LOCAL TRANSPORT AND TERMINATION SERVICES

7. Local Transport and Termination Services Interfaces and Transmission Specifications

7.1 Contains LTTS Options (which are comprised of Interface Groups, Supervisory Signaling, Entry Switch Receive Level and Local Transport Termination) and transmission Specifications.

7.1 LTTS

Ten Interface Groups are provided for terminating the Transport Facility at the customer's switch. Each Interface Group provides a specified premises interface (e.g., two-wire, four-wire, DS1, etc.).

As a result of the customer's LTTS order and the type of Telephone Company transport facilities serving the customer designated premises, the need for signaling conversions or two-wire to four-wire conversions, or the need to terminate digital or high frequency facilities in channel bank equipment may require that Telephone Company equipment be placed at the customer designated premises. For example, if a voice frequency interface is ordered by the customer and the Telephone Company facilities serving the customer designated premises are digital, then the Telephone Company channel bank equipment must be placed at the customer designated premises in order to provide the voice frequency interface ordered by the customer.

7.1.1 Local Transport Interface Groups

Interface Groups are combinations of technical parameters which describe the Telephone Company handoff at the point of termination at the customer switch. The technical specifications concerning the available interface groups are set forth in (A) though (D) following.

LOCAL TRANSPORT AND TERMINATION SERVICES

7. Local Transport and Termination Interfaces and Transmission Specifications (Cont'd)

7.1 LTTS (Cont'd)

7.1.1 Local Transport Interface Groups (Cont'd)

Interface Group 1 and Group 3 through Group 5 are not available with LTTS. Interface Groups 2 and Groups 6 through 10 are provided with Type A or B Transmission Specifications, as set forth respectively in 7.1.2(E) and (F) following, depending on whether LTTS is routed directly or through an access tandem. All Interface Groups are provided with Data Transmission Parameters.

Only certain premises interfaces are available at the customer switch.

LOCAL TRANSPORT AND TERMINATION SERVICES

7. Local Transport and Termination Interfaces and Transmission Specifications (Cont'd)

7.1 LTTS (Cont'd)

7.1.1 Local Transport Interface Groups (Cont'd)

(A) Interface Group 1

Interface Group 1 is not available with LTTS.

(B) Interface Group 2

Interface Group 2 provides four-wire voice frequency transmission at the point of termination at the customer designated premises. The interface is capable of transmission of voice and associated telephone signals within the frequency bandwidth of approximately 300 to 3000 Hz.

The transmission path between the point of termination
at the customer designated premises and the customer's serving wire center may be comprised of any form or configuration of plant capable of and typically used

in the telecommunications industry for the transmission of voice and associated telephone signals within the frequency bandwidth of approximately 300 to 3000 Hz.

The interface is provided with loop supervisory signaling. Such signaling, except for two-way calling
which is E&M signaling, will be reverse battery signaling.

(C) Interface Group 3 through Group 5

Interface Group 3 through Group 5 are not available with LTTS.

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LOCAL TRANSPORT AND TERMINATION SERVICES

7. Local Transport and Termination Services Interfaces and Transmission Specifications (Cont'd)

7.1 LTTS (Cont'd)

7.1.1 Local Transport Interface Groups (Cont'd)

(D) Interface Groups 6 through 10

Interface Groups 6 through 10 provide digital transmission at the point of termination at the customer designated premises. The various interfaces are capable of transmitting electrical signals at the nominal bit rates illustrated following, with the capability to channelize voice frequency transmission paths. Before the first point of switching, when analog switching utilizing analog terminations is provided, the Telephone Company will provide multiplex and channel bank equipment to derive transmission paths of a frequency bandwidth of approximately 300 to 3000 Hz. When digital switching or analog switching with digital carrier terminations is provided, the Telephone Company will provide, a DS1 signal(s) in D3/D4 format.

The interfaces are provided with individual transmission path bit stream supervisory signaling.

Interface group Identification No.	Nominal Bit Rate (Mbps)	Digital Hierarchy Level	Max No. of Channelized Voice Freq. Trans. Paths
6	1.544	DS1	24
7	3.152	DS1C	48
8	6.312	DS2	96
9	44.736	DS3	672
10	274.176	DS4	4032

LOCAL TRANSPORT AND TERMINATION SERVICE

7. Local Transport and Termination Services Interfaces and Transmission Specifications (Cont'd)

7.1 LTTS (Cont'd)

7.1.1 Local Transport Interface Groups (Cont'd)

(E) Local Transport Optional Features

Where transmission facilities permit, the Telephone Company will, at the option of the customer, provide the following features associated with Local Transport.

