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AMERITECH DIGITAL SERVICE TRANSMISSION PARAMETERS

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1. Overview

1.1. General

This document states the transmission parameters and objectives for Ameritech Base Rate, DS1 and DS3 Services.

Base Rate, DS1 and DS3 Services provide a transmission path between customer designated premises, or a customer designated premises and an Ameritech operating company (AOC) location where multiplexing and/or cross-connection functions are performed.

1.2. Reason for Reissue

This document is being reissued to include Ameritech OC-N Service and Ameritech OC-N Dedicated Ring Service Parameters and objectives.

1.3. Purpose of Document

The purpose of this document is to define the technical requirements and transmission performance objectives applicable to Ameritech Base Rate, Ameritech DS1, Ameritech DS3 Services, Ameritech OC-N Services and Ameritech OC-N Dedicated Ring Services. In particular, it provides a quantitative and qualitative description of performance objectives for these access services at the Network Interface (NI) or the Point of Termination (POT).

This is a companion document of Bellcore Publications TR-NPL-000341, TR-INS-000342 and TR-NPL-000054. Those publications contain Interface Specifications and Network Channel Interface (NCI) code details. Ameritech's available NCI codes and compatibilities are contained in AM TR-TMO-000080. It is not the intent of this document to provide specific ordering information.

To enhance understanding of the application of the digital services parameters set forth herein, it is necessary to understand that interLATA end-to-end services are comprised of "access network" segments, and "transit network" segments. See the Point-to-Point Reference Model shown in [Figure 1-a](#). For multipoint configurations (see [Figure 1-b](#)) the point-to-point reference model will apply.

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End-to-end performance is specified from NI (Network Interface) to NI. Access services provided by Ameritech extend from the NI to the INI (Inter-Network Interface). Performance parameters are specified for these segments via the formula process outlined below. A more detailed discussion of these models and methodology is available in the ANSI T1.503-1989 Recommendation "Telecommunications-Network Performance Parameter for Dedicated Digital Services-Definitions and Measurement Methods."

- The parameters listed herein may be applied directly to access segments.
- End-to-end intraLATA connections typically consist of two access segments. These connections will perform at a level equivalent to the sum of the performance level of the two access segments. This level may be expressed mathematically as "less than or equal to the sum of the performance level objectives of the two access segments."

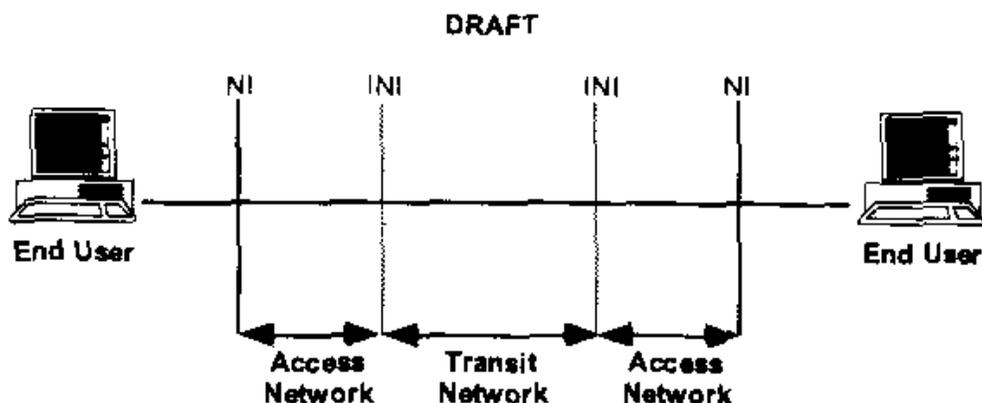
For example, if one access segment is performing at a level of 108 ES per day, and the other is performing at a level of 44 ES per day, then the end-to-end performance level is $108 \text{ ES} + 44 \text{ ES} = 152 \text{ ES}$ per day. This would equate to a performance level percentage of 99.824% EFS (Error Free Seconds).

