ATTACHMENT 2

SERVICE DESCRIPTION: UNBUNDLED NETWORK ELEMENTS

TABLE OF CONTENTS

SERVICE DESCRIPTION: UNBUNDLED NETWORK ELEMENTS

1. Introduction

This Attachment sets forth the descriptions and requirements for unbundled network elements that GTE agrees to offer to AT&T under this Agreement.

2. Network Interface Device

2.1. Definition*:*

The Network Interface Device (NID) is a single-line termination device or that portion of a multiple-line termination device required to terminate a single line or circuit. The fundamental function of the NID is to establish the official network demarcation point between a carrier and its end-user customer. The NID generally features two independent chambers or divisions which separate the service provider's network from the customer's inside wiring. Each chamber or division contains the appropriate connection points or posts to which the service provider, and the end-user customer each make their connections. The NID provides a protective ground connection, and is capable of terminating cables such as twisted pair cable. The NID may be ordered as a Network Element independently from the Loop Distribution**.**

2.1.1. With respect to multiple-line termination devices, AT&T shall specify the quantity of NIDs it requires within such device.

Figure 1 - Network Interface Device [Intentionally Deleted]

2.1.2. Technical Requirements

2.1.2.1. The Network Interface Device shall provide a clean, accessible point of connection for the inside wiring and for the Distribution Media and shall maintain a connection to ground that meets the requirements set forth below.

2.1.2.2. The NID shall be capable of transferring electrical analog or digital signals between the customer's inside wiring and the Distribution Media.

2.1.2.3. All NID posts or connecting points shall be in place, secure, usable and free of any rust or corrosion. The protective ground connection shall exist and be properly installed. The ground wire will also be free of rust or corrosion and have continuity relative to ground.

2.1.2.4. The NID shall be capable of withstanding all normal local environmental variations.

2.1.2.5. Where the NID is not located in a larger, secure cabinet or closet, the NID shall be protected from physical vandalism. The NID shall be physically accessible to AT&T designated personnel and GTE will identify the cable pair used for the particular service which will be replaced by AT&T. In cases where entrance to the customer premises is required to give access to the NID, AT&T shall obtain entrance permission directly from the customer.

2.1.2.6. GTE shall offer the NID together with, and separately from the Loop or Loop Distribution Media component of the Loop.

2.1.3. Interface Requirements

2.1.3.1. AT&T shall be permitted to connect its own Loop directly to GTE's Network Interface Device (NID) in cases in which AT&T uses its own facilities to provide local service to an end user formerly served by GTE, as long as such direct connection does not adversely affect GTE's network. In order to minimize any such adverse effects, AT&T shall follow the procedures in sub-sections 2.1.3.2 and 2.1.3.3.

2.1.3.2. When connecting its own loop facility directly to GTE's NID for a residence or business customer, AT&T must make a clean cut on the GTE drop wire at the NID so that no bare wire is exposed. AT&T shall not remove or disconnect GTE's drop wire from the NID or take any other action that might cause GTE's drop wire to be left lying on the ground.

2.1.3.3. At multi-tenant customer locations, AT&T must remove the jumper wire from the distribution block (i.e. the NID) to the GTE cable termination block. If AT&T cannot gain access to the cable termination block, AT&T must make a clean cut at the closest point to the cable termination block. At AT&T's request and discretion,

GTE will determine the cable pair to be removed at the NID in multi-tenant locations. AT&T will compensate GTE for the trip charge necessary to identify the cable pair to be removed.

2.1.3.4. GTE agrees to offer NIDs for lease to AT&T, but not for sale. AT&T may remove GTE identification from any NID which it connects to an AT&T loop, but AT&T may not place its own identification on such NID.

2.1.3.5. NID to NID Connection. GTE will not require that a separate NID be installed by AT&T in order to make a NID to NID connection. Rather than connecting its loop directly to GTE's NID, AT&T may also elect to install its own NID and effect a NID to NID connection to gain access to the end user's inside wiring.

2.1.3.6. Removal of Cable Pairs. Removal from the NID of existing cable pairs required for AT&T to terminate service is the responsibility of AT&T.

2.1.3.7. Maintenance / Liability. Sub-paragraphs 2.1.3.8 through 2.1.3.11 outline AT&T's responsibilities when leasing NIDs from GTE.

2.1.3.8. GTE is responsible for the maintenance of the NID when it is leased as part of the unbundled loop.

2.1.3.9. GTE is not responsible for any damage to AT&T's customer's interior wiring, station apparatus, or physical harm to the dwelling or persons resulting from over-voltage intrusion from AT&T's cable facilities.

2.1.3.10. When AT&T no longer wishes to lease the GTE NID, AT&T is responsible for ensuring that this equipment is left in proper working order.

2.1.3.11. When AT&T discontinues the use of the NID, GTE will perform a physical inspection of the NID prior to reconnection to a GTE customer and charge AT&T for any corrective maintenance which may be required.

2.1.4. The Network Interface Device shall be provided to AT&T in accordance with the technical references listed in Appendix A, under paragraph 1.

3. Loop

3.1. Definition*:*

A "Loop" is a transmission facility between the main distribution frame (cross-connect), or functionally comparable piece of equipment in a GTE end office or wire center to a demarcation, connector block or network interface device at a customer's premises. Loop types include, but are not limited to, two-wire and four-wire copper analog voice-grade loops, two-wire and four-wire loops that are conditioned to transmit analog and digital signals, needed to provide, for example, ISDN, ADSL, HDSL, and DS-1 level signals, DS-1 loops, Coax loops and Fiber loops. A Loop is composed of the following Sub-Loop Elements, to the extent that each is physically existent in the LEC network where the Loop is ordered and the Network Interface Device (NID). The Sub-Loop Elements are defined in detail below:

Loop Distribution Media

Loop Concentrator/Multiplexer

Loop Feeder

3.1.1. Requirements:

3.1.1.1. Basic Loop. The Basic Loop is a 2-wire copper facility or functional equivalent which will meet industry standard specifications for Voice Frequency transmission. The Basic Loop may include load coils, bridge taps, etc., or may include carrier derived facility components (i.e. pair gain applications, loop concentrator/multiplexers). The Basic Loop will be designed within industry design parameters with a loop loss (from customer to MDF) which does not exceed 10 dB and with a noise level less than 30 dbrnC. For loaded loops, the Bridge Tap and End section will be between 3 and 12 kFt.

3.1.1.2. Special Conditioning Requirements. The Basic Loop will be provided to AT&T at parity with GTE customers and will comply with the specifications noted in this section 3.1, Loop.

Transmission of signaling messages or tones not provided by these specifications will be provided to AT&T, as agreed between AT&T and GTE. When placing an order for unbundled Loop and Sub-Loop elements, AT&T will notify GTE of any special requirements. Special conditioning to provide such requirements will be provided on a case-by-case basis, if technically feasible. AT&T agrees to bear the cost of any such special conditioning. Types of Loops which may require such conditioning include 2W/4W PABX Trunks, 2W/4W voice grade private line and foreign exchange lines, 4W digital data (2.4Kbps through 64Kbps), etc.

3.1.1.3. ISDN BRI Loops. Upon request by AT&T, GTE will provide 2W loops capable of transmitting ISDN data rates, where technically feasible. For Loops up to 18,000 feet from the MDF to the customer, the Loops will be designed within industry design parameters with a loss not to exceed 42 dB at 40kHz. Bridge taps will not exceed 2,500 feet with no single bridge tap greater than 2,000 feet. Customers located greater than 18,000 feet from the MDF will require special Loop provisioning at an additional charge.

3.1.1.4. 4-Wire DS-1 Loops/ISDN PRI. These Loops will be designed to support a digital transmission rate of 1,544, 000 bps. These Loops will be designed within industry parameters and have no bridge taps or load coils. These Loops will employ special line treatment (span line repeaters, office terminating repeaters at the GTE wire center, or similar technology).

3.1.1.5. Features, Functions, Attributes, Etc. To the degree possible, all transport-based features, functions, service attributes, grades-of-service, installation, maintenance and repair intervals that apply to the bundled services, will apply to the above unbundled Loop.

3.1.1.6. All Loop facilities furnished by GTE on the premises of AT&T's end users and up to the network interface or functional equivalent are the property of GTE. GTE must have access to all such facilities for network management purposes. GTE employees and agents may enter said premises at any reasonable hour to test and inspect such facilities in connection with such purposes or, upon termination or cancellation of the Loop facility, to remove such facility.

3.1.1.7. If AT&T leases Loops which are conditioned to transmit digital signals, as a part of that conditioning, GTE will test the Loop after conditioning and provide recorded test results to AT&T. When AT&T provides its own switching, it will test the unbundled loops. If there is a maintenance problem on an unbundled loop, AT&T will report the problem to GTE, and GTE will be responsible for the repair of the loop. In maintenance and repair cases, if loop tests are taken, GTE will provide any recorded readings to AT&T at the time the trouble ticket is closed in the same manner as GTE provides to itself and its end users.

3.1.1.8. AT&T may order a copper twisted pair Loop even in instances where the Loop for services that GTE offers is other than a copper facility.

3.1.2. Unbundled Loop Facility Certification

3.1.2.1. Before deploying any service enhancing copper cable technology (e.g., HDSL, ISDN, etc.) over unbundled 2-wire analog voice grade loops provided by GTE, AT&T shall notify GTE of such intentions to enable GTE to assess the loop transport facilities to determine whether there are any existing copper cable loop transport technologies (e.g., analog carrier, etc.) deployed within the same cable sheath that would be interfered with if AT&T deployed the proposed service enhancing copper cable technology. If there are existing copper cable loop transport technologies already deployed within the same cable sheath, or if GTE already has specific planned projects to deploy copper cable loop transport technologies within the next six months for which it can demonstrate a specific commitment by producing detailed engineering plans, GTE will so inform AT&T and AT&T shall not be permitted to deploy such service enhancing copper cable technologies.

3.1.2.1.1. If AT&T fails to notify GTE of its plans to deploy service enhancing copper cable technology and obtain prior certification from GTE of the facilities, and if AT&T's deployment of such technology is determined to have caused interference with existing or planned copper cable loop transport technologies deployed by GTE in the same cable sheath, AT&T will immediately remove such service enhancing copper cable technology and shall reimburse GTE for all incurred expense related to this interference.

3.1.2.2. Prior to GTE deploying service enhancing copper cable technology, as described above, GTE will validate, through a search of its facility assignment records, that AT&T has not deployed technologies within the same cable sheath that would be interfered by those planned by GTE. Should such incompatibility exist, GTE will not deploy such technology that would interfere with those already deployed by AT&T.

3.1.2.2.1. Should GTE deploy service enhancing copper cable technology which is determined to interfere with technology previously deployed by AT&T, and AT&T can demonstrate that they had complied with GTE's Unbundled Loop Facility Certification procedure, GTE will remove their technology from the cable sheath, reimburse AT&T for all incurred expenses related to this interference.

3.1.3. Unbundled Loop Facility Reservation. GTE and AT&T may each reserve for up to 6 (six) months the right to deploy within GTE's network copper cable loop transport technology for specific projects for which a party can demonstrate a specific commitment by producing detailed engineering plans.

3.1.4. Requirements:

Specific Loops as described in 3.1.1.1 through 3.1.1.4 are capable of transmitting signals for the following services (as needed by AT&T to provide end-to-end service capability to its end-user customer):

1. 2-wire voice grade basic telephone services
2. 2-wire ISDN
3. 2-wire Centrex
4. 2 and 4-wire PBX lines or trunks
5. 2 and 4-wire voice grade private lines and foreign
6. 4-wire digital data (2.4kbps through 64Kbps and n
7. 4-wire DS1 (switched or private line)

3.1.5. Additional Requirements for Loop Where Integrated Digital Loop Carrier Systems are being used. If GTE uses Integrated Digital Loop Carrier (DLCs) systems to provide local loop, GTE will make alternative arrangements to permit AT&T to order a contiguous unbundled Loop. These arrangements may include the following: provide AT&T with copper facilities or universal DLC that are acceptable to AT&T, deploy Virtual Remote Terminals, allow AT&T to purchase the entire Integrated DLC, or convert integrated DLCs to non-integrated systems.

3.2. Loop Distribution Media

3.2.1. Definition**:**

Loop Distribution Media provides connectivity between the NID and the terminal block on the customer-side of a Feeder Distribution Interface (FDI). The FDI is a device that terminates the Loop Distribution Media and the Loop Feeder, and cross-connects them in order to provide a continuous transmission path between the NID and a telephone company central office.

3.2.1.1. In some instances, AT&T shall require a copper twisted pair Distribution Media in instances where the Loop Distribution Media for services that GTE offers is other than a copper facility.

3.2.2. GTE will provide to AT&T Loop Distribution Media of the same condition that exists for the current GTE customer.

3.2.3. GTE is not responsible for the end to end performance of the entire loop when GTE provides only the Loop Distribution Media.

3.2.4. The Loop Distribution Media provided under this Agreement shall meet or exceed the applicable interface requirements set forth in the technical references listed in Appendix A to this Attachment 2 under paragraph 2 thereof.

3.2.5. The Loop Distribution Media may be ordered by AT&T through the Bona Fide Request procedures outlined in Attachment 12. The request shall specify the technical requirements for the Loop Distribution Media.

3.2.6. GTE shall perform all cross connections to the FDI as AT&T may request from time to time in order to provide Network Elements to AT&T in

accordance with this Agreement. Since GTE will be performing all necessary cross connections within the FDI and at the main distribution frame, AT&T agrees that there will be no requirement for personnel of AT&T to access the FDI or the serving wire center to the extent that AT&T has no equipment collocated in the GTE central office.

3.2.7. AT&T shall be responsible for the costs (if any) required to create an interface at the main distribution frame if such interface does not already exist, such as in the case of an Integrated Digital Loop Carrier System, as specified in Attachment 14.

3.3. Loop Concentrator/Multiplexer

3.3.1. Definition:

The Loop Concentrator/Multiplexer is the Network Element that: (1) aggregates lower bit rate or bandwidth signals to higher bit rate or bandwidth signals (multiplexing); (2) disaggregates higher bit rate or bandwidth signals to lower bit rate or bandwidth signals (demultiplexing); (3) aggregates a specified number of signals or channels to fewer channels (concentrating); (4) performs signal conversion, including encoding of signals (e.g., analog to digital and digital to analog signal conversion); and (5) in some instances performs electrical to optical (E/O) conversion.

The Loop Concentrator/Multiplexer function may be provided through a Digital Loop Carrier (DLC) system, channel bank, multiplexer or other equipment at which traffic is encoded and decoded, multiplexed and demultiplexed, or concentrated.

3.3.2. GTE is not responsible for the end to end performance of the entire loop when GTE provides only the Loop Concentrator/Multiplexer.

3.3.3. The Loop Concentrator/Multiplexer provided under this Agreement shall meet or exceed the applicable interface requirements set forth in the technical references listed in Appendix A to this Attachment 2, under paragraph 2 thereof.

3.3.4. The Loop Concentrator/Multiplexer may be ordered by AT&T through the Bona Fide Request procedures outlined in Attachment 12. The request shall specify the technical requirements for the Loop Concentrator/Multiplexer.

3.4. Loop Feeder

3.4.1. Definition:

3.4.2. The Loop Feeder is the Network Element that provides connectivity between (1) a FDI associated with Loop Distribution Media and a termination point appropriate for the media in a central office, or (2) a Loop Concentrator/Multiplexer provided in a remote terminal and a termination point appropriate for the media in a central office. Since GTE will be performing all necessary cross connections within the FDI and the main distribution frame, there will be no requirement for personnel of AT&T to access the FDI or the serving wire center to the extent that AT&T has no equipment collocated in the GTE central office.

3.4.3. In certain cases, AT&T will require a copper twisted pair loop even in instances where the medium of the Loop Feeder for services that GTE offers is other than a copper facility.

3.4.4. The Loop Feeder provided under this Agreement shall meet or exceed the applicable interface requirements set forth in the technical references listed in Appendix A to this Attachment 2, under paragraph 2 thereof.

3.4.5. The Loop Feeder may be ordered by AT&T through the Bona Fide Request procedures outlined in Attachment 12. The request shall specify the technical requirements for the Loop Feeder.

3.4.6. GTE is not responsible for the end performance of the entire loop when GTE provides only the Loop Feeder.

3.5. Other Sub-Loop Terms and Conditions

3.5.1. GTE agrees to provide access to the sub-loop network elements at the Feeder Distribution Interface (FDI), based on the following conditions:

3.5.2. AT&T agrees to pay GTE to expand or replace the FDI (over and above the established price of the basic loop) to accommodate terminating the new AT&T cable.