When the 64 Clear Channel Capability optional feature is installed on an existing facility, the addition will be treated as a discontinuance and start of service and all associated nonrecurring charges will apply.

- Supervisory Signaling

Supervisory Signaling allows the customer to order an optional supervisory signaling arrangement for each transmission path provided where the transmission parameters permit, and where signaling conversion is required by the customer to meet its signaling capability.

LOCAL TRANSPORT AND TERMINATION SERVICES

7. Local Transport and Termination Services Interfaces and Transmission Specifications (Cont'd)

7.1 LTTS (Cont'd)

7.1.1 Local Transport Interface Groups (Cont'd)

(F) Local Transport Optional Features (Cont'd)

- 64 Clear Channel Capability

64 Clear Channel Capability allows the customer to to transport voice or data signals over a 64 kbps channel with no constraints on the quantity or sequence of ones and zero bits. This option employs the Bipolar 8 Zero Suppression (B8ZS) technique to permit customers to use the full 64 Kbps bandwidth of a DS0 channel. It is only available in suitably equipped electronic end offices as identified in NATIONAL EXCHANGE CARRIER ASSOCIATION, TARIFF No. 4. 64 Clear Channel Capability, as described in Technical Reference GR-334-CORE, is available with Interface Groups 6 and 9 for Signaling System 7 (SS7) signaling.

The Interface Groups, as described in (A) through (D) preceding, represent industry standard arrangements. Where transmission parameters permit, the customer may select the following optional signaling arrangements in place of the signaling arrangements standardly associated with the Interface Groups.

- For Interface Group 2

- DX Supervisory Signaling,
E&M Type I Supervisory Signaling,
E&M Type II Supervisory Signaling, or
E&M Type III Supervisory Signaling

SF Supervisory Signaling, or Tandem Supervisory Signaling

- For Interface Groups 6 through 10

These Interface Groups may, at the option of the customer, be provided with individual transmission path SF supervisory signaling where such signaling is available in Telephone Company

LOCAL TRANSPORT AND TERMINATION SERVICES

7. Local Transport and Termination Interfaces and Transmission Specifications (Cont'd)

7.1 LTTS (Cont'd)

7.1.1 Local Transport Interface Groups (Cont'd)

(E) Local Transport Optional Features (Cont'd)

central offices. Generally such signaling is available only where the first point of switching provides an analog (i.e., non-digital) interface to the transport termination.

These optional Supervisory Signaling arrangements are not available in combination with the SS7 optional feature as described in 4.5.2(B)(2) preceding.

Additionally, in (F) following, there is a matrix of available Premises Interface Codes as a function of Interface Group A Telephone Company Switch Supervisory Signaling.

(F) Available Premises Interface Codes

Following is a matrix showing premises interface codes which are available for each Interface Group. Their availability is a function of the Telephone Company switch supervisory signaling and Feature Group.

Premise Interface Codes

Premise Code	Option	Definition
DS-		digital hierarchy interface
-	15	1.544 Mbps (DS1) format per PUB 1451 plus D4
-	15L	1.544 Mbps (DS1) with SF signaling
-	27	274.176 Mbps (DS4)
-	27L	274.176 Mbps (DS4) with SF signaling
-	31	3.152 Mbps (DS1C)
-	31L	3.152 Mbps (DS1C) with SF signaling
-	44	44.736 Mbps (DS3)
-	44 L	44.736 Mbps (DS3) with SF signaling
-	63	6.312 Mbps (DS2)
-	63L	6.312 Mbps (DS2) with SF signaling
DX -		duplex signaling interface at customer's point of termination

LOCAL TRANSPORT AND TERMINATION SERVICES

7. Local Transport and Termination Interfaces and Transmission Specifications (Cont'd)

7.1 LTTS (Cont'd)

7.1.1 Local Transport Interface Groups (Cont'd)

(F) Available Premises Interface Codes (Cont'd)

Premise Interface Codes (Cont'd)

Premise Code	Option	Definition
EA -	E	Type I E&M Lead Signaling. Customer at POT or customer's end user at POT originates on E Lead.
EA -	M	Type I E&M Lead Signaling. Customer at POT or customer's end user at POT originates on M Lead.
EB -	E	Type II E&M Lead Signaling. Customer at POT or customer's end user at POT originates on E Lead.
EB -	M	Type II E&M Lead Signaling. Customer at POT or customer's end user at POT originates on M Lead.
EC -		Type III E&M signaling at customer POT
NO -		no signaling interface, transmission only
RV -	O	reverse battery signaling, one way operation, originate by customer
-	T	reverse battery signaling, one way operation, terminate function by customer or customer's end user
SF -		single frequency signaling with VF band at either customer POT or customer's end user POT