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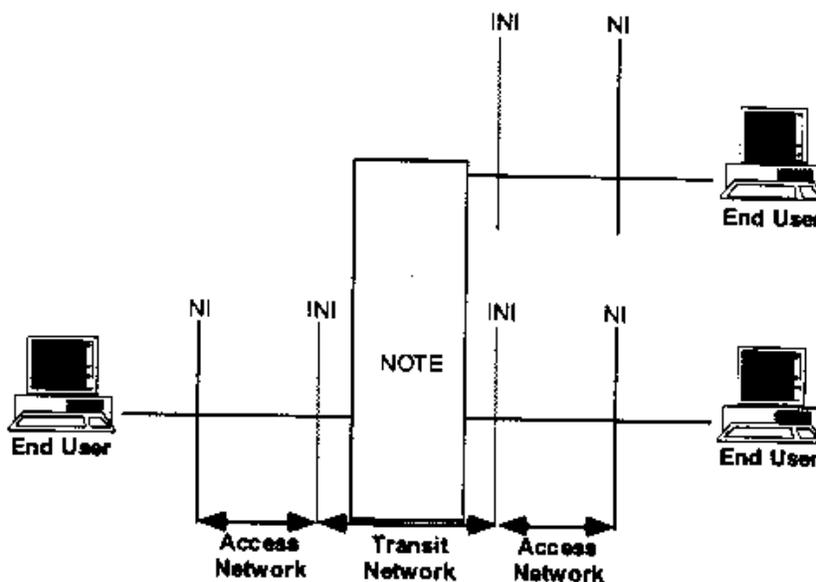
Figure 1. Figure 1 - Reference Model

Figure 1. (a) Point-to-Point Dedicated Digital Service



(a) Point-to-Point Dedicated Digital Service

Figure 1. (b) Point-to-Point Multipoint Dedicated Digital Service



NOTE: The multipoint node can be located within either the Access or Transit segments of the network.

(b) Point-to-Point Multipoint Dedicated Digital Service

NOTES: NI - Network Interface
 INI - Inter-Network Interface: INIs are only present when the service is provided across multiple networks.
 Where a point of termination (POT) exists, it will coincide with an INI.
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2. SERVICE DESCRIPTION

2.1. *Ameritech Base Rate*

Ameritech Base Rate provides for the transmission of synchronous serial data at discrete bit rates of 2.4 Kbps, 4.8 Kbps, 9.6 Kbps, 19.2 Kbps, 56.0 Kbps and 64.0 Kbps. Service is provided between customer designated locations, or between a customer designated location and a HUB where multiplexing and/or cross-connection functions are offered.

2.2. *Ameritech DS1 Service*

Ameritech DS1 Service provides for the transmission of nominal 1.544 Mb/s isochronous serial data. Service is provided between customer designated locations or between a customer designated location and a HUB, where multiplexing and/or cross-connection functions are offered.

2.3. *Ameritech DS3 Service*

Ameritech DS3 Service provides for the transmission of nominal 44.736 Mb/s isochronous serial data. Service is provided between customer designated locations, or a customer designated location and a HUB, where multiplexing and/or cross-connection functions are offered.

2.4. *Ameritech OC-N Service and Ameritech OC-N Dedicated Ring Service*

Ameritech OC-N Service

Ameritech OC-N Service provides point to point SONET based services at the Optical Carrier (OC) Rates of OC-3 (155.52 Mbps), OC-12 (622.08 Mbps), and OC-48 (2488.32 Mbps). This service is available between customer designated premises, or between a customer designated premises and an Ameritech Central Office (CO) location where multiplexing and/or cross-connection functions are offered.

Ameritech OC-N Dedicated Ring Service

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Ameritech OC-N Dedicated Ring Service provides SONET based dedicated ring services at the Optical Carrier Rates of OC-3 (155.52 Mbps), OC-12 (622.08 Mbps), and OC-48 (2488.32 Mbps). This service provides a dedicated ring connecting three or more nodes located at customer premises and Ameritech COs.

2.5. *Optional Features*

Customers can order a basic service and select from a list of available features those features that they desire to meet their specific requirements. These features are listed in the applicable Ameritech tariffs.

3. AMERITECH BASE RATE TECHNICAL SPECIFICATIONS

3.1. *General*

This section presents the technical specification for Ameritech Base Rate Services.