3.5.3. AT&T agrees to pay GTE an agreed upon charge to perform all cross

connections within the GTE FDI (in addition to the price of the basic sub-loop network element(s) leased by AT&T).

3.5.4. AT&T agrees that since all cross connects will be performed by GTE personnel, AT&T personnel will not require access to the FDI.

4. Local Switching

4.1. Definition:

Local Switching is the Network Element that provides the functionality required to connect the appropriate originating lines or trunks wired to the Main Distributing Frame (MDF) or Digital Signal Cross Connect (DSX) panel to a desired terminating line or trunk. Such functionality shall include all of the features, functions, and capabilities of the GTE switch including but not limited to: line signaling and signaling software, digit reception, dialed number translations, call screening, routing, recording, call supervision, dial tone, switching, telephone number provisioning, announcements, calling features and capabilities (including call processing), CENTRANET, Automatic Call Distributor (ACD), Carrier pre-subscription (e.g., long distance carrier, intraLATA toll), Carrier Identification Code (CIC) portability capabilities, testing and other operational features inherent to the switch and switch software. Local Switching provides access to transport, signaling (ISDN User Part (ISUP) and Transaction Capabilities Application Part (TCAP), and platforms such as adjuncts, Public Safety Systems (911), operator services, directory services and Advanced Intelligent Network (AIN). Remote Switching Module functionality is included in the Local Switching function. The switching capabilities used will be based on the line side features they support, where technically feasible. Local Switching will also be capable of routing local directory assistance and operator services calls to alternative directory assistance and operator services platforms.

4.1.1. Local Switching also includes Data Switching, which provides for ISDN Packet and Circuit Switched Data service, the data switching functionality that is required to connect between industry standard ISDN interfaces. In this case, the purpose of Data Switching is to terminate, concentrate, and switch data traffic from Customer Premises Equipment (CPE) in the digital format consistent with ISDN standards. Data Switching also provides connectivity for the purpose of conveying the customer data to its final destination.

4.2. Technical Requirements:

The requirements set forth in this Section 4.2 apply to Local Switching.

4.2.1. GTE shall offer to AT&T unbundled access to all facilities, functions, features and capabilities of its local switches to the extent it is technically feasible. If AT&T requests access to any facility, function, feature or capability of the GTE local switch that is technically feasible but which requires GTE to make modifications to the switch where such modifications are outside the scope of modifications that have been made in the past and are modifications that the manufacturer of the switch does not, and has not supported, GTE shall immediately seek endorsement from the manufacturer of the switch to make such modifications, and shall promptly notify AT&T that GTE has done so within thirty (30) days of receiving AT&T's request. After obtaining the vendor endorsement, GTE shall provide the unbundled access to the facility, function, feature or capability requested by AT&T. AT&T will reimburse GTE for all costs associated with such modification in accordance with section 251(d)(1) of the Act.

4.2.1.1. GTE shall offer Local Switching together with and separately from Data Switching.

4.2.1.2. When applicable, GTE shall route calls to the appropriate trunk or lines for call origination or termination.

4.2.1.3. GTE shall route local directory assistance and operator services calls on a per line or per screening class basis to (1) GTE platforms providing Network Elements or additional requirements, (2) AT&T designated platforms, or (3) third-party platforms.

4.2.1.4. GTE shall provide standard recorded announcements as designated by AT&T and call progress tones to alert callers of call progress and disposition.

4.2.1.5. GTE shall activate service for an AT&T Customer or network interconnection on any of the Local Switching interfaces. This includes provisioning changes to change a customer from GTE's services to AT&T's services without loss of feature functionality.

4.2.1.6. GTE shall perform routine testing (e.g., Mechanized Loop Tests (MLT) and test calls such as 105, 107 and 108 type calls) and fault isolation on a reasonable schedule designated by AT&T.

4.2.1.7. GTE shall repair and restore any equipment or any other maintainable component owned by or under the control of GTE that may adversely impact Local Switching.

4.2.1.8. GTE shall control congestion points such as those caused by radio station call-ins, and network routing abnormalities, using capabilities such as Automatic Call Gapping, Automatic Congestion Control, and Network Routing Overflow.

4.2.1.9. GTE shall perform manual call trace as designated by AT&T and permit customer originated call trace.

4.2.1.10. GTE shall record billable events and send the appropriate billing data to AT&T as outlined in Attachment 6.

4.2.1.11. For Local Switching used as 911 Tandems, GTE shall allow interconnection from AT&T local switching elements and GTE shall route the calls to the appropriate Public Safety Access Point (PSAP).

4.2.1.12. GTE shall provide where the switch is capable, each of the following capabilities:

4.2.1.13. Essential Service Lines;

4.2.1.14. Telephone service prioritization;

4.2.1.15. Telephone Relay Services for handicapped;

4.2.1.16. Soft dial tone where required by law; and

4.2.1.17. Any other capability required by law.

4.2.1.18. GTE shall provide Switching Service Point (SSP) capabilities and signaling software to interconnect the signaling links destined to the Signaling Transfer Point Switch (STPS). In the event that Local Switching is provided out of a switch without SS7 capability, the Tandem shall provide this capability as discussed in the section on Tandem Switching. These capabilities shall adhere to Bellcore specifications - TCAP (GR-1432-CORE), ISUP(GR-905-CORE), Call Management (GR-1429-CORE), Switched Fractional DS1 (GR-1357-CORE), Toll Free Service (GR-1428-CORE), Calling Name (GR-1597-CORE), Line Information Database (GR-954-CORE), and Advanced Intelligent Network (GR-2863-CORE). A further description of AIN is set forth on Sections 4.2.1.26.1 and 4.2.1.26.2 of this Attachment 2.

4.2.1.19. GTE shall provide interfaces to adjuncts through industry standard and Bellcore interfaces. These adjuncts can include, but are not limited to, the Service Circuit Node and Automatic Call Distributors. Examples of existing interfaces are ANSI ISDN standards Q.931 and Q.932.

4.2.1.20. GTE shall provide performance data regarding a customer line, traffic characteristics or other measurable elements to AT&T to the extent that it provides that information to itself.

4.2.1.21. GTE shall offer Local Switching that provides feature offerings at parity to those provided by GTE to itself or any other party. Such feature offerings, where available, shall include but are not limited to:

4.2.1.22. Basic and primary rate ISDN;

4.2.1.23. Residential features;

4.2.1.24. Customer Local Area Signaling Services (CLASS/LASS);

4.2.1.25. CENTRANET (including equivalent administrative capabilities, such as customer accessible reconfiguration and detailed message

recording); and

4.2.1.26. Advanced intelligent network triggers supporting AT&T features. GTE shall offer to AT&T all AIN triggers to the extent technically feasible and currently available to GTE for offering AIN-based services in accordance with the applicable technical references listed in Appendix A to this Attachment 2, under paragraph 3 thereof.

4.2.1.26.1. When AT&T utilizes GTE's Local Switching network element and requests GTE to provision such network element with a technically feasible AIN trigger, GTE will provide access to the appropriate AIN Call Related Database for the purpose of invoking either a GTE AIN feature or an AIN feature developed by AT&T through use of GTE's SCE/SMS under Section 11.7 below, provided, however, that GTE is not required to allow SS7 advanced intelligent access from AT&T's SCP to GTE's switch to invoke an AT&T-developed AIN feature, until testing and security concerns regarding the reliability of service to GTE's end users have been addressed, either through industry forums or successful testing.

4.2.1.26.2. When AT&T utilizes its own local switch, GTE will provide access to the appropriate AIN Call Related Database for the purpose of invoking either a GTE AIN feature or an AIN feature developed by AT&T through use of GTE's SCE/SMS under 11.7 below, provided, however, that GTE is not required to allow such use until testing and security concerns regarding the reliability of service to GTE's end users have been addressed, either through industry forums or successful testing.

4.2.1.27. GTE shall assign each AT&T Customer line the class of service designated by AT&T (e.g., using line class codes or other switch specific provisioning methods), and shall route local directory assistance calls from AT&T Customers to AT&T directory assistance operators at AT&T’s option.

4.2.1.28. GTE shall assign each AT&T Customer line the class of services designated by AT&T (e.g., using line class codes or other switch specific provisioning methods) and shall route operator calls from AT&T Customer to AT&T operators at AT&T’s option. Where technically feasible, GTE shall route local Operator Services calls

(0+, 0-) dialed by AT&T Customers directly to the AT&T Local Operator Services platform, unless AT&T requests otherwise pursuant to Section 28.6.1. Such traffic shall be routed over trunk groups specified by AT&T which connect GTE end offices and the AT&T Local Operator Services platform, using standard Operator Services dialing protocols of 0+ or 0-. Where intraLATA presubscription is not available, GTE will provide the functionality and features within its local switch (LS), to route AT&T Customer dialed 0- and 0+ IntraLATA calls to the AT&T designated line or trunk on the Main Distributing Frame (MDF) or Digital Cross Connect (DSX) panel via Modified Operator Services (MOS) Feature Group C signaling. Where IntraLATA presubscription is available, AT&T Customer dialed 0- and 0+ intraLATA calls will be routed to the intraLATA PIC carrier's designated operator services platform. In all cases, GTE will provide post-dial delay at no greater than that provided by GTE for its end user customers. AT&T shall pay GTE's costs, if any, pursuant to the pricing standards of Section 252(d) of the Act, and in such amounts or levels as determined by the Commission for implementation of such routing.

4.2.1.29. If AT&T requests the termination of Local Switching, GTE shall promptly remove the class of service assignment from the line.

4.2.1.30. If an AT&T Customer subscribes to AT&T provided voice mail and messaging services, GTE shall redirect incoming calls to the AT&T system based upon presubscribed service arrangements (e.g., busy, don’t answer, number of rings). GTE shall provide, where available, the following feature capabilities allowing for voice mail services: SMDI-E (Station Message Desk Interface-Enhanced) or SMDI (Station Message Desk Interface), MWI (Message Waiting Indicator) stutter dialtone and message waiting light feature capabilities; CF-B/DA (Call Forward on Busy/Don't Answer); CF/B (Call Forward on Busy); and CF/DA (Call Forward Don't Answer).

4.2.1.31. Local Switching shall be offered in accordance with the requirements of the technical references listed in Appendix A to this Attachment 2, under paragraph 3 thereof.

4.2.2. Interface Requirements:

4.2.2.1. GTE shall provide the following interfaces (i.e. ports) to loops:

4.2.2.2. Standard Tip/Ring interface including loopstart or groundstart, on-hook signaling (e.g., for calling number, calling name and message waiting lamp);

4.2.2.3. Coin phone signaling;

4.2.2.4. Basic Rate Interface ISDN;

4.2.2.5. Two-wire analog interface to PBX;

4.2.2.6. Four-wire analog interface to PBX;

4.2.2.7. Four-wire DS1 interface to PBX or customer provided equipment (e.g. computers and voice response systems);

4.2.2.8. Primary Rate ISDN to PBX;

4.2.2.9. Switched Fractional DS1 with capabilities to configure Nx64 channels (where N = 1 to 24); and

4.2.2.10. GTE shall provide access to, but not limited to the following:

4.2.2.11. SS7 Signaling Network or Multi-Frequency trunking if requested by AT&T;

4.2.2.12. Interface to AT&T operator services systems or Operator Services through appropriate trunk interconnections for the system; and

4.2.2.13. Interface to AT&T directory assistance services through the AT&T switched network or to Directory Services through the appropriate trunk interconnections for the system; and 950 access or other AT&T required access to interexchange carriers as requested through appropriate trunk interfaces.

4.2.2.14. Interfaces to Loops provided under this Agreement shall meet or exceed the applicable interface requirements set forth in the technical references listed in Appendix A to this Attachment 2, under paragraph 4 thereof.

4.3. Integrated Services Digital Network (ISDN)

Integrated Services Digital Network (ISDN) is defined in two variations. The first variation is Basic Rate ISDN (BRI). BRI consists of 2 Bearer (B) Channels and one Data (D) Channel. The second variation is Primary Rate ISDN (PRI). PRI consists of 23 B Channels and one D Channel. Both BRI and PRI B Channels may be used for voice, Circuit Switched Data (CSD) or Packet Switched Data (PSD). The BRI D Channel may be used for call related signaling, non-call related signaling or packet switched data. The PRI D Channel may be used for call related signaling.

4.3.1. Technical Requirements - ISDN

4.3.1.1. Where available, GTE shall offer Data Switching providing ISDN that, at a minimum:

4.3.1.2. Provides integrated packet handling capabilities;

4.3.1.3. Allows for full 2B+D Channel functionality for BRI; and.

4.3.1.4. Allows for full 23B+D Channel functionality for PRI.

4.3.1.5. Each B Channel shall allow for voice, 64Kbs CSD, and PSD of 128 logical channels at minimum speeds of 19Kbs throughput of each logical channel up to the total capacity of the B Channel.

4.3.1.6. Each B Channel shall provide capabilities for alternate voice and data on a per call basis.

4.3.1.7. The BRI D Channel shall allow for call associated signaling, non-call associated signaling and PSD of 16 logical channels at minimum speeds of 9.6 Kbs throughput of each logical channel up to the total capacity of the D channel.

4.3.1.8. The PRI D Channel shall allow for call associated signaling.

4.3.2. Interface Requirements - ISDN

4.3.2.1. GTE shall provide the BRI U interface using 2 wire copper loops.

4.3.2.2. GTE shall provide the BRI interface using Digital Subscriber Loops.

4.3.2.3. GTE shall offer PSD interfaces.

4.3.2.4. GTE shall offer PSD trunk interfaces operating at 56Kbs.

4.3.2.5. Interfaces to Loops for ISDN requirements provided under this Agreement shall meet or exceed the applicable interface requirements set forth in the technical references listed in Appendix A to this Attachment 2, under paragraph 5 thereof.

5. Operator Service

5.1. [Intentionally Deleted]

5.1.1. Definition.

Operator Service provides where technically feasible: (1) operator handling for call completion (for example, collect, third number billing, and manual credit card calls), (2) operator or automated assistance for billing after the customer has dialed the called number; and (3) special services including Busy Line Verification and Emergency Line Interrupt (ELI), Emergency Agency Call, Operator-assisted Directory Assistance, and Rate Quotes.

5.1.2. Requirements

5.1.2.1. Operator Services for calls which are routed from the local switch shall include but not be limited to the following:

5.1.2.2. GTE shall complete 0+ and 0- dialed local calls.

5.1.2.3. GTE shall complete 0+ and 0- intraLATA toll calls.

5.1.2.4. GTE shall complete calls that are billed to a GTE calling card and AT&T shall designate to GTE the acceptable types of special billing.

5.1.2.5. GTE shall complete person-to-person calls.

5.1.2.6. GTE shall complete collect calls.

5.1.2.7. GTE shall provide the capability for callers to bill to a third party and complete such calls.

5.1.2.8. GTE shall complete station-to-station calls.

5.1.2.9. GTE shall process emergency calls.

5.1.2.10. GTE shall process Busy Line Verify and Emergency Line Interrupt requests.

5.1.2.11. GTE shall process emergency call trace.

5.1.2.12. GTE shall process operator-assisted directory assistance calls.

5.1.2.13. GTE shall provide rate quotes and process time-and-charges requests on 0- calls, and shall provide AT&T's rates where technically feasible.

5.1.2.14. GTE shall route 0- traffic directly to a “live” operator team.

5.1.2.15. Operator Services provided by GTE to AT&T local service customers under this Agreement will be customized for AT&T, where technically feasible, at rates specified in Attachment 14. GTE will perform necessary software upgrades to allow for customized Operator Services on a switch-by-switch basis, subject to capability and capacity limitations.

5.1.2.16. GTE shall provide caller assistance for the handicapped at parity with what is provided under GTE's tariff.

5.1.2.17. [Intentionally deleted.]

5.1.2.18. [Intentionally deleted]

5.1.2.19. GTE shall provide notification of the length of call.

5.1.2.20. Operator Service shall adhere to equal access requirements consistent with GTE Equal Access Deployment Schedule.

5.1.2.21. GTE shall exercise at least the same level of fraud control in providing Operator Service to AT&T that GTE provides for its own operator service.

5.1.2.22. GTE shall perform Billed Number Screening when handling Collect, Person-to-Person, and Billed-to-Third-Party calls.

5.1.2.23. GTE shall provide to AT&T such service measurements and accounting reports as it prepares to meet Commission requirements.