Available Premise Interface Codes

Interface Group	Telephone Company Switch Supervisory Signaling	Premises Interface Code
2		
	RV, EA, EB, EC	4SF2
	RV, EA, EB, EC	4DX2
	RV, EA, EB, EC	6EA2-E
	RV, EA, EB, EC	6EA2-M
	RV, EA, EB, EC	8EB2-E
	RV, EA, EB, EC	8EB2-M
	EA, EB, EC	8EC2-M
	RV	4RV2-O
	RV	4RV2-T
	SS7	4NO2

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LOCAL TRANSPORT AND TERMINATION SERVICES

7. Local Transport and Termination Interfaces and Transmission Specifications (Cont'd)

7.1 LTTS (Cont'd)

7.1.1 Local Transport Interface Groups (Cont'd)

(F) Available Premises Interface Codes (Cont'd)

Interface Group	Telephone Company Switch Supervisory Signaling	Premises Interface Code
6		
	RV, EA, EB, EC	4DS9-15
	RV, EA, EB, EC	4DS9-15L
	SS7	4DS9-15
7		
	RV, EA, EB, EC	4DS9-31
	RV, EA, EB, EC	4DS9-31L
	SS7	4DS9-31
8		
	RV, EA, EB, EC	4DS0-63
	RV, EA, EB, EC	4DS0-63L
	SS7	4DS0-63
9		
	RV, EA, EB, EC	4DS6-44
	RV, EA, EB, EC	4DS6-44L
	SS7	4DS6-44
10		
	RV, EA, EB, EC	4DS6-27
	RV, EA, EB, EC	4DS6-27L
	SS7	4DS6-27

LOCAL TRANSPORT AND TERMINATION SERVICES

7. Local Transport and Termination Interfaces and Transmission Specifications (Cont'd)

7.1 LTTS (Cont'd)

7.1.2 Standard Transmission Specifications

Descriptions of the transmission specifications available with each Interface Group selected by the customer, are set forth following. Descriptions of each of these Standard Transmission Parameters mentioned are set forth respectively in (B) through (D) and 7.1.3(A) and (B) following.

LOCAL TRANSPORT AND TERMINATION SERVICES

7. Local Transport and Termination Interfaces and Transmission Specifications (Cont'd)

7.1 LTTS (Cont'd)

7.1.2 Standard Transmission Specifications (Cont'd)

(A) LTTS is provided with either Type A or Type B Transmission Specifications as follows:

- When routed to the end office Type B is provided.

- When routed to an access tandem only Type A is provided.

- Type A is provided on the transmission path from the access tandem to the end office.

Type A and Type B Transmission Specifications are provided with Interface Groups 2 and Group 6 through Group 10.

Type DB Data Transmission Parameters are provided for the transmission path between the customer designated premises and the end office when directly routed to the end office. Type DA Data Transmission Parameters are provided for the transmission path between the customer designated premises and the access tandem and between the access tandem and the end office when routed via an access tandem.

(B) Type A Transmission Specifications

Type A Transmission Specifications is provided with the following parameters:

(1) Loss Deviation

The maximum Loss Deviation of the 1004 Hz loss relative to the Expected Measured Loss (EML) is ± 2.0 dB.

LOCAL TRANSPORT AND TERMINATION SERVICES

7. Local Transport and Termination Interfaces and Transmission Specifications (Cont'd)

7.1 LTTS (Cont'd)

7.1.2 Standard Transmission Specifications (Cont'd)

(E) Type A Transmission Specifications (Cont'd)

(2) Attenuation Distortion

The maximum Attenuation Distortion in the 404 to 2804 Hz frequency band relative to the loss at 1004 Hz is -1.0 dB to +3.0 dB.

(3) C-Message Noise

The maximum C-Message Noise for the transmission path at the route miles listed is less than or equal to:

Route Miles	C-Message Noise
less than 50	32 dBrnCO
51 to 100	34 dBrnCO
101 to 200	37 dBrnCO
201 to 400	40 dBrnCO
401 to 1000	42 dBrnCO

(4) C-Notch Noise

The maximum C-Notch Noise, utilizing a -16 dbmO holding tone, is less than or equal to 45 dBrnCO.