3.2. *Nominal Rate*

The Ameritech Base Rate signals have discrete nominal line rates of 2.4 Kbps, 4.8 Kbps, 9.6 Kbps, 19.2 Kbps, 56.0 Kbps and 64.0 Kbps. Additional details may be found in TR-NPL-000341 and AM-TR-OAT-000070.

3.3. *Transmission Performance Specifications*

Ameritech has established Minimum Performance Expectations and Performance Objectives for Ameritech Base Rate Service. The Minimum Performance Expectation defines minimum performance levels a customer can expect for Ameritech Base Rate Service.

Ameritech Base Rate Services, in aggregate, will perform at the Ameritech Base Rate Performance Objective level, or better. Individual circuit performance may vary as a result of factors such as technology mix, geographic factors, isolated events, etc.

Ameritech Base Rate Minimum Performance Expectation:

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- * Percent error free seconds : 99.9%
- * Errored seconds per day: 87
- * Availability (12 months): 99.925%

Ameritech Base Rate Performance Objective:

- * Percent error free seconds: 99.995%
- * Errored seconds per day: 4
- * Availability (12 months): 99.999%

Percent Error Free Seconds is the calculated ratio (using extrapolation where practical) between errored seconds and error free seconds in a twenty-four (24) hour period.

Percent EFS is the quantity, total measured seconds minus errored seconds divided by total measured seconds, and expressed as a percent, during the period of time the circuit is the available state. This can be represented by the formula:

$$\text{EFS} = \frac{\text{Total Measured Seconds} - \text{Errored Seconds}}{\text{Total Measured Seconds}} \times 100 = \%$$

Total Measured Seconds

An error free second is any second during which no bit error occurs.

An errored second is any second during which one or more bit errors occur.

Measurements of ES and percent EFS levels will commence with a trouble report from the customer to the Ameritech Report Center, and will end when the circuit is returned to service. Current operational procedures and tariffs will apply to the administration of such trouble reports.

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Availability is the quantity, total time minus unavailable time, divided by total time and expressed as a percent (%). This can be represented by the formula:

$$A = \frac{\text{Total time} - \text{unavailable time}}{\text{Total time}} \times 100 = \%$$

Unavailability is defined as beginning at the onset of ten consecutive severely errored seconds (SES) and ending at the onset of ten consecutive seconds with no SES. (See ANSI T1.231-1993 for additional details.) An SES exists when the Bit Error Rate (BER) for that second is 1×10^{-3} or greater.

Measurement of unavailable time will commence with a trouble report to the Ameritech Report Center, and will end when the circuit is returned to service. Current operational procedures and tariffs will apply to the administration of such trouble reports.

4. AMERITECH DS1 TECHNICAL SPECIFICATIONS

4.1. General

This section presents the technical specifications for Ameritech DS1 Services.

4.2. Nominal Rate

The Ameritech DS1 signal has a nominal line rate of 1.544 Mb/s. Additional details may be found in TR-NPL-000054 and TR-INS-000342.

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4.3. Transmission Performance Specifications

Ameritech has established Minimum Performance Expectations and Performance Objectives for Ameritech DS1 Service. The Minimum Performance Expectations defines minimum performance levels a customer can expect for Ameritech DS1 Service.

Ameritech DS1 Services, in aggregate, will perform at the Ameritech DS1 Performance Objective level, or better. Individual circuit performance may vary as a result of factors such as technology mix, geographic factors, isolated events, etc.

Ameritech DS1 Minimum Performance Expectations

- Percent error free seconds: 99.75%
- Errored Seconds per day: 216
- Availability (12 months): 99.925%

Ameritech DS1 Performance Objective

- Percent error free seconds: 99.995%
- Errored Seconds per day: 4
- Availability (12 months): 99.999%

Percent Error Free Seconds is the calculated ratio (using extrapolation where practical) between errored seconds and error free seconds in a twenty-four (24) hour period.

Percent EFS is the quantity, total measured seconds minus errored seconds divided by total measured seconds, and expressed as a percent, during the period of time the circuit is in the available state. This can be represented by the formula:

$$\text{EFS} = \frac{\text{Total Measured Seconds} - \text{Errored Seconds}}{\text{Total Measured Seconds}} \times 100 = \%$$

Total Measured Seconds

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An error free second is any second during which no bit error occurs.