5.1.2.24. GTE shall direct customer inquiries to a single, AT&T-designated customer service center.

5.1.2.25. [Intentionally deleted]

5.1.2.26. GTE will offer AT&T a level of Operator Services which is at parity with what it provides itself, and, at a minimum, meets all criteria, requirements and guidelines established by the Commission, if any. To the extent that the level of service GTE provides to its own customers exceeds any criterion, requirement or guideline set by the applicable state regulatory commission, GTE shall offer the same level of service to AT&T.

5.1.2.27. GTE will make all of its automation and other new technology related to the provision of Operator Services available to AT&T as soon as it is available to GTE. GTE will otherwise make all tariffed Operator Service offerings available to AT&T.

5.2. Interface Requirements:

With respect to Operator Services for calls that originate on local switching capability provided by or on behalf of AT&T, the interface requirements shall conform to the then current established system interface specifications for the platform used to provide Operator Service and the interface shall conform to industry standards.

6. Directory Assistance Service

6.1. Definition*:*

Directory Assistance Service is a service that provides telephone number information to local end users that GTE serves on behalf of AT&T who dial 411, 1411 or 555-1212 to obtain directory assistance for local numbers within their NPA.

6.1.1. [Intentionally deleted]

6.2. Requirements

6.2.1. GTE shall offer Directory Assistance Service which allows AT&T Customers to obtain two listings at parity with the service provided to GTE's customers in accordance with tariff.

6.2.2. Directory Assistance Service provided by GTE to AT&T local service customers under this Agreement will be customized for AT&T, where technically feasible, at rates specified in Attachment 14. GTE will perform necessary software upgrades to allow for customized Directory Assistance on a switch-by-switch basis, subject to capability and capacity limitations.

6.2.3. GTE Directory Assistance Service will provide optional call completion service to AT&T Customers in areas where call completion denial is available; Call completion services shall be provided at parity with that which GTE provides to its own end users.

6.2.4. GTE shall provide data regarding billable events.

6.2.5. To the extent that GTE provides free call allowances to Directory Assistance to its customers as part of any local service offering, GTE shall provide the same to AT&T for AT&T Customers to whom such local service offerings are resold;

6.2.6. GTE shall ensure that any Directory Assistance information that is provided by ARU shall be repeated twice for AT&T Customers;

6.2.7. GTE Directory Assistance will provide emergency listings and related services to AT&T Customers at service levels equivalent to those provided to GTE customers;

6.2.8. GTE Directory Assistance Services will include a service which intercepts calls placed to an AT&T Customer whose number has been disconnected or changed. GTE shall provide a recorded announcement to (i) notify a calling party that the end user customer has transferred to a new telephone number of AT&T and (ii) provide such calling party with details concerning the new

telephone number to be dialed to reach the customer. GTE shall provide such announcement for the same length of time that GTE provides intercept or referral information for its customers that have changed telephone numbers.

6.2.9. GTE shall waive all Directory Assistance charges to AT&T for calls placed by handicapped AT&T Customers, provided however, that in accordance with GTE tariff for such services, AT&T will submit to GTE, at the same time AT&T requests such service, a doctor's letter or other proper certification, certifying that the AT&T customer is qualified to receive such service.

6.2.10. Directory Assistance Service Updates

6.2.10.1. GTE shall update the GTE DA database with AT&T customer listing changes daily. These changes include:

6.2.10.2. New customer connections;

6.2.10.3. Customer disconnections; and

6.2.10.4. Customer changes, including but not limited to name, address and listing status.

6.2.10.5. These updates shall also be provided for non-listed and non-published numbers for use in emergencies.

7. Common Transport

7.1. Definition:

Common Transport is an interoffice transmission path between GTE Network Elements that carries the traffic of more than one carrier and is not dedicated to a single carrier. Where GTE Network Elements are connected by intra-office wiring, such wiring is provided as a part of the Network Elements and is not Common Transport. For tandem interconnection, GTE shall provide interoffice transmission for common transport.

7.2. Technical Requirements

7.2.1. [Intentionally deleted.]

7.2.2. Common Transport provided on DS1 or VT1.5 circuits, shall, at a minimum, meet the performance, availability, jitter, and delay requirements specified for Central Office to Central Office "CO to CO" connections in the technical reference in Appendix A to this Attachment 2, under paragraph 6 thereof.

7.2.3. Common Transport provided on DS3 circuits, STS-1 circuits, and higher transmission bit rate circuits, Common Transport shall, at a minimum, meet the performance, availability, jitter, and delay requirements specified for Central Office to Central Office "CO to CO" connections in the technical reference set forth in Appendix A to this Attachment 2, under paragraph 6 thereof.

7.2.4. GTE shall be responsible for the engineering, provisioning, and maintenance of the underlying equipment and facilities that are used to provide Common Transport.

7.2.5. At a minimum, Common Transport shall meet all of the requirements set forth in the technical references in Appendix A to this Attachment 2, under paragraph 6 thereof (as applicable for the transport technology being used).

8. Dedicated Transport

8.1. Definition:

Dedicated Transport is an interoffice transmission path between AT&T designated locations. Such locations may include GTE central offices or other equipment locations, AT&T network components, other carrier network components, or customer premises.

8.1.1. GTE shall offer Dedicated Transport in each of the following ways:

8.1.1.1. As capacity on a shared circuit.

8.1.1.2. As a circuit (e.g., DS1, DS3, STS-1) dedicated to AT&T.

8.1.1.3. As a system (i.e., the equipment and facilities used to provide Dedicated Transport such as SONET ring) dedicated to AT&T.

8.1.2. When Dedicated Transport is provided as a circuit or as capacity on a shared circuit, it shall include (as appropriate):

8.1.2.1. Multiplexing functionality;

8.1.2.2. [intentionally deleted]

8.1.2.3. [intentionally deleted]

8.1.3. When Dedicated Transport is provided as a system it shall include:

8.1.3.1. Transmission equipment such as multiplexers, line terminating equipment, amplifiers, and regenerators;

8.1.3.2. Inter-office transmission facilities such as optical fiber, copper twisted pair, and coaxial cable. The specific arrangements with respect to dark fiber are covered in this Attachment 2, Section 14, "Unused Transmission Media";

8.1.3.3. Redundant equipment and facilities necessary to support protection and restoration; and,

8.1.3.4. Dedicated Transport includes the Digital Cross-Connect System (DCS) functionality as an option. DCS is described below in Section 8.4.

8.2. Technical Requirements

This Section sets forth technical requirements for all Dedicated Transport.

8.2.1. When GTE provides Dedicated Transport as a circuit or a system, the entire designated transmission circuit or system (e.g., DS1, DS3, STS-1) shall be dedicated to AT&T designated traffic.

8.2.2. GTE shall offer Dedicated Transport in all then currently available technologies including, but not limited to, DS1 and DS3 transport systems, SONET (or SDH) Bi-directional Line Switched Rings,

SONET (or SDH) Unidirectional Path Switched Rings, and SONET (or SDH) point-to-point transport systems (including linear add-drop systems), at all available transmission bit rates.

8.2.3. For DS1 or VT1.5 circuits, Dedicated Transport shall, at a minimum, meet the performance, availability, jitter, and delay requirements specified for Customer Interface to Central Office "CI to CO" connections in the technical references listed in Appendix A to this Attachment 2, at paragraph 2.6 thereof.

8.2.4. For DS3 circuits, STS-1 circuits, and higher rate circuits, Dedicated Transport shall, at a minimum, meet the performance, availability, jitter, and delay requirements specified for Customer Interface to Central Office "CI to CO" connections in the technical reference listed in Appendix A to this Attachment 2, at paragraph 2.13 thereof.

8.2.5. When requested by AT&T, Dedicated Transport shall provide physical diversity. Physical diversity means that two circuits are provisioned in such a way that no single failure of facilities or equipment will cause a failure on both circuits.

8.2.6. When physical diversity is requested by AT&T, GTE shall provide the maximum feasible physical separation between intra-office and inter-office transmission paths (unless otherwise agreed by AT&T).

8.2.7. Upon AT&T's request, GTE shall provide Real Time and continuous remote access to performance monitoring and alarm data affecting, or potentially affecting, AT&T's traffic.

8.2.8. GTE shall offer the following interface transmission rates for Dedicated Transport:

8.2.8.1. DS1 (Extended SuperFrame - ESF, D4, and unframed applications shall be provided);

8.2.8.2. DS3 (C-bit Parity, M13, and unframed applications shall be provided);

8.2.8.3. SONET standard interface rates in accordance with ANSI T1.105 and ANSI T1.105.07 and physical interfaces per ANSI T1.106.06

(including referenced interfaces). In particular, VT1.5 based STS-1s will be the interface at an AT&T service node.

8.2.8.4. SDH Standard interface rates in accordance with International Telecommunications Union (ITU) Recommendation G.707 and Plesiochronous Digital Hierarchy (PDH) rates per ITU Recommendation G.704.

8.2.9. GTE shall provide cross-office wiring up to a suitable Point of Termination (POT) between Dedicated Transport and AT&T designated equipment. GTE shall provide the following equipment for the physical POT:

8.2.9.1. DSX1 for DS1s or VT1.5s;

8.2.9.2. DSX3 for DS3s or STS-1s; and

8.2.9.3. LGX for optical signals (e.g., OC-3 and OC-12)

8.2.10. [Intentionally deleted.]

8.2.11. For Dedicated Transport provided as a system, GTE shall design the system (including but not limited to facility routing and termination points and facility routing over existing transport facilities between GTE and a second carrier to carry traffic designated for that carrier) according to AT&T specifications. If AT&T requests higher quality specifications than GTE provides to itself, AT&T shall pay the incremental cost of implementing such higher quality specification.

8.2.12. Upon AT&T's request, GTE shall provide AT&T with electronic provisioning control of Dedicated Transport purchased by AT&T and connected to a Digital Cross Connect System (DCS), if the DCS has Customer Network Controller capability.

8.2.13. [Intentionally deleted]

8.2.14. At a minimum, Dedicated Transport shall meet each of the requirements set forth in Section 7.2 and in the technical references listed in Appendix A to this Attachment 2, under paragraph 7 thereof.

8.3. Technical Requirements for Dedicated Transport Using SONET technology.

This Section sets forth additional technical requirements for Dedicated Transport using SONET technology including rings, point-to-point systems, and linear add-drop systems.

8.3.1. All SONET Dedicated Transport provided as a system shall:

8.3.1.1. Be synchronized from both a primary and secondary Stratum 1 level timing source. Additional detail on synchronization requirements are given in Section 13.4.

8.3.1.2. Provide SONET standard interfaces which properly interwork with SONET standard equipment from other vendors. This includes, but is not limited to, SONET standard Section, Line, and Path performance monitoring, maintenance signals, alarms, and data channels.

8.3.1.3. Provide Data Communications Channel (DCC) or equivalent connectivity through the SONET transport system. Dedicated Transport provided over a SONET transport system shall be capable of routing DCC messages between AT&T SONET network components connected to the Dedicated Transport. For example, if AT&T leases a SONET ring from GTE, that ring shall support DCC message routing between AT&T SONET network components connected to the ring.

8.3.1.4. Support the following performance requirements for each circuit (STS-1, DS1, DS3, etc.):

8.3.1.4.1. No more than 10 Errored Seconds Per Day (Errored Seconds are defined in the technical reference at Appendix A to this Attachment 2 at paragraph 7.5); and

8.3.1.4.2. No more than 1 Severely Errored Second Per Day (Severely Errored Seconds are defined in the technical references set forth in Appendix A to this Attachment 2, at paragraph 7.5).

8.3.2. All SONET rings shall:

8.3.2.1. Be provisioned on physically diverse fiber optic cables (including separate building entrances where available and diversely routed intra-office wiring). "Diversely routed" shall be interpreted as the maximum feasible physical separation between transmission paths, unless otherwise agreed by AT&T.

8.3.2.2. Support dual ring interworking per SONET Standards.

8.3.2.3. Provide the necessary redundancy in optics, electronics, and transmission paths (including intra-office wiring) such that no single failure will cause a service interruption.

8.3.2.4. Provide the ability to disable ring protection switching at AT&T's direction (selective protection lock-out). This requirement applies to line switched rings only.

8.3.2.5. Provide the ability to use the protection channels to carry traffic (extra traffic). This requirement applies to line switched rings only.

8.3.2.6. Provide 50 millisecond restoration unless a ring protection delay is set to accommodate dual ring interworking schemes.

8.3.2.7. Have settable ring protection switching thresholds that shall be set in accordance with AT&T's specifications.

8.3.2.8. Provide revertive protection switching with a settable wait to restore delay with a default setting of 5 minutes. This requirement applies to line switched rings only.

8.3.2.9. Provide non-revertive protection switching. This requirement applies to path switched rings only.

8.3.2.10. Adhere to the following availability requirements, where availability is defined in the technical reference listed in Appendix A to this Attachment 2, at paragraph 7.5 thereof.

8.3.2.10.1. No more than 0.25 minutes of unavailability month; and

8.3.2.10.2. No more than 0.5 minutes of unavailability per year.

8.4. Digital Cross-Connect System (DCS)

8.4.1. Definition:

8.4.1.1. DCS is a function which provides automated cross connection of Digital Signal level 0 (DS0) or higher transmission bit rate digital channels within physical interface facilities. Types of DCSs include but are not limited to DCS 1/0s, DCS 3/1s, and DCS 3/3s, where the nomenclature 1/0 denotes interfaces typically at the DS1 rate or greater with cross-connection typically at the DS0 rate. This same nomenclature, at the appropriate rate substitution, extends to the other types of DCSs specifically cited as 3/1 and 3/3. Types of DCSs that cross-connect Synchronous Transport Signal level 1 (STS-1s) or other Synchronous Optical Network (SONET) signals (e.g., STS-3) are also DCSs, although not denoted by this same type of nomenclature. DCS may provide the functionality of more than one of the aforementioned DCS types (e.g., DCS 3/3/1 which combines functionality of DCS 3/3 and DCS 3/1). For such DCSs, the requirements will be, at least, the aggregation of requirements on the "component" DCSs.

8.4.1.2. In locations where automated cross connection capability does not exist, DCS will be defined as the combination of the functionality provided by a Digital Signal Cross-Connect (DSX) or Light Guide Cross-Connect (LGX) patch panels and D4 channel banks or other DS0 and above multiplexing equipment used to provide the function of a manual cross connection.

8.4.1.3. Interconnection between a DSX or LGX, to a switch, another cross-connect, or other service platform device, is included as part of DCS.

8.5. DCS Technical Requirements

8.5.1. DCS shall provide completed end-to-end cross connection of the channels designated by AT&T.

8.5.2. DCS shall perform facility grooming, multipoint bridging, one-way broadcast, two-way broadcast, and facility test functions.

8.5.3. DCS shall provide multiplexing, format conversion, signaling conversion, or other functions.

8.5.4. The end-to-end cross connection assignment shall be input to the underlying device used to provide DCS from an operator at a terminal or via an intermediate system. The cross connection assignment shall remain in effect whether or not the circuit is in use.

8.5.5. GTE shall continue to administer and maintain DCS, including updates to the control software to current available releases.

8.5.6. GTE shall provide various types of Digital Cross-Connect Systems including:

8.5.6.1. DS0 cross-connects (typically termed DCS 1/0);

8.5.6.2. DS1/VT1.5 (Virtual Tributaries at the 1.5Mbps rate) cross-connects (typically termed DCS 3/1);

8.5.6.3. DS3 cross-connects (typically termed DCS 3/3);

8.5.6.4. STS-1 cross-connects; and

8.5.6.5. Other technically feasible cross-connects designated by AT&T.

8.5.7. GTE shall provide immediate and continuous configuration and reconfiguration of the channels between the physical interfaces (i.e., GTE shall establish the processes to implement cross connects on demand, or, at AT&T's option, permit AT&T control of such configurations and reconfigurations).

8.5.8. GTE shall provide scheduled configuration and reconfiguration of the channels between the physical interfaces (i.e., GTE shall establish the processes to implement cross connects on the schedule designated by AT&T, or, at AT&T's option, permit AT&T to control such configurations and reconfigurations).

8.5.9. DCS shall continuously monitor protected circuit packs and redundant common equipment.

8.5.10. DCS shall automatically switch to a protection circuit pack on detection of a failure or degradation of normal operation.

8.5.11. The underlying equipment used to provide DCS shall be equipped with a redundant power supply or a battery back-up.

