is equipped with an ATM switch



RATE ELEMENTS

- AAC = ATM Access Connection
- VC = Virtual Connection
- ACC = ATM Customer Connection

Customer=s Serving Wire Center is not equipped with a ATM switch



RATE ELEMENTS

- AAC = ATM Access Connection
- VC = Virtual Connection
- ACC = ATM Customer Connection

ACCESS SERVICE (Cont.)

SECTION 6 - ASYNCHRONOUS TRANFER MODE (ATM) SERVICE (Cont.)

6.6 Rate Regulations (Cont.)

6.6.2 Minimum Period

The minimum period for ATM Service is six (6) months, except when provided under an Extended Service Plan (ESP) arrangement.

6.6.3 Rate Elements

(A) ATM Level of Service

A monthly rate, based on the speed of the port connection (DS1, DS3 or OC3c), applies per port for each physical connection to the network supporting ATM Service.

(B) ATM NNI or UNI Ports

A nonrecurring charge and a monthly rate, based on the speed of the port connection (DS1, DS3 or OC3c), apply per port for each ATM access channel connection to the network supporting ATM Service. Each port can accommodate multiple paths (PVCs).

(1) Network-to-Network Interface (NNI) (FOR FUTURE USE)

The NNI port configuration is used for connecting the Telephone Company's ATM Switch network to another ATM switch for bi-directional messaging. Special Access facilities apply.

(2) User-to-Network Interface (UNI) (AAC) (ACC)

The UNI port provides an interface between the user and the Telephone Company's ATM network. Special Access facilities (AAC) are included in ATM service for DS1 service rate. For DS3 and OC3c, leased line costs will be added depending on the user location (ACC).

(C) ATM CBR/VBR Activation

A nonrecurring charge, based on the quantity of Permanent Virtual Circuits CBR/VBR ordered, applies for the first and each additional PVC activation, per Access Service Request (ASR).

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6.6 Rate Regulations (Cont.)

6.6.2 Rate Elements (Cont.)

(D) ATM DS3, OC3c Access Link (ACC)

- (1) A non-recurring charge and a monthly charge applies for each point-to-point connection between the Telephone Company's ATM switch and the customer's ATM terminal equipment at the DS3 and OC3c ATM customer connection. The ATM DS1, DS3 and OC3c Access Links are not available for meet point service arrangements, nor for when the serving wire center (SWC) for the CDL and the Telephone Company's ATM switch are the same.
- (2) No diverse routing of fiber circuits or self-activated service restoral capabilities are provided with the ATM DS3, OC3c Access Links, however, if such services are desired, the appropriate rate elements are applicable. When one of the CDLs is provided by another telephone company the appropriate rates are applicable.

The regulations, rates and charges for associated DS3 and OC3c facilities apply.

6.6.3 Rate Application

A customer may order a connection to ATM Service via a DS1, DS3 or ATM OC3c Access Link. The associated regulations, rates and charges for such facilities apply in addition to the rates and charges associated with the ATM rate elements.

ATM Service for each port must be subscribed according to the customer's chosen Level of Service as described following:

- (A) Level 1: Up to 50% of port bandwidth may be utilized for Constant Bit Rate (CBR) Quality of Service (QOS) priority processing and network transmission. Any remaining bandwidth may be utilized for VBR-nrt, ABR or UBR services. (FOR FUTURE USE)
- (B) Level 2: Up to 25% of port bandwidth may be utilized for Constant Bit Rate (CBR) Quality of Service (QOS) priority processing and network transmission. Any remaining bandwidth may be utilized for VBR-nrt, ABR or UBR service. (FOR FUTURE USE)

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SECTION 6 - ASYNCHRONOUS TRANSFER MODE (ATM) SERVICE (Cont.)

6.6 Rate Regulations (Cont.)

6.6.3 Rate Application (Cont.)

- (C) Level 3: Up to 50% of port bandwidth may be utilized for Variable Bit Rate-real time (VBR-rt) Quality of Service (QOS) priority processing and network transmission. Remaining bandwidth may be utilized for VBR-nrt, ABR or UBR services.
- (D) Level 4: Up to 25% of port bandwidth may be utilized for Variable Bit Rate-real time (VBR-rt) Quality of Service (QOS) priority processing and network transmission. Remaining bandwidth may be utilized for VBR-nrt, ABR or UBR services.