An errored second is any second during which one or more bit errors occur.

Measurements of ES and percent EFS levels will commence with a trouble report from the customer to the Ameritech Report Center, and will end when the circuit is returned to service. Current operational procedures and tariffs will apply to the administration of such trouble reports.

Availability is the quantity, total time minus unavailable time, divided by total time and expressed as a percent (%). This can be represented by the formula:

$$A = \frac{\text{Total Time} - \text{Unavailable Time}}{\text{Total Time}} \times 100 = \%$$

Total Time

Unavailability is defined to begin at the onset of ten consecutive SES, and to end at the onset of ten consecutive SES. (See ANSI T1.231-1993 for additional details.)

Measurement of unavailable time will commence with a trouble report from the customer to the Ameritech Report Center, and will end when the circuit is returned to service. Current operational procedures and tariffs will apply to the administration of such trouble reports.

5. AMERITECH DS3 TECHNICAL SPECIFICATIONS

5.1. General

This section presents the technical specifications for Ameritech DS3 Digital Services.

5.2. Nominal Rate

The Ameritech DS3 signal has a nominal line rate of 44.736 Mb/s. Additional details may be found in TR-INS-000342.

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5.3. Transmission Performance Specifications

Ameritech has established Minimum Performance Expectations and Performance Objectives for Ameritech DS3 Service. The Minimum Performance Expectations defines minimum performance levels a customer can expect for Ameritech DS3 Service.

Ameritech DS3 Services, in aggregate, will perform at the Ameritech DS3 Performance Objective level, or better. Individual circuit performance may vary as a result of factors such as technology mix, geographic factors, isolated events, etc.

Ameritech DS3 Minimum Performance Expectations:

- Percent error free seconds (EFS): 99.5%
- Errored Seconds (ES) per day: 432
- Availability (12 months): 99.975%

Ameritech DS3 Performance Objective:

- Percent error free seconds (EFS) per day: 99.99%
- Errored Seconds (ES) per day: 8
- Availability (12 months): 99.999%

Percent Error Free Seconds (EFS) is the calculated ratio (using extrapolation where practical) between errored seconds and error free seconds in a twenty-four (24) hour period.

Percent EFS is the quantity, total measured seconds minus errored seconds divided by total measured seconds, and expressed as a percent, during the period of time the circuit is in the available state. This can be represented by the formula:

$$\text{EFS} = \frac{\text{Total Measured Seconds} - \text{Errored Seconds}}{\text{Total Measured Seconds}} \times 100 = \%$$

Total Measured Seconds

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An error free second is any second during which no bit error occurs.

An errored second is any second during which one or more bit errors occur.

Measurements of ES and percent EFS levels will commence with a trouble report from the customer to the Ameritech Report Center, and will end when the circuit is returned to service. Current operational procedures and tariffs will apply to the administration of such trouble reports.

Availability is the quantity, total time minus unavailable time, divided by total time and expressed as a percent (%). This can be represented by the formula:

$$A = \frac{\text{Total Time} - \text{Unavailable Time}}{\text{Total Time}} \times 100 = \%$$

Total Time

Unavailability is defined to begin at the onset of ten consecutive SES, and to end at the onset of ten consecutive seconds with no SES. (See ANSI T1.231-1993 for additional details.)

Measurement of unavailable time will commence with a trouble report from the customer to the Ameritech Report Center, and will end when the circuit is returned to service. Current operational procedures and tariffs will apply to the administration of such trouble reports.

6. AMERITECH OC-N SERVICES AND AMERITECH DEDICATED RING SERVICES

6.1. General

This section lists the technical specifications for Ameritech's OC-N and Dedicated Ring services.

6.2. Nominal Rate

The Ameritech OC-N and Dedicated Ring services have the following nominal line rates:

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OC-3	155.52 Mbps
OC-12	622.08 Mbps
OC-48	2488.32 Mbps

Additional details may be found in ANSI Document T1A1.3/95-011 draft, Network Performance Parameters and Objectives for Dedicated Digital Services - SONET Bit Rates.