8.5.12. GTE shall make available to AT&T spare facilities and equipment, at AT&T's expense to the extent such costs are not included in the cost of the unbundled network element, necessary for provisioning repairs, and to meet AT&T's Direct Measures Of Quality (DMOQs) as specified in the Provisioning and Maintenance sections.

8.5.13. At AT&T's option, GTE shall provide AT&T with Real Time performance monitoring and alarm data on the signals and the components of the underlying equipment used to provide DCS that actually impact or might impact AT&T's services. GTE will need to establish processes that allow GTE to provide these capabilities to AT&T. For example, this may include hardware alarm data and facility alarm data on a DS3 in which an AT&T DS1 is traversing.

8.5.14. At AT&T's option, GTE shall provide AT&T with Real Time ability to initiate tests on integrated equipment used to test the signals and the underlying equipment used to provide DCS, as well as other integrated functionality for routine testing and fault isolation.

8.5.15. DCS shall provide SONET to asynchronous gateway functionality (e.g., STS-1 to DS1 or STS-1 to DS3).

8.5.16. DCS shall perform optical to electrical conversion where the underlying equipment used to provide DCS contains optical interfaces or terminations (e.g., Optical Carrier level 3, i.e., OC-3, interfaces on a DCS 3/1).

8.5.17. DCS shall have SONET ring terminal functionality where the underlying equipment used to provide DCS acts as a terminal on a SONET ring.

8.5.18. DCS shall provide multipoint bridging of multiple channels to other DCSs. AT&T may designate multipoint bridging to be one-way broadcast from a single master to multiple tributaries, or two-way broadcast between a single master and multiple tributaries.

8.5.19. DCS shall multiplex lower speed channels onto a higher speed interface and demultiplex higher speed channels onto lower speed

interfaces as designated by AT&T.

8.6. DCS Interface Requirements

8.6.1. GTE shall provide physical interfaces on DS0, DS1, and VT1.5 channel cross-connect devices at the DS1 rate or higher. In all such cases, these interfaces shall be in compliance with applicable Bellcore, ANSI, ITU, and AT&T standards.

8.6.2. GTE shall provide physical interfaces on DS3 channel cross-connect devices at the DS3 rate or higher. In all such cases, these interfaces shall be in compliance with applicable Bellcore, ANSI, ITU, and AT&T standards.

8.6.3. GTE shall provide physical interfaces on STS-1 cross-connect devices at the OC-3 rate or higher. In all such cases, these interfaces shall be in compliance with applicable Bellcore, ANSI, ITU , and AT&T standards.

8.6.4. Interfaces on all other cross-connect devices shall be in compliance with applicable Bellcore, ANSI, ITU , and AT&T standards.

8.6.5. DCS shall, at a minimum, meet all the requirements set forth in the technical references listed in Appendix A to this Attachment 12, under paragraph 8 thereof.

9. Signaling Link Transport

9.1. Definition:

Signaling Link Transport is a set of two or four dedicated 56 Kbps. transmission paths between AT&T-designated Signaling Points of Interconnection (SPOI) that provides appropriate physical diversity.

9.2. Technical Requirements

Signaling Link Transport shall consist of full duplex mode 56 kbps transmission paths.

9.3. Of the various options available, Signaling Link Transport shall perform in the following two ways:

9.3.1. As an “A-link” which is a connection between a switch and a home Signaling Transfer Point Switch (STPS) pair; and

9.3.2. As a “D-link” which is a connection between two STPS pairs in different company networks (e.g., between two STPS pairs for two Competitive Local Exchange Carriers (CLECs)).

9.4. Signaling Link Transport shall consist of two or more signaling link layers as follows:

9.4.1. An A-link layer shall consist of two links.

9.4.2. A D-link layer shall consist of four links.

9.4.3. A signaling link layer shall satisfy a performance objective such that:

9.4.3.1. There shall be no more than two minutes down time per year for an A-link layer; and

9.4.3.2. There shall be negligible (less than 2 seconds) down time per year for a D-link layer.

9.4.4. A signaling link layer shall satisfy interoffice and intraoffice diversity of facilities and equipment, such that:

9.4.5. No single failure of facilities or equipment causes the failure of both links in an A-link layer; and

9.4.6. No two concurrent failures of facilities or equipment shall cause the failure of all four links in a D-link layer.

9.5. Interface Requirements

9.5.1. There shall be a dedicated DS1 (1.544 Mbps) interface at the AT&T-designated SPOIs. Each 56 kbps transmission path shall appear as a DS0 channel within the DS1 interface.

10. Signaling Transfer Points (STPs)

10.1. **Definition:** Signaling Transfer Points is a signaling network function that includes all of the capabilities provided by the signaling transfer point switches (STPs) and their associated signaling links which enable the exchange of SS7 messages among and between switching elements, database elements and signaling transfer point switches.

10.2. **Technical Requirements**

10.2.1. STPs shall provide access to all other Network Elements connected to the GTE SS7 network. These include:

10.2.1.1. GTE Local Switching or Tandem Switching;

10.2.1.2. GTE Service Control Points/DataBases;

10.2.1.3. Third-party local or tandem switching systems; and

10.2.1.4. Third-party-provided STPs.

10.2.2. The connectivity provided by STPs shall fully support the functions of all other Network Elements connected to the GTE SS7 network. This explicitly includes the use of the GTE SS7 network to convey messages which neither originate nor terminate at a signaling end point directly connected to the GTE SS7 network (i.e., transient messages). When the GTE SS7 network is used to convey transient messages, there shall be no alteration of the Integrated Services Digital Network User Part (ISDNUP) or Transaction Capabilities Application Part (TCAP) user data that constitutes the content of the message.

10.2.3. If a GTE tandem switch routes calling traffic, based on dialed or translated digits, on SS7 trunks between an AT&T local switch and third party local switch, the GTE SS7 network shall convey the TCAP messages that are necessary to provide Call Management features (Automatic Callback, Automatic Recall, and Screening List Editing) between the AT&T local STPSs and the STPSs that provide connectivity with the third party local switch, even if the third party local switch is not directly connected to the GTE STPSs.

10.2.4. STPs shall provide all functions of the SCCP necessary for Class 0

(basic connectionless) service. In cases where the destination signaling point is a GTE local or tandem switching system or data base, or is an AT&T or third party local or tandem switching system directly connected to the GTE SS7 network, STPs shall perform final GTT of messages to the destination and SCCP Subsystem Management of the destination. In all other cases, STPs shall perform intermediate GTT of messages to a gateway pair of STPSs in an SS7 network connected with the GTE SS7 network, and shall not perform SCCP Subsystem Management of the destination.

10.2.5. When such capability is deployed in the GTE network, STPs shall provide all functions of the OMAP commonly provided by STPs, as specified in the reference set forth in Appendix A to this Attachment 2, at paragraph 9.5. This includes:

10.2.5.1. MTP Routing Verification Test (MRVT); and,

10.2.5.2. SCCP Routing Verification Test (SRVT).

10.2.6. This Section 10.2.8 applies when such capabilities are deployed in the GTE network. In cases where the destination signaling point is a GTE local or tandem switching system or DB, or is an AT&T or third party local or tandem switching system directly connected to the GTE SS7 network, STPs shall perform MRVT and SRVT to the destination signaling point. In all other cases, STPs shall perform MRVT and SRVT to a gateway pair of STPSs in an SS7 network connected with the GTE SS7 network. This requirement shall be superseded by the specifications for Internetwork MRVT and SRVT if and when these become approved ANSI standards and available capabilities of GTE STPs.

10.2.7. AT&T and GTE agree to participate in the industry IN Forum “Interconnection and Access Group” project to address interconnection requirements for multiple third party AIN SCP access to GTE’s switch triggers. AT&T and GTE recognize that actual commencement of tests under this project will be determined by all participants in the project.

10.3. Interface Requirements

10.3.1. GTE shall provide the following STPs options to connect AT&T or AT&T-designated local switching systems or STPSs to the GTE SS7 network:

10.3.1.1. An A-link interface from AT&T local switching systems; and,

10.3.1.2. A D-link interface from AT&T local STPSs.

10.3.2. Each type of interface shall be provided by one or more sets (layers) of signaling links, as follows:

10.3.2.1. An A-link layer shall consist of two links.

10.3.2.2. A D-link layer shall consist of four links.

10.3.3. The Signaling Point of Interconnection (SPOI) for each link shall be located at a cross-connect element, such as a DSX-1, in the Central Office (CO) where the GTE STPS is located. There shall be a DS1 or higher rate transport interface at each of the SPOIs. Each signaling link shall appear as a DS0 channel within the DS1 or higher rate interface. GTE shall offer higher rate DS1 signaling for interconnecting AT&T local switching systems or STPSs with GTE STPSs as soon as these become approved ANSI standards and available capabilities of GTE STPs.

10.3.4. GTE shall provide intraoffice diversity between the SPOIs and the GTE STPS, so that no single failure of intraoffice facilities or equipment shall cause the failure of both D-links in a layer connecting to a GTE STPS.

10.4. Message Screening

10.4.1. GTE shall set message screening parameters so as to accept messages from AT&T local or tandem switching systems destined to any signaling point in the GTE SS7 network with which the AT&T switching system has a legitimate signaling relation.

10.4.2. GTE shall set message screening parameters so as to accept messages from AT&T local or tandem switching systems destined to any signaling point or network interconnected within the GTE SS7 network with which the AT&T switching system has a

legitimate signaling relation.

10.4.3. GTE shall set message screening parameters so as to accept messages destined to an AT&T local or tandem switching system from any signaling point or network interconnected within the GTE SS7 network with which the AT&T switching system has a legitimate signaling relation.

10.4.4. GTE shall set message screening parameters so as to accept and send messages destined to an AT&T SCP from any signaling point or network interconnected within the GTE SS7 network with which the AT&T SCP has a legitimate signaling relation.

10.5. STPs shall meet or exceed the requirements for STPs set forth in the technical references listed in Appendix A to this Attachment 2, under paragraph 9 thereof.

11. Service Control Points/Databases

11.1. Definition:

Databases are the Network Elements that provide the functionality for storage of, access to, and manipulation of information required to offer a particular service and/or capability.

11.1.1. A Service Control Point (SCP) is a specific type of Database Network Element functionality deployed in a Signaling System 7 (SS7) network that executes service application logic in response to SS7 queries sent to it by a switching system also connected to the SS7 network. SCPs also provide operational interfaces to allow for provisioning, administration and maintenance of subscriber data and service application data. (e.g., an 800 database stores customer record data that provides information necessary to route 800 calls).

11.2. Technical Requirements for SCPs/Databases

Requirements for SCPs/Databases within this section address storage of information, access to information (e.g. signaling protocols, response times), and administration of information (e.g., provisioning, administration, and maintenance). All SCPs/Databases shall be provided to AT&T in accordance with the following requirements, except where such a requirement is

superseded by specific requirements set forth in Sections 11.3 to 11.7.

11.2.1. GTE shall make available physical interconnection to SCPs through the SS7 network and protocols, as specified in Section 10 of this Attachment, with TCAP as the application layer protocol.

11.2.2. Except for GTE's directory assistance databases, GTE shall provide physical interconnection to databases via industry standard interfaces and protocols. GTE will provide AT&T with copies of its directory assistance databases on magnetic tape. GTE will also provide to AT&T daily updates to its directory assistance databases on magnetic tape. AT&T and GTE shall agree on the type of magnetic tape, the format of the data on the tapes, the locations for delivery of the tapes, and all other implementation issues that the parties need to be resolved within ten days of the Effective Date of this Agreement. If the parties fail to reach agreement pursuant to this Section, the parties will submit the disputed issues to the alternative dispute resolution process as set forth in this Agreement.

11.2.3. The reliability of interconnection options shall be consistent with requirements for diversity and survivability as specified in Section 10 of this Attachment (which applies to both SS7 and non-SS7 interfaces).

11.2.4. [Intentionally deleted.]

11.2.5. GTE shall provide Database provisioning consistent with the provisioning requirements of this Agreement (e.g., data required, edits, acknowledgments, data format and transmission medium and notification of order completion).

11.2.6. GTE shall provide Database maintenance consistent with the maintenance requirements as specified in this Agreement.

11.2.7. GTE shall provide billing and recording information to track database usage consistent with connectivity billing and recording requirements as specified in this Agreement.

11.2.8. GTE shall provide SCPs/Databases in accordance with the physical security requirements specified in this Agreement.

11.2.9. GTE shall provide SCPs/Databases in accordance with the logical security requirements specified in this Agreement.

11.3. Line Information Database (LIDB).

This Subsection defines and sets forth additional requirements for the Line Information Database.

11.3.1. Definition**:**

The Line Information Database (LIDB) is a transaction-oriented database accessible through Common Channel Signaling (CCS) networks. It contains records associated with customer Line Numbers and Special Billing Numbers (in accordance with the requirements set forth in the technical reference listed in Appendix A to this Attachment 2, at paragraph 10.5.). LIDB accepts queries from other Network Elements and provides appropriate responses. The query originator need not be the owner of LIDB data. LIDB queries include functions such as screening billed numbers that provides the ability to accept Collect or Third Number Billing calls and validation of Telephone Line Number based non-proprietary calling cards. The interface for the LIDB functionality is the interface between the GTE CCS network and other CCS networks. LIDB also interfaces to administrative systems. The administrative system interface provides Work Centers with an interface to LIDB for functions such as provisioning, auditing of data, access to LIDB measurements and reports.

11.3.2. Technical Requirements

11.3.2.1. Prior to the availability of a long-term solution for Local Number Portability, GTE shall enable AT&T to store in GTE's LIDB any customer Line Number or Special Billing Number record, for which the NPA-NXX or NXX-0/1XX Group is supported by that LIDB.

11.3.2.2. Prior to the availability of a long-term solution for Local Number Portability, GTE shall enable AT&T to store in GTE's LIDB any

customer Line Number or Special Billing Number record, and NPA-NXX and NXX-0/1XX Group Records, belonging to an NPA-NXX or NXX-0/1XX owned by AT&T.

11.3.2.3. Subsequent to the availability of a long-term solution for Local Number Portability, GTE shall enable AT&T to store in GTE's LIDB any customer Line Number or Special Billing Number record, regardless of the number's NPA-NXX or NXX-0/1XX.

11.3.2.4. GTE shall perform the following LIDB functions for AT&T's customer records in LIDB:

11.3.2.4.1. Billed Number Screening (provides information such as whether the Billed Number may accept Collect or Third Number Billing calls); and

11.3.2.4.2. Calling Card Validation

11.3.2.5. GTE shall process AT&T's customer records in LIDB at least at parity with GTE customer records. With respect to other LIDB functions, GTE shall indicate to AT&T what additional functions (if any) are performed by LIDB in their network.

11.3.2.6. Within two (2) weeks after a request by AT&T, GTE shall provide AT&T with a list of the customer data items which AT&T would have to provide in order to support each required LIDB function. The list shall indicate which data items are essential to LIDB function, and which are required only to support certain services. For each data item, the list shall show the data formats, the acceptable values of the data item and the meaning of those values.

11.3.2.7. [Intentionally deleted.]

11.3.2.8. [Intentionally deleted.]

11.3.2.9. [Intentionally deleted.]

11.3.2.10. GTE shall make changes to NPA-NXX and NXX-0/1XX Group Records, and Line Number and Special Billing Number Records associated with AT&T Customer, as requested by AT&T, within

time frames at parity with those time frames in which GTE makes such changes for its own or any other carrier's customers.

11.3.2.11. In the event that end user customers change their local service provider, GTE shall maintain customer data (for line numbers, card numbers, and for any other types of data maintained in LIDB excluding GTE-issued line based calling card numbers) so that such customers shall not experience any interruption of service due to the lack of such maintenance of customer data.

11.3.2.12. All additions, updates and deletions of AT&T data to the LIDB shall be solely at the direction of AT&T.

11.3.2.13. GTE shall provide priority updates to LIDB for AT&T data upon AT&T's request (e.g., to support fraud protection).

11.3.2.14. [Intentionally deleted.]

11.3.2.15. GTE shall perform backup and recovery of all of AT&T's data in LIDB as frequently as AT&T may reasonably specify, including sending to LIDB all changes made since the date of the most recent backup copy.

11.3.2.16. GTE shall provide to AT&T access to LIDB measurements and reports at least at parity with the capability GTE has for its own customer records and that GTE provides to any other party.

11.3.2.17. GTE shall provide AT&T with LIDB reports of data which are missing or contain errors, as well as any misroute errors, within the time period reasonably designated by AT&T.