An ASR is required for programming and activation of PVCs. PVCs will be considered a single virtual circuit extending from ingress port to egress port through the network. There are two classes of NRCs for the activation of a PVC. The "First PVC Activation" charge will apply for the first PVC activation ordered by a customer. If multiple PVC activations are requested on the same ASR, the "First PVC Activation" charge will be assessed for each additional PVC. These charges will also apply for PVCs rerouted or changed.

Additional PVCs will not be added if the sum of the port bandwidth utilized by existing and additional PVCs for Constant Bit Rate (CBR) and Variable Bit Rate-real time (VBR-rt) services exceeds the bandwidth allocated for these services within the subscribed Level of Service for that port. (The Level of Service will have to change to support the required bandwidth.

For purposes of determining the Level of Service required for a port and calculating the sum of port bandwidth utilized through the port, each CBR PVC is to be added to the total at 100% of the bit rate utilized, and each VBR-rt PVC is to be added to the total of 100% of the peak cell rate (converted to Bits Per Second).

The derived total bandwidth utilized by the above described PVCs is then divided by the port bandwidth to determine the percentage of port bandwidth utilized. This percentage should then be compared to the Level of Service definitions as previously stated, to determine the Level of Service required.

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6.6 Rate Regulations (Cont.)

6.6.3 Rate Application (Cont.)

Example:

$$\frac{\text{Sum CBR PVC Bit Rates} + [\text{Sum VBR-rt PVC Peak Cell Rates} \times 53 \times 8]}{\text{ATM Port Bit Rate}}$$

ATM port bit rates are defined as follows:

- DS1 = 1.544 megabits per second,
- DS3 = 44.736 megabits per second,
- OC3c = 155.52 megabits per second.

The actual throughput of customer traffic cannot exceed the bandwidth of the access line and the port speed. Since multiple PVCs may be defined on one physical port, it is possible for the cumulative speeds to exceed the physical bandwidth of that port. This is referred to as over-subscription.

Over-subscription of non-real time (nrt) PVCs to ports will be allowed according to the following parameters:

Subscribed Level of Service	% of Port Allotted to Nrt Services	Maximum ¹ Allowed Port Subscription
1	0%	100%
2	25%	125%
3	50%	150%
4	75%	225%
5	100%	400%

¹The throughput of over-subscribed PVCs is not guaranteed through the network as such throughput is dependent upon the amount of simultaneous transmission traversing the network at any given point in time.

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SECTION 7 - ASYNCHRONOUS TRANSFER MODE (ATM) SERVICE (Cont.)

6.6 Rate Regulations (Cont.)

6.6.4 Extended Service Plan (ESP)

RESERVED FOR FUTURE USE

ACCESS SERVICES (Cont.)

SECTION 6 - ASYNCHRONOUS TRANSFER MODE (ATM) SERVICE (Cont.)

6.7 Rates and Charges

6.7.1 Standard Arrangements

	Monthly Charge	NRC
ATM Service DS1 UNI Port, Each UBR/ABR	\$ 1,700.00	\$ 1,200.00
ATM Service DS3 UNI Port, Each UBR/ABR	5,000.00	10,000.00
ATM Service OC3c UNI Port, Each UBR/ABR	7,000.00	12,000.00
ATM Level 1 of Service, DS1, CBR 50%	2,600.00	1,200.00
ATM Level 2 of Service, DS1, CBR 25%	2,400.00	1,200.00
ATM Level 3 of Service, DS1, VBR 50%	2,100.00	1,200.00
ATM Level 4 of Service, DS1, VBR 25%	2,000.00	1,200.00
ATM Level 1 of Service, DS3, CBR 50%	7,000.00	10,000.00
ATM Level 2 of Service, DS3, CBR 25%	6,000.00	10,000.00
ATM Level 3 of Service, DS3, VBR 50%	5,600.00	10,000.00
ATM Level 4 of Service, DS3, VBR 25%	5,400.00	10,000.00
ATM Level 1 of Service, OC3c, CBR 50%	10,000.00	12,000.00
ATM Level 2 of Service, OC3c, CBR 25%	9,000.00	12,000.00
ATM Level 3 of Service, OC3c, VBR 50%	8,200.00	12,000.00
ATM Level 4 of Service, OC3c, VBR 25%	7,800.00	12,000.00

6.7.2 Extended Service Plan (ESP) Arrangements

RESERVED FOR FUTURE USE