6.3. Transmission Performance Specifications

Ameritech has established Minimum Performance Expectations and Performance Objectives for the Synchronous Transmission Signal (STS) Channels contained within Ameritech's SONET based OC-N and Dedicated Ring services. The Minimum Performance Expectations defines minimum performance levels a customer can expect for an STS channel contained within an AMERITECH OC-N or Dedicated Ring service.

These STS channels in aggregate, will perform at the AMERITECH OC-N or Dedicated Ring Performance Objective level, or better. Individual circuit performance may vary as a result of factors such as technology mix, geographic factors, isolated events, etc.

Ameritech OC-N and Dedicated Ring Minimum Performance Expectation:

* Percent error free seconds (EFS)

*ANSI

Standard T1.514-1995 provides for a new performance value, Background Block Error Ratio (BBER) to more finely describe the performance of higher bit rate services. The values that define Expectation and Objective levels are under study at this time. When finalized, they will be included in this document.

99.9725%

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* Errored seconds (ES) per day: 24/Day

* Availability (12 months):

OC-N Services with LDC 1+1 Protection 99.999%

and OC-N Dedicated Ring Services

OC-N Services without LDC 1+1 99.983%

Protection

AMERITECH OC-N and Dedicated Ring Performance Objective:

OC-N

* Percent error free seconds (EFS)

*ANSI

Standard T1.514-1995 provides for a new performance value, Background Block Error Ratio (BBER) to more finely describe the performance of higher bit rate services. The values that define Expectation and Objective levels are under study at this time. When finalized, they will be included in this document.

99.9975%

* Errored seconds (ES) per day: 24/day

* Availability (12 months):

OC-N Services with LDC 1+1 Protection 99.99994%

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and OC-N Dedicated Ring Services

OC-N Services without LDC 1+1 99.999%

Protection

Percent Error Free Seconds (EFS) is the calculated ratio (using extrapolation where practical) between errored seconds and error free seconds in a twenty-four (24) hour period.

Percent EFS is the quantity, total measured seconds minus errored seconds divided by total measured seconds, and expressed as a percent, during the period of time the circuit is in the available state. This can be represented by the formula:

$$\text{EFS} = \frac{\text{Total Measured Seconds} - \text{Errored Seconds}}{\text{Total Measured Seconds}} \times 100 = \%$$

Total Measured Seconds

An error free second is any second during which no bit error occurs.

An errored second is any second during which one or more bit errors occur.

Measurement of ES and percent EFS levels will commence with a trouble report from the customer to the Ameritech Report Center, and will end when the circuit is returned to service. Current operational procedures and tariffs will apply to the administration of such trouble reports.

Availability is the quantity, total time minus unavailable time, divided by total time and expressed as a percent (%). This can be represented by the formula:

$$A = \frac{\text{Total Time} - \text{Unavailable Time}}{\text{Total Time}} \times 100 = \%$$

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Total Time

Unavailability is defined to begin at the onset of ten consecutive SES and to end at the onset of ten consecutive seconds with no SES. (See ANSI T1.231-1993 for additional detail.)

Measurement of unavailable time will commence with a trouble report from the customer to the Ameritech Report Center, and will end when the circuit is returned to service. Current operational procedures and tariffs will apply to the administration of such trouble reports.

7. ANNOUNCEMENTS

BERBit Error Rate

COCentral Office

DS1Digital signal level 1 (1.544 Mb/s)

DS3Digital signal level 3 (44.736 Mb/s)

EFError free second

EUEnd User

ICInterexchange carrier

LOFLoss of Frame

LOSLoss of Signal

NINetwork interface

POPPoint of presence

POTPoint of termination

SESSeverely errored second

SONETSynchronous Optical Network

STSSynchronous Transmission Signal

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- 8.10** Ameritech National Standards Institute (ANSI) T1.514-1995, Network Performance Parameters and Objectives for Dedicated Digital Services - SONET Bit Rates.
- 8.11** Ameritech AM TR-NIS-000111, Ameritech OC-3, OC-12 and OC-48 Service Interface Specifications.
- 8.12** Ameritech AM TR-NIS-000133, Ameritech OC-3, OC-12 and OC-48 Dedicated Ring Service Interface Specifications.

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