11.3.2.18. GTE shall prevent any access to or use of AT&T data in LIDB by GTE personnel or by any other party that is not authorized by AT&T in writing.

11.3.2.19. Where technically feasible and currently available, GTE shall provide AT&T performance of the LIDB Data Screening function, which allows a LIDB to completely or partially deny specific query originators access to LIDB data owned by specific data owners, (in accordance with the technical reference listed in Appendix A to this

Attachment 2, at paragraph 10.5.) for Customer Data that is part of an NPA-NXX or NXX-0/1XX wholly or partially owned by AT&T at least at parity with GTE Customer Data. AT&T will provide GTE the screening information associated with LIDB Data Screening of AT&T data in accordance with this requirement.

11.3.2.20. GTE shall accept queries to LIDB associated with AT&T Customer records, and shall return responses in accordance with the requirements of this Section 11.

11.3.2.21. [Intentionally deleted.]

11.3.2.22. [Intentionally deleted.]

11.3.2.23. [Intentionally deleted.]

11.3.2.24. [Intentionally deleted.]

11.3.2.24.1. [Intentionally deleted.]

11.3.2.24.2. [Intentionally deleted.]

11.3.2.24.3. [Intentionally deleted.]

11.3.2.24.4. [Intentionally deleted.]

11.3.2.24.5. [Intentionally deleted.]

11.3.2.24.6. [Intentionally deleted.]

11.3.2.24.6.1. [Intentionally deleted.]**.**

11.3.2.24.6.2. [Intentionally deleted.]

11.3.2.24.6.3. [Intentionally deleted.]

11.3.3. LIDB Interface Requirements.

GTE shall offer LIDB in accordance with the requirements of this Subsection.

11.3.3.1. The interface to LIDB shall be in accordance with the technical reference listed in Appendix A to this Attachment 2, at paragraph 10.3.

11.3.3.2. The CCS interface to LIDB shall be the standard interface listed in Appendix A to this Attachment 2, at paragraph 10.3.

11.3.3.3. The LIDB Data Base interpretation of the ANSI-TCAP messages shall comply with the technical reference listed in Appendix A to this Attachment 2, at paragraph 10.4. Global Title Translation shall be maintained in the signaling network in order to support signaling network routing to the LIDB.

11.4. Toll Free Number Database

The Toll Free Number Database is a SCP that provides functionality necessary for toll free (e.g., 800 and 888) number services by providing routing information and additional so-called vertical features during call set-up in response to queries from SSPs. GTE shall provide the Toll Free Number Database in accordance with the following:

11.4.1. Technical Requirements

11.4.1.1. GTE shall make the GTE Toll Free Number Database available for AT&T to query with a toll-free number and originating information.

11.4.1.2. The Toll Free Number Database shall return carrier identification and, where applicable, the queried toll free number, translated numbers and instructions as it would in response to a query from a GTE switch.

11.4.2. Signaling Interface Requirements

The signaling interface between the AT&T or other local switch and the Toll-Free Number database shall use the TCAP protocol as specified in the technical reference listed in Appendix A to this Attachment 2, at paragraph 10.1, together with the signaling network interface as specified in the technical reference listed in Appendix A to this Attachment 2, at paragraphs 10.2. and 10.6.

11.5. Automatic Location Identification/Data Management System (ALI/DMS)

11.5.1. The ALI/DMS Database contains customer information (including name, address, telephone information, and sometimes special information from the local service provider or customer) used to determine to which Public Safety Answering Point (PSAP) to route the call. The ALI/DMS database is used to provide more routing flexibility for E911 calls than Basic 911.

11.6. Technical Requirements

11.6.1. GTE shall provide the Emergency Services Data Base in accordance with the following: GTE shall offer AT&T a data link to the ALI/DMS database or permit AT&T to provide its own data link to the ALI/DMS database. GTE shall provide error reports from the ALI/DMS data base to AT&T immediately after AT&T inputs information into the ALI/DMS data base. Alternately, AT&T may utilize GTE to enter customer information into the data base on a demand basis, and validate customer information on a demand basis.

11.6.2. The ALI/DMS database shall contain the following customer information:

11.6.2.1. Name;

11.6.2.2. Address;

11.6.2.3. Telephone number; and

11.6.2.4. Other information as appropriate (e.g., whether a customer is blind or deaf or has another disability).

11.6.2.5. When GTE is responsible for administering the ALI/DMS database in its entirety, ported number NXXs entries for the ported numbers should be maintained unless AT&T requests otherwise and shall be updated if AT&T requests.

11.6.2.6. When Remote Call Forwarding (RCF) is used to provide number portability to the local customer and a remark or other appropriate

field information is available in the database, the shadow or "forwarded-to" number and an indication that the number is ported shall be added to the customer record.

11.6.2.7. If GTE is responsible for configuring PSAP features (for cases when the PSAP or GTE supports an ISDN interface) it shall ensure that CLASS Automatic Recall (Call Return) is not used to call back to the ported number.

11.6.2.8. [Intentionally deleted.]

11.6.3. SCPs/Databases shall meet or exceed the requirements for SCPs/Databases set forth in the technical references listed in Appendix A to this Attachment 2, under paragraph 10.

11.7. Service Creation Environment and Service Management System (SCE/SMS) Advanced Intelligent Network (AIN) Access

11.7.1. Advanced Intelligent Network (AIN) Database. AT&T shall have the right to obtain access to and to use GTE's service applications in the GTE SMS in addition to AT&T's own service applications that AT&T deploys via the GTE SMS to the GTE SCP, as required below. AT&T may use and access such service applications either through AT&T Switch(es) to the GTE AIN SCP via interconnection of the GTE SS7 and AT&T SS7 networks or through its purchase of unbundled elements, including local switching, from GTE. When AT&T obtains access to GTE's service applications using an AT&T switch, this interconnection arrangement shall result in the GTE AIN SCP recognizing the AT&T Switch as at least at parity with GTE's Local Switch in terms of interfaces, performance and capabilities.

11.7.1.1. GTE STPs shall maintain global title translations necessary to direct AIN queries for select global title address and translation type values to and from the AT&T SS7 network, within the global title translation capacity to the STP.

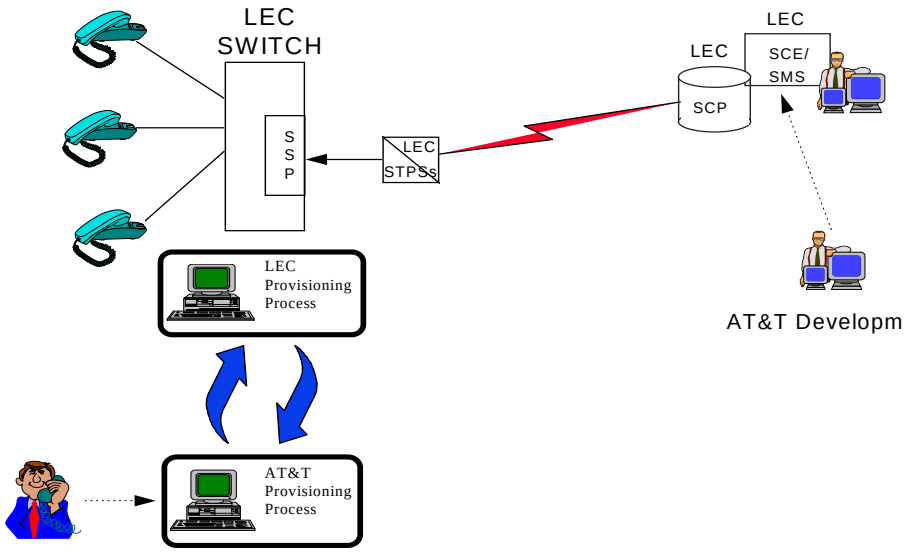
11.7.1.2. Requirements for billing and recording information to track AIN query-response usage shall be consistent with Connectivity Billing and Recording requirements as specified in Attachment 6 (e.g., recorded message format and content, timeliness of feed, data format and transmission medium).

11.7.1.3. GTE shall provide to AT&T all necessary testing resources and staff to perform service certification testing prior to service deployment in accordance with the Cooperative Testing section of this Agreement provided that AT&T shall reimburse GTE for the cost of providing such resources.

11.7.1.4. [Intentionally deleted]

11.7.1.5. When AT&T selects SS7 Access, GTE will provide interconnection of its SS7 network per Section 10 of this Attachment 10 with AT&T's SS7 network for exchange of AIN TCAP messages between AT&T's SSP and GTE's AIN SCP.

11.7.1.6. STPs shall offer SS7 AIN Access in accordance with the requirements of the technical references listed in Appendix A to this Attachment 2,

11.7.2. 

the

nt
E's
ble
ent

E
SCE

11.7.2.1. GTE shall make SCE hardware, software, testing and technical support (e.g., technical contacts, system administrator) resources available to AT&T. Scheduling of SCE resources shall allow AT&T at least equal priority to GTE provided that AT&T shall reimburse GTE for the cost of providing such resources.

11.7.2.2. The GTE SCE/SMS shall allow for multi-user access with proper source code management and other logical security functions as specified in the Security section of this Agreement.

11.7.2.3. The GTE SCP shall partition and protect AT&T service logic and data from unauthorized access, execution or other types of compromise.

11.7.2.4. GTE shall provide training and documentation for AT&T development staff only in cases in which such training or documentation is not reasonably available from another source. If training or documentation is required in accordance with this section, it will be provided in a manner at least at parity with that provided by GTE to its development staff. Training will be conducted at a mutually agreed upon location provided that AT&T shall reimburse GTE for the cost of providing such resources.

11.7.2.5. When AT&T selects SCE/SMS AIN Access, GTE shall provide for a secure, controlled access environment on-site, and, if technically feasible, via remote data connections (e.g., dial up, LAN, WAN).

11.7.2.6. When AT&T selects SCE/SMS AIN Access, GTE shall allow AT&T to download data forms and/or tables to GTE SCP via GTE SMS without intervention from GTE (e.g., customer subscription).

11.7.2.7. Service Control Points (SCP)/Databases shall offer SCE/SMS AIN Access in accordance with requirements of GR-1280-CORE, AIN SCP Generic Requirements.

11.7.3. Any mediation to GTE's AIN database that GTE decides to apply, including the application of network management controls determined by GTE to be necessary to protect the SCP from an overload condition, will be done in a competitively neutral and nondiscriminatory basis for all users of the AIN database, including GTE and its customers. For example, any load mediation will affect all links to the STP, including those of GTE or its customers, in a like manner. AT&T agrees to provide forecast information of its AIN requirements sufficient to permit GTE to engineer sufficient capacity on GTE's AIN SCP platform.

12. Tandem Switching

12.1. Definition*:*

Tandem Switching is the function that establishes a communications path between two switching offices through a third switching office (the tandem switch).

12.2. Technical Requirements

Tandem switching shall provide the following capabilities, where technically feasible:

12.2.1. Signaling to establish a tandem connection;

12.2.2. Screening and routing;

12.2.3. Recording of all billable events;

12.2.4. Connectivity to Operator Systems;

12.2.5. Access to Toll Free number portability database;

12.2.6. Tandem Switching shall provide all trunk interconnections discussed under the "Network Interconnection" section (e.g., SS7, MF, DTMF, DialPulse, PRI-ISDN, DID, and CAMA-ANI (if appropriate for 911));

12.2.7. Tandem Switching shall provide connectivity to PSAPs where 911 solutions are deployed and the tandem is used for 911; and

12.2.8. Tandem Switching shall provide connectivity to transit traffic to and from other carriers.

12.2.9. Tandem Switching shall accept connections (including the necessary signaling and trunking interconnections) between end offices, other tandems, IECs, ICOs, CAPs and CLEC switches.

12.2.10. Tandem Switching shall provide local tandeming functionality between two end offices including two offices belonging to different CLEC's (e.g., between an AT&T end office and the end office of another CLEC).

12.2.11. Tandem Switching shall preserve CLASS/LASS features and Caller ID as traffic is processed. Additional signaling information and requirements are provided in Section 10.

12.2.12. Tandem Switching shall record billable events and send them to the area billing centers designated by AT&T. Billing requirements are specified in Attachment 6 of this Agreement.

12.2.13. GTE shall perform routine testing and fault isolation on the underlying switch that is providing Tandem Switching and all its interconnections. When requested by AT&T, the results and reports of the testing shall be made available to AT&T. If AT&T requests testing and fault isolation which GTE does not provide for

itself, AT&T shall pay all costs associated therewith to the extent that such costs are not otherwise included in the cost of the element.

12.2.14. GTE shall maintain AT&T's trunks and interconnections associated with Tandem Switching at least at parity to its own trunks and interconnections.

12.2.15. When requested by AT&T, GTE shall provide performance data regarding traffic characteristics or other measurable elements to AT&T for review.

12.2.16. Tandem Switching shall control congestion using capabilities such as Automatic Congestion Control and Network Routing Overflow. Congestion control provided or imposed on AT&T traffic shall be at parity with controls being provided or imposed on GTE traffic (e.g., GTE shall not block AT&T traffic and leave its traffic unaffected or less affected).

12.2.17. Tandem Switching shall route calls to GTE or AT&T endpoints or platforms (e.g., operator services and PSAPs) on a per call basis as designated by AT&T. AT&T shall pay all costs associated therewith to the extent that such costs are not otherwise included in the cost of the element. Detailed primary and overflow routing plans for all interfaces available within the GTE switching network shall be mutually agreed to by AT&T and GTE. Such plans shall meet AT&T requirements for routing calls through the local network.

12.2.18. Tandem Switching shall process originating toll-free traffic received from an AT&T local switch.

12.2.19. The Local Switching and Tandem Switching functions may be combined in an office. If this is done, both Local Switching and Tandem Switching shall provide all of the functionality required of each of those Network Elements in this Agreement.

12.3. Interface Requirements

12.3.1. Tandem Switching shall provide interconnection to the E911 PSAP where the underlying Tandem is acting as the E911 Tandem.

12.3.2. Tandem Switching shall interconnect, with direct trunks, to all carriers with which GTE interconnects.

12.3.3. GTE shall provide all signaling necessary to provide Tandem Switching with no loss of feature functionality.

12.3.4. Tandem Switching shall interconnect with AT&T's switch, using two-way trunks, for traffic that is transiting via the GTE network to interLATA or intraLATA carriers GTE shall record tandem switching events necessary for GTE to bill AT&T for tandem switching and any applicable transport.

12.3.5. At AT&T's request, Tandem Switching shall provide overflow routing of traffic from a given trunk group or groups onto another trunk group or groups according to the methodology that AT&T designates.

12.3.6. Tandem Switching shall adhere to the Trunk Interface Requirements provided in the "Network Interconnection" section.

12.4. Tandem Switching shall meet or exceed each of the requirements for Tandem Switching set forth in the technical references listed in Appendix A to this Attachment 2, under paragraph 12.

13. Additional Requirements

This Section 13 of Attachment 2 sets forth the additional requirements for unbundled Network Elements which GTE agrees to offer to AT&T under this Agreement.

13.1. Cooperative Testing

13.1.1. Definition:

Cooperative Testing means that GTE shall cooperate with AT&T upon request or as needed to (1) ensure that any designed Network Elements provided to AT&T by GTE are in compliance with the requirements of this Agreement, (2) test the overall functionality of various designed Network Elements provided by GTE to AT&T in combination with each other or in combination with other equipment and facilities provided by AT&T or third parties, and (3) ensure that

all operational interfaces and processes are in place and functioning properly and efficiently for the provisioning and maintenance of designed Network Elements so that all appropriate billing data can be provided to AT&T.

13.1.2. Requirements

Within 60 days of the Effective Date of this Agreement, AT&T and GTE will agree upon a process to resolve technical issues relating to interconnection of AT&T's network to GTE's network and Network Elements and Ancillary Functions. The agreed upon process shall include procedures for escalating disputes and unresolved issues up through higher levels of each company's management. If AT&T and GTE do not reach agreement on such a process within 60 days, any issues that have not been resolved by the parties with respect to such process shall be submitted to the ADR procedures set forth in Section 15 and Attachment 1 of this Agreement unless both parties agree to extend the time to reach agreement on such issues.

13.1.2.1. GTE shall provide AT&T access for testing at the MDF. Such test access shall be sufficient to ensure that the applicable requirements can be tested by AT&T. This access shall be available seven (7) days per week, 24 hours per day.

13.1.2.2. AT&T may test any interfaces, Network Elements or Ancillary Functions and additional requirements provided by GTE pursuant to this Agreement.

13.1.2.3. GTE shall provide engineering data as requested by AT&T for the loop components as set forth in Sections 2 and 3 of this Attachment which AT&T may desire to test. Such data shall include equipment engineering and cable specifications, signaling and transmission path data. GTE shall provide to AT&T the same type and quality of loop testing information that it provides to itself. Where GTE develops loop testing information as a matter of course, it will make that information available to AT&T where such information is relevant to AT&T's business. Where GTE maintains the internal discretion to test loops as needed, GTE will provide similar testing discretion to AT&T.

13.1.2.4. [Intentionally Deleted]

13.1.2.5. [Intentionally Deleted]

13.1.2.6. GTE shall temporarily provision selected Local Switching features for testing. Within 60 days of the Effective Date of this Agreement AT&T and GTE shall mutually agree on the procedures to be established between GTE and AT&T to expedite such provisioning processes for feature testing.

13.1.2.7. Upon AT&T's request, GTE shall provide technical staff to meet with AT&T representatives to provide required support for Cooperative Testing.

13.1.2.8. Dedicated Transport and Loop Feeder may experience alarm conditions due to in-progress tests. GTE shall not remove such facilities from service without obtaining AT&T's prior approval.

13.1.2.9. GTE shall conduct tests or maintenance procedures on Network Elements or Ancillary Functions or on the underlying equipment that is then providing a Network Element or Ancillary Function, that may cause a service interruption or degradation if such tests and procedures are at a time that is mutually acceptable to AT&T and GTE.

13.1.2.10. GTE shall provide a single point of contact to AT&T that is available 7 days per week, 24 hours per day for trouble status, sectionalization, resolution, escalation, and closure. Such staff shall be adequately skilled to allow expeditious problem resolution.

13.1.2.11. [Intentionally Deleted]

13.1.2.12. GTE shall participate in Cooperative Testing with AT&T upon AT&T's request to test any operational interface or process used to provide any designed Network Elements to AT&T.

13.1.2.13. AT&T and GTE shall endeavor to complete Cooperative Testing expeditiously.

13.1.2.14. During Cooperative Testing, GTE provisioning processes shall be enhanced to deliver designed Network Elements to AT&T in shorter

intervals than during subsequent normal service periods upon development of a rate for premium service provisioning.

13.1.2.15. GTE shall participate in Cooperative Testing requested by AT&T as mutually required to insure service performance, reliability and customer serviceability of a designed Network Element.

13.1.2.16. AT&T may accept or reject the designed Network Element ordered by AT&T if upon completion of cooperative acceptance testing, the tested designed Network Element does not meet the technical or performance requirements for such designed Network Element.

13.2. Performance

13.2.1. Scope:

This section addresses performance requirements for Network Elements and Ancillary Functions to provide local service. It includes requirements for the reliability and availability of Network Elements and Ancillary Functions, and quality parameters such as transmission quality (analog and digital), and speed (or delay). In addition, an overview of service performance requirements is given.

13.2.1.1. The General Performance Requirements in this section apply to all aspects of Network Elements and Ancillary Functions. Additional requirements are given in this performance section and in the individual Network Elements sections.

13.2.1.2. GTE shall work cooperatively with AT&T to determine appropriate performance allocations across Network Elements.

13.2.2. GTE shall meet or exceed the performance standards and requirements set forth in the technical references listed in Appendix A to this Attachment 2, under paragraph 13.

13.2.3. Services and Capabilities

13.2.3.1. All Network Elements shall provide performance sufficient, in combination with other Network Elements, to provide the following applications in accordance with the requirements of this document:

13.2.3.1.1. All types of voice services.

13.2.3.1.2. All types of voice-band data modem connections up to and including 28.8 kbps V.34.

13.2.3.1.3. All types of FAX transmissions up to and including 14.4 kbps group 3.

13.2.3.1.4. All CLASS/LASS features.

13.2.3.1.5. All Operator Systems.

13.2.3.2. The following capabilities shall be provided as applicable:

13.2.3.2.1. ISDN BRI

13.2.3.2.2. ISDN PRI

13.2.3.2.3. Switched Digital Data

13.2.3.2.4. Non-Switched Digital Data

13.2.3.2.5. Any types of Video applications that a customer may order

13.2.3.2.6. Any Coin Services the customer may order

13.2.3.2.7. Frame Relay and ATM

Private Line Services

13.2.4. Specific Performance Requirements for Network Elements and Ancillary Functions

13.2.4.1. The following sections itemize performance parameters for Network Elements and Ancillary Functions. GTE shall provide performance equal to or better than all of the requirements set forth in this Section. Unless noted otherwise, requirements and objectives are given in terms of specific limits. This means that all tests (acceptance and ongoing performance) shall meet the limit(s) to satisfy the requirement.

13.2.4.2. Performance Allocation Transmission path impairments may be classified as either analog or digital, and will depend on the nature of the signal transmitted across the Network Element. Analog impairments are introduced on any analog portion of the loop, typically between the NID portion of Loop Distribution and the analog to digital (A/D) conversion, and are usually correlated with the length of the physical plant. Digital impairments are introduced by A/D conversion and by interfaces between digital Network Elements. In addition, noise can be introduced by either analog transmission or the A/D conversion.

13.2.4.3. Loop Combination Architecture Constraints

13.2.4.3.1. The following constraints will limit not only the variety of Loop Combination architectures that may be considered, but also the architectures GTE may consider to deliver any Ancillary Function or Network Element. These constraints apply to the entire path between the NID portion of Loop Distribution and the GTE switch. Any exceptions to these restrictions shall be specifically requested or approved by AT&T in writing.

13.2.4.3.1.1. No more than 1 A-D conversion.

13.2.4.3.1.2. No more than 1, 2-to-4-wire hybrid.

13.2.4.3.1.3. No voice compression.

13.2.4.3.1.4. No echo cancelers or suppressers.

13.2.4.3.1.5. One digital loss pad per PBX.

13.2.4.3.1.6. No digital gain.

13.2.4.3.1.7. No additional equipment that might significantly increase intermodulation distortion.

13.2.4.4. Transmission Impairments

13.2.4.4.1. Analog Impairments Analog impairments are those introduced on portions of the end-to-end circuit on which communications signals are transmitted in analog format. These portions of the

transmission path would typically be between NID and an A/D conversion, most commonly on the metallic loop. The performance on the analog portion of a circuit is typically inversely proportional to the length of that circuit.

13.2.4.4.1.1. Loss

13.2.4.4.1.1.1. Electrical loss is measured using a 1004 Hz 0.0dB one Milliwatt 900 ohm test tone.

13.2.4.4.1.1.2. Off-hook electrical loss between the NID and the switch shall be no more than 8.0 dB for any line, and the mean value for all lines shall be 3.5 dB ±0.5 dB. On-hook electrical loss between the NID and the switch shall be no more than 4.0 dB above the off-hook electrical loss for any line.

13.2.4.4.1.2. Idle Channel Circuit Noise

13.2.4.4.1.2.1. Idle channel circuit noise (C-message) is added by analog facilities, by the A/D conversion of signals, by digital processing equipment (e.g. echo cancelers, digital loss pads), robbed bit signaling, and errors on digital facilities.

13.2.4.4.1.2.2. Idle channel circuit noise shall be less than or equal to 18 dBrnC.

13.2.4.4.1.3. Talker Echo

13.2.4.4.1.3.1. The primary source of echo is improper impedance-matching at the 2-to-4 wire hybrid in the GTE network. The impact on customer perception is a function of both echo return loss and delay.

13.2.4.4.1.3.2. Echo Return Loss (ERL) shall be greater than 26dB to a standard termination (900 ohms, 2.16 mFd), and greater than 14 dB to a telephone set off-hook. Singing Return Loss (SRL) shall be greater than 21dB to a standard termination, and greater than 11 dB to a telephone set off-hook.

13.2.4.4.1.4. Listener Echo

Listener echo is a double reflection of a transmitted signal at two different impedance mismatches in the end-to-end connection. While in extreme cases it can degrade voice transmission

performance, listener echo is primarily an issue for voiceband data. The requirements on Talker Echo shall apply to Listener Echo.

13.2.4.4.1.5. Propagation and Processing Delay

13.2.4.4.1.5.1. Propagation delay is the delay involved in transmitting information from one location to another. It is caused by processing delays of equipment in the network and delays associated with traveling across transmission facilities.

13.2.4.4.1.5.2. GTE shall cooperate with AT&T to limit total service propagation and processing delay to levels at parity with that within the GTE local network.

13.2.4.4.1.6. Signal-to-Noise Ratio

13.2.4.4.1.6.1. The Signal-to-Noise Ratio (S/N) is a critical parameter in determining voiceband data performance. It is typically measured with a 1004 Hz tone.

13.2.4.4.1.6.2. GTE must provide on the Loop Combination a signal-to-noise ratio of at least 37 dB between the NID and the end office.

13.2.4.4.1.7. C-Notched Noise

The requirements for Signal-to-Noise Ration shall apply to C-Notched Noise.

13.2.4.4.1.8. Attenuation Distortion

13.2.4.4.1.8.1. Attenuation distortion, also known as frequency distortion or gain slope, measures the variations in loss at different frequencies across the voice frequency spectrum (200 Hz - 3400 Hz). It is measured by subtracting the loss at 1004 Hz from the loss at the frequency of interest.

13.2.4.4.1.8.2. Attenuation distortion from the NID to the switch shall be within the range ± 0.5 dB for frequencies between 304 and 3004 Hz; from the switch to NID attenuation distortion shall be within the range ± 0.5 dB for frequencies between 204 Hz and 3004 Hz. In addition, attenuation distortion shall remain within the range +1dB/-3dB for

frequencies between 200 Hz and 3500 Hz.

13.2.4.4.1.9. Envelope Delay Distortion

13.2.4.4.1.9.1. Envelope Delay Distortion (EDD) measures the difference in transit time of signals at different frequencies. EDD is measured relative to the transit time of a 1704 Hz. tone, and is given in microseconds. EDD is used as an approximation of the group delay of the channel.

13.2.4.4.1.9.2. EDD shall be: 1704 Hz to 604 Hz -- ≤ 350 msec.; 1704 Hz to 2804 Hz -- ≤ 195 msec.; 1704 Hz to 204 Hz -- ≤ 580 msec.; 1704 Hz to 3404 Hz -- ≤ 400 msec.

13.2.4.4.1.10. Phase Jitter

13.2.4.4.1.10.1. Phase jitter measures the unwanted angular modulation of a signal. It is caused by noise or the actual modulation of the signal by another unwanted signal. It displaces the zero crossings of a signal. It is measured in terms of peak-to-peak deviations of a 1004 Hz. tone from its nominal zero crossings, and in a particular frequency band (20-300 Hz and either 4-300 Hz or 2-300 Hz). Phase jitter impacts voiceband data performance and can make modems more susceptible to other impairments, including noise.

13.2.4.4.1.10.2. From the NID to the interexchange carrier point of termination, phase jitter shall be <1.5 ° point-to-point in the 20-300 Hz band, and <1.8° point-to-point in the 4-300 Hz. band.

13.2.4.4.1.11. Amplitude Jitter

13.2.4.4.1.11.1. Amplitude jitter is any deviation of the peak value of a 1004 Hz signal from its nominal value. Excessive amounts can impair voiceband data performance. It is primarily caused by noise but can also be caused by phase jitter, gain hits, or single frequency interference.

13.2.4.4.1.11.2. In NID-interexchange carrier point of termination, ≤2.5% of amplitude jitter is permitted in the 20-300 Hz band and ≤2.9% in the 4-300 Hz band.

13.2.4.4.1.12. Intermodulation Distortion

13.2.4.4.1.12.1. Intermodulation distortion (IMD) measures non-linear distortions of a signal. It compares the power of harmonic tones to the power of the transmitted tones. It is measured for both the 2nd and 3rd harmonics of the transmitted tones. IMD is caused by compression or clipping and can impair voiceband data performance.

Both 2nd and 3rd order IMD between the NID and end office must be $\geq$ 52dB.

13.2.4.4.1.13. Impulse Noise

13.2.4.4.1.13.1. Impulse noise is a sudden and large increase in noise on a channel for a short duration of time. Impulse noise is measured as a count of the number of times a noise threshold is exceeded during a given time period (typically 5 or 15 minutes). It is caused by protection switching, maintenance activities, electromechanical switching systems, digital transmission errors, and line coding mismatches. Impulse noise sounds like clicking noises or static on voice connections. Impulse noise impairs voiceband data performance.

13.2.4.4.1.13.2. The NID to interexchange carrier point of termination portions of connections shall introduce no impulse noise events within 6dB of the received signal power on 93% of all 15 minute connections. In addition, there shall be no more than 1 impulse noise event within 6 dB of the received signal power during any 30-minute period.

13.2.4.4.1.14. Phase Hits

13.2.4.4.1.14.1. Phase hits are a sudden change in the phase of a signal lasting at least 4 msec. Phase hits are measured using a threshold which indicates how much the phase of the signal has changed with respect to its nominal phase. Phase hits are caused by protection switching and slips or other synchronization errors. Phase hits can impair voiceband data performance.

13.2.4.4.1.14.2. Between the NID and interexchange carrier point of termination, 99.75% of all 15-minute connections shall have no phase hits exceeding 10°. In addition, there shall be no more than 1 phase hit

exceeding 10° in any 30-minute period.

13.2.4.4.1.15. Gain Hits

13.2.4.4.1.15.1. Gain hits are sudden changes in the level of a signal that last at least 4 msec. Gain hits are measured against a threshold of typically 2-5 dB relative to the signal's nominal level. Gain hits are usually caused by protection switches and can impair voiceband data performance.

13.2.4.4.1.15.2. Between the NID and the interexchange carrier point of termination, 99.5% of all 15-minute connections shall have no gain hits exceeding 3 dB. In addition, there shall be no more than 1 gain hit exceeding 3 dB in any 30-minute period.

13.2.4.4.1.16. Dropouts

13.2.4.4.1.16.1. Dropouts are drops in the level of a signal of 12 dB or more for at least 4 msec. They are caused by protection switching events, radio fading, and conditions causing digital carrier systems to lose frame. Dropouts are critical for voiceband data performance but, if severe enough, will also affect voice quality.

13.2.4.4.1.16.2. Between the NID and the interexchange carrier point of termination, 99.9% of all 15-minute connections shall have no dropouts and in addition, no connection shall suffer more than 1 dropout in any 60-minute period.

13.2.4.4.1.17. Frequency Shift

13.2.4.4.1.17.1. Frequency shift measures any frequency changes that occur when a signal is transmitted across a channel. It is typical measured using a 1004 Hz tone. Frequency shift has very little impact on voice or voiceband data performance; however, round-trip frequency shifts can affect the ability of echo cancelers to remain converged.

13.2.4.4.1.17.2. No more than 0.2 Hz frequency shift shall be on any connection. In addition, 99.5% of all calls shall have frequency shift < 0.1 Hz.

13.2.4.4.1.18. Crosstalk

13.2.4.4.1.18.1. Crosstalk is the presence of signals from other telephone connections on a circuit. Crosstalk can be either intelligible, when speech from other connections can be heard and understood, or unintelligible. Crosstalk is caused by inter-channel interference on the transmission system. Crosstalk is difficult to measure: it requires correlating signals on different circuits or using human listeners to identify its presence. Trouble reports may be used to estimate the probability of crosstalk.

13.2.4.4.1.18.2. 99% of Loop Combinations shall have probability $\leq$ 0.1% of experiencing crosstalk exceeding -65 dBm0.

13.2.4.4.1.19. Clipping

13.2.4.4.1.19.1. Clipping occurs when part of a transmitted signal is dropped and does not reach the receiving portion on a connection. It can be caused by Digital Speech Interpolation (DSI) equipment used in Digital Circuit Multiplication Systems (DCMS) which increase the amount of traffic that transmission facilities carry, and by echo cancelers or echo suppressers.

No clipping incidents shall occur on any call.

13.2.4.4.2. Digital Impairments

Digital impairments occur in the signal wherever it is transmitted in digital format. These errors are usually introduced upon conversion of the signal from analog to digital, as well as at interfaces between digital components. While many digital impairments have little impact on subjective voice quality, they can impact voiceband data performance.

13.2.4.4.2.1. Signal Correlated Distortion

13.2.4.4.2.1.1. Signal correlated distortion (SCD) is unwanted noise or distortion introduced into a signal through the conversion of a signal from analog to digital format or through digital processing that changes the transmitted signal. SCD affects performance when a sign is being transmitted. The primary sources of SCD are signal encoders, echo cancelers, digital loss pads, and robbed bit signaling. SCD affects both voice and voiceband data performance.

13.2.4.4.2.1.2. The NID-to-end-office connection shall allow:

13.2.4.4.2.1.2.1. A maximum of 1 A/D conversion, using 64Kbps m-law (m=255) PCM;

13.2.4.4.2.1.2.2. No voice compression;

13.2.4.4.2.1.2.3. No echo cancellation; and

13.2.4.4.2.1.2.4. Robbed bit signaling only if SS7 or ISDN are not used.

13.2.4.4.2.2. Slips

13.2.4.4.2.2.1. Slips occur when a frame of digital data is either deleted or repeated because of differences in the clocks used to synchronize digital facilities. Slips sound like clicks or pops on voice calls and have major impact on voiceband data performance.

13.2.4.4.2.2.2. The NID-to-interexchange carrier point of termination portion of connections shall have fewer than 0.45 slips every 24 hours on average.

13.2.4.4.2.3. Digital Timing Jitter and Wander

13.2.4.4.2.3.1. Digital timing jitter is the unwanted phase modulation of digital signals at rates above 10 Hz. Wander is the unwanted phase modulation of digital signals at rates below 10 Hz. Digital timing jitter is caused by imperfections in the timing recovery process of repeaters and the stuffing synchronization process used by multiplexer/demultiplexers. Wander is caused by slowly varying changes in digital signal phase due to clock frequency offset and drift, changes in propagation delay of terrestrial facilities due to temperature changes and changes in the distance of satellites from the earth. These events have a major impact on voiceband data performance.

13.2.4.4.2.3.2. The maximum digital timing jitter allowed in the 10 Hz to 8 kHz frequency band at any network interface or any terminal equipment in the network is 5 Unit Intervals (UI). The maximum digital timing jitter allowed in the 8 kHz to 40 kHz frequency band is 0.1 UI. The objective for wander is less than 28 UI at any network interface or

terminal equipment.

13.2.4.4.2.4. DS-1 Errored Seconds

13.2.4.4.2.4.1. An Errored Second (ES) on a DS-1 facility is any second during which at least 1 bit is in error. The impact of an ES on performance depends on the number of errors that occur during a second. Typically, voice performance is not significantly impacted by ES but they can cause errors in voiceband data transmissions.

13.2.4.4.2.4.2. Each GTE network shall have less than 20 ESs per 24 hour period.

13.2.4.4.2.5. DS-1 Severely Errored Seconds

13.2.4.4.2.5.1. A severely Errored Second (SES) is any second during which a DS-1 has an error rate exceeding 0.001. An SES can be caused by a loss of framing, a slip, or a protection switch. SESs have impacts on both voice and voiceband data performance. For voice, an SES will sound like a burst of noise or static. SESs that occur during a voiceband data transmission cause a significant burst of errors and can cause modems to retrain.

13.2.4.4.2.5.2. The digital portion of each NID to POP connection shall have less than 2 SESs per 24 hour period).

13.2.4.4.2.6. Short Failure Events

13.2.4.4.2.6.1. A Short Failure Event (SFE) is a Loss of Frame (LOF) event of less than two minutes' duration. An LOF event is declared when, on detection of a Loss of Signal (LOS) or Out-of-Frame (OOF), a rise-slope-type integration process starts that declares a LOF after 2.5±0.5 sec. of continuous LOS or OOF. If the LOS or OOF is intermittent, the integration process shall decay at a slope of 1/5 the rise slope during the period when the signal is normal. Thus, if the ratio of a LOS or OOF to a normal signal is greater than 1/2, a LOF will be declared. A LOS condition shall be declared when the Network Channel Terminating Equipment has determined that 175±75 successive pulse positions with no pulses of either positive or negative polarity have occurred. An OOF condition shall be declared when either Network equipment or Digital Terminal Equipment detects errors in the framing pattern.

13.2.4.4.2.6.2. There shall be fewer than 1 SFE per month.

13.2.4.5. Service Availability and Reliability

Availability refers to the time period during which the service is up and usable for its intended purpose. Reliability refers to the probability that a task will be completed successfully, given that it is successfully begun.

13.2.4.5.1. Blocked Calls

13.2.4.5.1.1. Blocking is the fraction of call origination attempts denied service during a stated measurement period. Blocking occurs because of competition for limited resources within the network.

13.2.4.5.1.2. For intraLATA toll service as well as for local exchange service, the blocking level from originating network interface (NID) to terminating NID shall not exceed 1% in any hour, except under conditions of service disruption. For access to or egress from the AT&T long distance network, the blocking rate shall not exceed 0.5% in any hour, except under conditions of service disruption.

13.2.4.5.2. Blocked Dial Tone

13.2.4.5.2.1. Blocked dial tone occurs when the subscriber does not receive dial tone within 3 seconds of going off-hook.

13.2.4.5.2.2. Customers shall not experience more than 0.1% dial tone blocking during average busy season busy hour (ABSBH).

13.2.4.5.3. Downtime

Downtime is the period of time that a system is in a failed state.

13.2.4.5.3.1. The average downtime for all subscriber Loop Combinations shall be less than 49 minutes per year. The maximum downtime for 99% of all subscriber Loop Combinations shall be less than 74 minutes per year.

13.2.4.5.3.2. The average downtime for an end office switch shall be less than 3 minutes per year. The average downtime for individual trunks shall

be less than 28 minutes per year. The average downtime for digital trunk groups shall be less than 20 minutes per year. The average downtime for an individual line appearance at the switch shall be less than 28 minutes per year. The average downtime for a Remote Terminal (RT) shall be less than 17 minutes per year. The average downtime for an individual line on a Remote Terminal (RT) shall be less than 13 minutes per year.

13.2.4.5.3.3. The mean time to repair (MTTR) of any equipment at an attended site shall be less than 3 hours. The mean time to repair (MTTR) of any equipment at an unattended site shall be less than 4 hours. 95% of all repairs to the network interface (NID) shall be completed within 24 hours.

13.2.4.5.3.4. There shall be no downtime due to power failures at the switch.

13.2.4.5.3.5. The probability of a stable call being cut off shall be less than 20 cutoffs per one million 1 minute calls.

13.2.4.5.3.6. The rate of ineffective machine attempts at the end office shall be less than 0.0005 (5 failures per 10,000 call attempts).

13.2.4.5.3.7. GTE shall meet all requirements for private line services in TR-NWT-000335, ANSI T1.512-1994, and AT&T Technical References as listed in this Section 13.2.

13.2.4.5.4. Dial Tone Delay

13.2.4.5.4.1. Dial-Tone Delay is the time period between a customer off-hook and the receipt of dial tone from an originating end office. Dial-Tone Delay has a significant effect on customer opinion of service quality.

13.2.4.5.4.2. The average dial-tone delay shall not exceed 0.6 seconds. At most 0.5% of calls during the average-season busy hour (ABSBH) shall experience dial-tone delay greater than 3 seconds. At most 8% of calls during the ten-high-day busy hour (THDBH) shall experience dial-tone delay greater than 3 seconds. At most 10% of calls during the high-day busy hour (HDBH) shall experience dial-tone delay greater than 3 seconds.

13.2.4.5.5. Dial Tone Removal

13.2.4.5.5.1. Dial tone removal is the time between recognition of the first address digit to the removal of dial tone on the line.

The maximum dial tone removal interval shall be ≤ 500 milliseconds.

13.2.4.5.6. Post Dial Delay

13.2.4.5.6.1. Post Dial Delay (PDD) is the amount of time a caller must wait after entering or dialing the last digit of a Destination Telephone Number (DTN) before hearing a valid audible network response. The PDD for an end user is measured from the time the caller has pressed or dialed the last digit of a DTN until receipt of an audible network response.

13.2.4.5.6.2. The requirements given reflect an end-to-end CCS7 protocol for AT&T end users. Where a mixture of CCS7 and inband (MF) signaling protocols are employed, an increase in the PDD can be expected.

13.2.4.5.6.2.1. PDD 1 - A - Intra AT&T LSO

13.2.4.5.6.2.1.1. Intra-LSO calls do not employ external signaling protocols. The PDD for intra-LSO calls flows are dependent upon the processor cycle time and traffic load conditions. This PDD is assumed to be between customers on the same AT&T LSO, between the Remote Switch Modules (RSMs) on the same Host, or between an RSM and 5ESS Host customers.

13.2.4.5.6.2.1.2. The objective for intra-LSO PDD is less than 310 milliseconds for 50% of all calls and less than 460 milliseconds for 95% of all calls.

13.2.4.5.6.2.2. PDD1 - B - AT&T LSO to Another AT&T Local LSO

13.2.4.5.6.2.2.1. The signaling protocols from an AT&T LSO to another AT&T LSO are assumed to employ out-of-band Common Channel Signaling System 7 (CCS7) format. Local calls, that is, calls from an AT&T LSO to another AT&T LSOs are assumed to have no more than one pair of Signaling Transfer Point Switches (STPSs) and no more

than one data base dip.

13.2.4.5.6.2.2.2. This PDD is expected to be better than the AT&T Long Distance objective with an average PDD of ≤.870 seconds with 95% ≤1.34 seconds.

13.2.4.5.6.2.3. PDD1 - C - AT&T LSO to Other LSO

13.2.4.5.6.2.3.1. Calls from an AT&T LSO to other LSOs are dependent upon the interface agreements between AT&T and the LSO service provider and may employ CCS7, inband (MF) or a combination of both protocols.

13.2.4.5.6.2.3.2. Calls from an AT&T LSO to another LSO via the Public Switched Telecommunications Network (PSTN), using end-to-end CCS7 signaling protocols, can expect to meet the AT&T PDD objectives of an average of 2.0 seconds with 95% in ≤2.5 seconds. Calls from an AT&T LSO via the PSTN to LSOs outside the local service area are assumed to use CCS7 signaling protocols to the AT&T #4ESS.Ô The egress signaling protocols from the AT&T Switched Network (ASN) to the many different local telephone company service providers however does not necessarily utilize CCS7 signaling. There are three basic egress signaling configuration. They are:

13.2.4.5.6.2.3.2.1. Network Inter-Connect, CCS7 between AT&T and the local telephone company.

13.2.4.5.6.2.3.2.2. Inband Multifrequency (MF) signaling protocols without a GTE egress tandem in the connection.

13.2.4.5.6.2.3.2.3. Inband MF signaling protocols with a GTE egress tandem in the connection.

13.2.4.6.3.2.3.2.3.1 Calls from an AT&T LSO to other LSOs outside the local service area are assumed to have multiple STPSs for 1+ traffic in the access and ASN portion of the connection. The egress from the ASN for 1+ traffic is again dependent upon the interface agreements in that service area and may consist of CCS7 or inband MF protocols.

13.2.4.6.3.2.3.2.3.2 Calls from an AT&T's LSO to another AT&T LSO with a mixture of

CCS7 or all inband signaling protocols are expected to receive PDDs on the average of 2.9 seconds with 95% in ≤ 6.5 seconds.

13.2.4.5.6.2.4. PDD2 - AT&T LSO to Operator Services

13.2.4.5.6.2.4.1. The signaling protocols between an AT&T LSO and the AT&T ASN 5ESS® Operator Services Position Systems (OSPS) will employ IN-band Feature Group C Modified Operator Services Multifrequency signaling format. As with 1+ traffic, the egress from the ASN to the local service providers LSO is dependent upon the interface.

13.2.4.5.6.2.5. PDD2 - A - AT&T LSO to 5ESS® OSPS 0 Only

13.2.4.5.6.2.5.1. When a "0" has been entered by the customer, timing is applied in the absence of a DTMF "#". If a "#" is not entered, the objective is for the timer to expire in 4 seconds +/- 1 second. After the timer has expired, or the "#" has been entered, the average PDD shall not exceed 2.2 seconds.

13.2.4.5.6.2.6. PDD2 - B - 0 Plus Calls

13.2.4.5.6.2.6.1. On calls where analysis of the first 6 digits (area code + central office code) is required, the PDD shall not exceed 2.0 seconds on the average, and 2.5 seconds in 95% of all occurrences. For calls that require analysis of the 10-digits CALLED number and the 7 digits of calling number (ANI, e.g. Automatic Charge Quotation Service) the PDD is expected to be 4.5 seconds on the average and < 5.0 seconds in 95% of all occurrences. These delays are based on the calling customer receiving a network response as described above, specifically the calling card alerting tone from the 5ESS® OSPS. The remaining call completion PDD to the DTN, after the customer has completed the Operator Service function, will take the form of the PDDs discussed in PDD1-C.

13.2.4.5.6.2.7. Impact of Local Number Portability (LNP)

13.2.4.5.6.2.7.1. Local Number Portability will increase PDDs. If a call forwarding option is used as an interim solution for LNP, the delay due to additional switching in the local access is estimated to be 0.3

seconds (mean) and 0.4 seconds (95th percentile) in addition to the PDDs described earlier. These estimates assumes CCS7 signaling between LSOs. If inband signaling is used between LSOs, the PDD will be increased by 1.9 to 3.6 (1.7+1.9) seconds compared to the PDDs provided in the section on Post Dial Delay.

13.2.4.5.6.2.8. Custom Local Area Subscriber Services (CLASS)

13.2.4.5.6.2.8.1. CLASS^{SM} features such as Calling Name Delivery can contribute to the PDD of a call. This delay is caused by the additional time (GTE option) before the ringing interval commences. This default delay is 3 seconds. Optional settings are available in 1 second intervals from 1 to 6 seconds. Calls to DTNs that have CLASS^{SM} features, particularly with calling name delivery, can expect to experience from 1 to 6 seconds (3 seconds default) of additional PDD compared to the PDDs shown for PDD1-C.

13.2.4.5.6.2.9. Partial Dial Timing

13.2.4.5.6.2.9.1. The interval between each information digit from a customer's line, until the LSO or switching system has determined that the digit string is incomplete.

13.2.4.5.6.2.9.2. For customer lines, partial dial timing shall be $\geq$ 16 seconds and $\leq$ 24 seconds. For trunks, inband signaling time-out shall be $\geq$ 5 seconds and $\leq$ 20 seconds.

13.2.5. Test and Verification

13.2.5.1. GTE will provision, test, and restore any Network Element to the appropriate technical specifications for such Network Element.

13.2.5.1.1. At AT&T's request, GTE will provide access to the Network Element sufficient for AT&T to test the performance of that Network Element to AT&T's satisfaction.

13.2.5.1.2. GTE will perform all necessary testing to provision and restore a Network Element to technical specifications. When GTE documents the performance of a test, GTE will provide such test results to AT&T.

13.3. Protection, Restoration, and Disaster Recovery

13.3.1. Scope:

This Section refers specifically to requirements on the use of redundant network equipment and facilities for protection, restoration, and disaster recovery.

13.3.2. Requirements

13.3.2.1. GTE shall provide protection, restoration, and disaster recovery capabilities at parity with those capabilities provided for GTE's own services, facilities and equipment (e.g., equivalent circuit pack protection ratios, facility protection ratios).

13.3.2.2. GTE shall provide Network Elements and Ancillary Functions equal priority in protection, restoration, and disaster recovery as provided to GTE's own services, facilities and equipment.

13.3.2.3. GTE shall provide Network Elements and Ancillary Functions equal priority in the use of spare equipment and facilities as provided to GTE's own services, facilities and equipment.

13.3.2.4. GTE shall restore Network Elements which are specific to AT&T end user customers on a priority basis as AT&T may designate.

13.4. Synchronization

13.4.1. Definition

Synchronization is the function which keeps all digital equipment in a communications network operating at the same average frequency. With respect to digital transmission, information is coded into discrete pulses. When these pulses are transmitted through a digital communications network, all synchronous Network Elements are traceable to a stable and accurate timing source. Network synchronization is accomplished by timing all synchronous Network Elements in the network to a stratum 1 traceable timing source so that transmission from these network points have the same average line rate.

13.4.2. Technical Requirements

The following requirements are applicable to the case where GTE provides synchronization to equipment that AT&T owns and operates within a GTE location. In addition, these requirements apply to synchronous equipment that is owned by GTE and is used to provide a Network Element to AT&T.

13.4.2.1. The synchronization of clocks within digital networks is divided into two parts: intra-building and inter-building. Within a building, a single clock is designated as the Building Integrated Timing Supply (BITS), which provides all of the DS1 and DS0 synchronization references required by other clocks in such building. This is referred to as intra-building synchronization. The BITS receives synchronization references from remotely located BITS. Synchronization of BITS between buildings is referred to as inter-building synchronization.

13.4.2.2. To implement a network synchronization plan, clocks within digital networks are divided into four stratum levels. All clocks in strata 2, 3, and 4 are synchronized to a stratum 1 clock, that is, they are traceable to a stratum 1 clock. A traceable reference is a reference that can be traced back through some number of clocks to a stratum 1 source. Clocks in different strata are distinguished by their free running accuracy or by their stability during trouble conditions such as the loss of all synchronization references.

13.4.2.2.1. Intra-Building

13.4.2.2.1.1. Within a building, there are different kinds of equipment that require synchronization at the DS1 and DS0 rates. Synchronization at the DS1 rate is accomplished by the frequency synchronizing presence of buffer stores at various DS1 transmission interfaces. Synchronization at the DS0 rate is accomplished by using a composite clock signal that phase synchronizes the clocks. Equipment requiring DS0 synchronization frequently does not have adequate buffer storage to accommodate the phase variations among different equipment. Control of phase variations to an acceptable level is accomplished by externally timing all interconnecting DS0 circuits to a single clock source and by limiting the interconnection of DS0 equipment to less than 1,500 cable feet.

Therefore, a BITS shall provide DS1 and composite clock signals when appropriate The composite signal is a 64-kHz 5/8th duty cycle, return to zero with a bipolar violation every eighth pulse (B8RZ).

13.4.2.2.2. Inter-Building

13.4.2.2.2.1. GTE shall provide inter-building synchronization at the DS1 rate, and the BITS shall accept the primary and secondary synchronization links from BITS in other buildings. From hierarchical considerations, the BITS shall be the highest stratum clock within the building and GTE shall provide operations capabilities (this includes, but is not limited to: synchronization reference provisioning; synchronization reference status inquiries; timing mode status inquiries; and alarm conditions).

13.4.3. Synchronization Distribution Requirements

13.4.3.1. Central office BITS shall contain redundant clocks meeting or exceeding the requirements for a stratum 2 clock as specified in ANSI T1.101-1994 and Bellcore TR-NWT-001244 Clocks for the Synchronized Network: Common Generic Criteria.

13.4.3.2. Central office BITS shall be powered by primary and backup power sources.

13.4.3.3. If both reference inputs to the BITS are interrupted or in a degraded mode (meaning off frequency greater than twice the minimum accuracy of the BITS, loss of frame, excessive bit errors, or in Alarm Indication Signal), then the stratum clock in the BITS shall provide the necessary bridge in timing to allow the network to operate without a frame repetition or deletion (slip free) with better performance than 1 frame repetition or deletion (slip) per week.

13.4.3.4. DS1s multiplexed into a SONET synchronous payload envelope within an STS-n (where n is defined in ANSI T1.105-1995) signal shall not be used as reference facilities for network synchronization.

13.4.3.5. The total number of Network Elements cascaded from the stratum 1 source shall be minimized.

13.4.3.6. A Network Element shall receive the synchronization reference signal only from another Network Element that contains a clock of equivalent or superior quality (stratum level).

13.4.3.7. GTE shall select for synchronization those facilities shown to have the greatest degree of availability (absence of outages).

13.4.3.8. Where possible, all primary and secondary synchronization facilities shall be physically diverse (this means the maximum feasible physical separation of synchronization equipment and cabling).

13.4.3.9. No timing loops shall be formed in any combination of primary and secondary facilities.

13.4.3.10. An Operations Support System (OSS) shall continuously monitor the BITS for synchronization related failures or degradation.

13.4.3.11. An OSS shall continuously monitor all equipment transporting synchronization facilities for synchronization related failures or degradation.

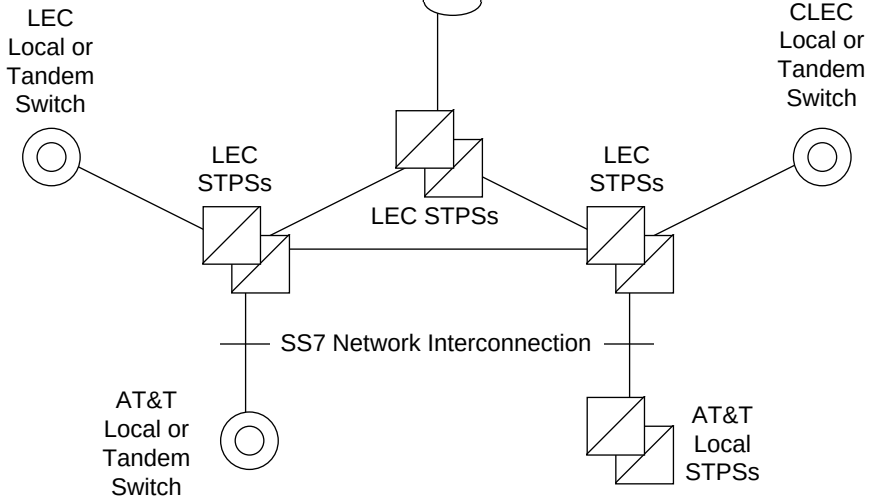
13.4.3.12. For non-SONET equipment, GTE shall provide synchronization facilities which, at a minimum, comply with the standards set forth in ANSI T1.101-1994.

For SONET equipment, GTE shall provide synchronization facilities that have time deviation (TDEV) for integration times greater than 0.05 seconds and less than or equal to 10 seconds, that is less than or equal to 10 nanoseconds. TDEV, in nanoseconds, for integration times greater than 10 seconds and less than 1000 seconds, shall be less than 3.1623 times the square-root of the integration time. For example, for integration times of 25 seconds, TDEV shall be less than 15.8 nanoseconds.

13.5. SS7 Network Interconnection

13.5.1. Definition:

SS7 Network Interconnection is the Interconnection of GTE Signal Transfer Points (STPs) with AT&T STPs or AT&T local or tandem switching systems. This connectivity enables the exchange of SS7 messages between AT&T local or tandem switching systems and GTE's local or tandem switching systems, and between AT&T local



rty local or tandem
the same STPs.
messages between
GTE databases.

Figure 3. SS7 Network Interconnection

13.5.2. Technical Requirements

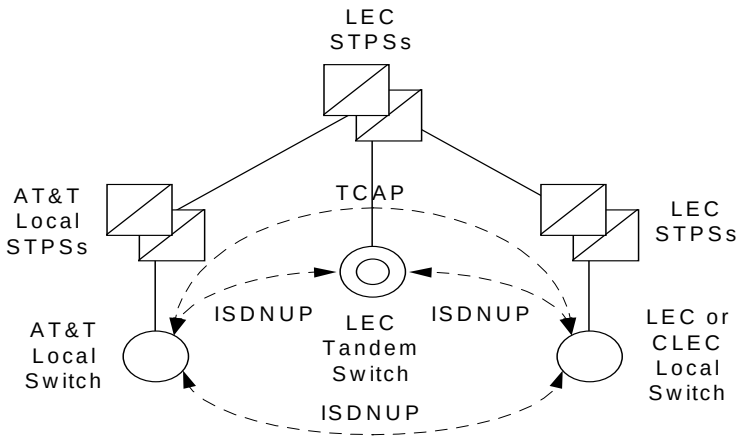
13.5.2.1. SS7 Network Interconnection shall provide connectivity to all components of the GTE SS7 network. These include:

13.5.2.1.1. GTE local or tandem switching systems;

13.5.2.1.2. GTE DBs; and

13.5.2.1.3. Other third-party local or tandem switching systems.

13.5.2.2. The connectivity provided by SS7 Network Interconnection shall fully support the functions of GTE switching systems and DBs and AT&T or other third-party switching systems with A-link access to



here SS7 Network
in types of
P) messages. If
gits between an
er third-party local
ndem switching
S7 network convey
ssages that are
s (Automatic
Editing) between
ird-party local

Figure 4. Interswitch TCAP Signaling for SS7 Network

Interconnection

13.5.2.4. When the capability to route messages based on Intermediate Signaling Network Identifier (ISNI) is generally available on GTE STPSs, the GTE SS7 Network shall also convey TCAP messages using SS7 Network Interconnection in similar circumstances where the GTE switch routes traffic based on a Carrier Identification Code (CIC).

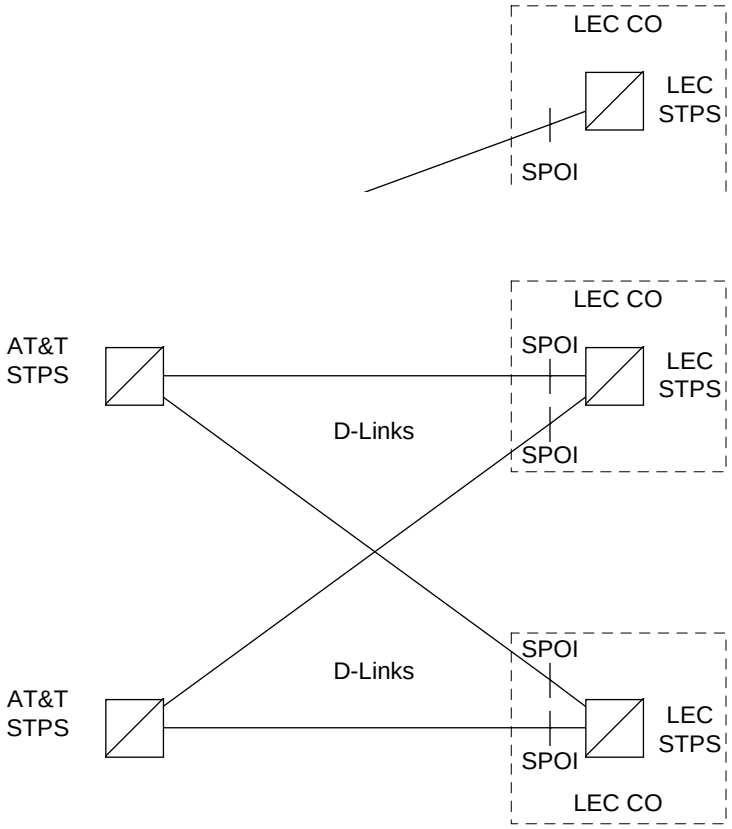
13.5.2.5. SS7 Network Interconnection shall provide all functions of the MTP as specified in ANSI T1.111. This includes Signaling Data Link functions, as specified in ANSI T1.111.2; Signaling Link functions, as specified in ANSI T1.111.3; and Signaling Network Management functions, as specified in ANSI T1.111.4.

13.5.2.6. SS7 Network Interconnection shall provide all functions of the SCCP necessary for Class 0 (basic connectionless) service, as specified in ANSI T1.112 (Reference 13.5.2.5). In particular, this includes Global Title Translation (GTT) and SCCP Management procedures, as specified in T1.112.4. Where the destination signaling point is a GTE switching system or DB, or is another third-party local or tandem switching system directly connected to the GTE SS7 network, SS7 Network Interconnection shall include final GTT of messages to the destination and SCCP Subsystem Management of the destination. Where the destination signaling point is an AT&T local or tandem switching system, SS7 Network Interconnection shall include intermediate GTT of messages to a gateway pair of AT&T local STPSs, and shall not include SCCP Subsystem Management of the destination.

13.5.2.7. SS7 Network Interconnection shall provide all functions of the Integrated Services Digital Network User Part (ISDNUP), as specified in ANSI T1.113 (Reference 13.5.2.5).

13.5.2.8. SS7 Network Interconnection shall provide all functions of the TCAP, as specified in ANSI T1.114 (Reference 13.5.2.5).

13.5.2.9. If and when Internetwork MTP Routing Verification Test (MRVT) and SCCP Routing Verification Test (SRVT) become approved ANSI standards and available capabilities of GTE STPSs, SS7 Network Interconnection shall provide these functions of the OMAP.



connection options
andem switching

ching systems; and

e sets (layers) of

icted in Figure 5.

cted in Figure 6.

Figure 6. D-Link Interface

13.5.3.3. The Signaling Point of Interconnection (SPOI) for each link shall be located at a cross-connect element, such as a DSX-1, in the Central Office (CO) where the GTE STPS is located. There shall be a DS1 or higher rate transport interface at each of the SPOIs. Each signaling link shall appear as a DS0 channel within the DS1 or higher rate interface. GTE shall offer higher rate DS1 signaling links for interconnecting AT&T local switching systems or STPSs with GTE STPSs as soon as these become approved ANSI standards and available capabilities of GTE STPSs.

13.5.3.4. GTE CO shall provide intraoffice diversity between the SPOIs and the GTE STPS, so that no single failure of intraoffice facilities or

equipment shall cause the failure of both D-links in a layer connecting to a GTE STPS.

13.5.3.5. The protocol interface requirements for SS7 Network Interconnection include the MTP, ISDNUP, SCCP, and TCAP. These protocol interfaces shall conform to the specifications contained in the technical references listed in Appendix A to this Attachment 2, under paragraph 14.

13.5.3.6. SS7 Network Interconnection shall be provided to AT&T in accordance with the technical references listed in Appendix A to this Attachment 2, under paragraph 15.

14. Unused Transmission Media

14.1. Definitions:

14.1.1. Unused Transmission Media is physical inter-office transmission media (e.g., optical fiber, from an LGX in one central office to another LGX in another central office, copper twisted pairs from the MDF of one central office to the MDF in another central office, coaxial cable) which has no lightwave or electronic transmission equipment terminated to such media to operationalize its transmission capabilities. This media may exist in aerial or underground structure or within a building.

14.1.2. Dark Fiber, one type of unused transmission media, is unused strands of optical fiber. Dark Fiber also includes strands of optical fiber existing in aerial or underground structure which have lightwave repeater (regenerator or optical amplifier) equipment interspliced to it at appropriate distances, but which has no line terminating elements terminated to such strands to operationalize its transmission capabilities

14.1.3. GTE is not responsible for the end-to-end performance in those applications where AT&T is utilizing unused transmission media.

14.2. Requirements

14.2.1. GTE shall make available, for lease by AT&T, its dark fiber in the feeder segment of GTE's loops and, when AT&T has collocation space in a GTE tandem or end office, in the dedicated interoffice transport segment of GTE's network, subject to the conditions and requirements set forth in sections 14.2.2 through 14.3.2.

14.2.1.1. AT&T will bear the cost of extending dark fiber in the feeder segment of GTE's network to AT&T end-user premises or AT&T's facility access locations within the loop access network.

14.2.2. GTE shall provide a Single Point of Contact (SPOC) for negotiating all Unused Transmission Media lease agreements.

14.2.3. AT&T may test the quality of the Unused Transmission Media to confirm its usability and performance specifications. AT&T may only test from its point of physical collocation, AT&T's end-user premises or AT&T's facility access locations at which AT&T has access to such unused Transmission Media. For virtual collocation applications, GTE will perform test(s) on the dark fiber as requested by AT&T and provide the results of the test(s) to AT&T, at AT&T's expense. Should such test results not meet AT&T specifications, GTE will only be obligated to perform those maintenance activities it would have performed for itself.

14.2.4. Upon receipt of a bona fide request, GTE shall provide to AT&T information regarding the location, availability of Unused Transmission Media within twenty (20) business days after receiving a request for a specific location from AT&T.

14.2.5. GTE shall make Unused Transmission Media available to AT&T within twenty (20) business days after it receives written confirmation from AT&T that the Unused Transmission Media previously deemed available by GTE is wanted for use by AT&T at the price established by the Commission or at an agreed upon lease price if the Commission does not establish a price. If a written confirmation is not received from AT&T within thirty (30) business days after verification of availability, GTE may make such Unused Transmission Media available for its own use or, may make it available to another requesting party.

14.2.6. In leasing loop feeder dark fiber and dedicated interoffice dark fiber to AT&T, GTE will allocate its dark fiber capacity among requesting CLECs on a first-come, first-served basis and in a competitively neutral manner.

14.3. Requirements Specific to Dark Fiber

14.3.1. AT&T will provide sufficient fiber cable from their LGX located in their physical collocation space to allow GTE personnel to terminate the GTE LGX. Where AT&T is obtaining access to dark fiber through virtual collocation, AT&T will provide the appropriate electronic equipment to terminate the fiber and GTE will provide the cross connection of the fiber to AT&T's equipment at AT&T's expense.

14.3.2. In those applications where AT&T requests optical regenerators, such regeneration will be provided by GTE on a case by case basis with additional costs to be borne by AT&T. However, in all events, AT&T may provide its own optical regenerators within AT&T's physical/virtual collocation space.