LOCAL TRANSPORT AND TERMINATION SERVICES

7. Local Transport and Termination Interfaces and Transmission Specifications (Cont'd)

7.1 LTTS (Cont'd)

7.1.2 Standard Transmission Specifications (Cont'd)

(E) Type A Transmission Specifications (Cont'd)

(5) Echo Control

Echo Control, identified as Equal Level Echo path Loss, and expressed as Echo Return Loss and Singing Return Loss, is dependent on the routing, i.e., whether the service is routed directly from the customer's point of termination (POT) to the end office or via an access tandem. It is equal to or greater than the following:

	Echo Return Loss	Singing Return Loss
-POT to Access Tandem	21 dB	14 dB
-POT to End Office		
-Direct	N/A	N/A
-Via Access Tandem	16 dB	11 dB

(6) Standard Return Loss

Standard Return Loss expressed as Echo Return Loss and Singing Return Loss on two-wire ports of a four-wire point of termination shall be equal to or greater than:

Echo Return Loss	Singing Return Loss
5 dB	2.5 dB

LOCAL TRANSPORT AND TERMINATION SERVICES

7. Local Transport and Termination Interfaces and Transmission Specifications (Cont'd)

7.1 LTTS (Cont'd)

7.1.2 Standard Transmission Specifications (Cont'd)

(F) Type B Transmission Specifications

Type B Transmission Specifications are provided with the following parameters:

(1) Loss Deviation

The maximum Loss Deviation of the 1004 Hz loss relative to the Expected Measured Loss (EML) is + 2.5 dB.

(2) Attenuation Distortion

The maximum Attenuation Distortion in the 404 to 2804 Hz frequency band relative to loss at 1004 Hz is -2.0 dB to +4.0 dB.

(3) C-Message Noise

The maximum C-Message Noise for the transmission path at the route miles listed is less than or equal to:

Route Miles	C-Message Noise Type B2
less than 50	35 dBrnCO
51 to 100	37 dBrnCO
101 to 200	40 dBrnCO
201 to 400	43 dBrnCO
401 to 1000	45 dBrnCO

(4) C-Notch Noise

The maximum C-Notch Noise, utilizing a -16 dBmO holding tone is less than or equal to 47 dBrnCO.

ACCESS SERVICE

7. Access Service Interfaces and Transmission Specifications (Cont'd)

7.1 LTTS (Cont'd)

7.1.2 Standard Transmission Specifications (Cont'd)

(F) Type B Transmission Specifications (Cont'd)

(5) Echo Control

Echo Control, identified Equal Level Echo Loss and expressed as Echo Return Loss (ERL) and Singing Return Loss (SRL), is dependent on the routing, i.e., whether the service is routed directly from the customer's point of termination (POT) to the end office or via an access tandem. The ERL and SRL also differ by type of termination, and type of transmission path. They are greater than or equal to the following:

	Echo Return Loss	Singing Return Loss
POT to Access Tandem - Terminated in 4-Wire trunk	21 dB	15 dB
- Terminated in 2-Wire trunk	16 dB	11 dB
POT to End Office - Direct	16 dB	11 dB

LOCAL TRANSPORT AND TERMINATION SERVICES

7. Local Transport and Termination Interfaces and Transmission Specifications (Cont'd)

7.1 LTTS (Cont'd)

7.1.2 Standard Transmission Specifications (Cont'd)

(F) Type B Transmission Specifications (Cont'd)

(6) Standard Return Loss

Standard Return Loss, expressed as Echo Return Loss and Singing Return Loss, on two-wire ports of a four-wire point of termination shall be equal to or greater than:

Echo Return Loss	Singing Return Loss
5 dB	2.5 dB

7.1.3 Data Transmission Parameters

Two types of Data Transmission Parameters, i.e., Type DA and Type DB, are provided for the LTTS arrangements. Type DB is provided when LTTS is directly routed to the end office. Type DA is only provided with LTTS and only when routed via an access tandem. Following are descriptions of each.

(A) Data Transmission Parameters Type DA

(1) Signal to C-Notched Noise Ratio

The Signal to C-Notched Noise Ratio is equal to or greater than 33 dB.

LOCAL TRANSPORT AND TERMINATION SERVICES

7. Local Transport and Termination Interfaces and Transmission Specifications (Cont'd)

7.1 LTTS (Cont'd)

7.1.3 Data Transmission Parameters Type DA (Cont'd)

(2) Envelope Delay Distortion

The maximum Envelope Delay Distortion for the frequency bands and route miles specified is:

	604 to 2804 Hz
less than 50 route miles	500 microseconds
equal to or greater than 50 route miles	900 microseconds

	1004 to 2404 Hz
less than 50 route miles	200 microseconds
equal to or greater than 50 route miles	400 microseconds

(3) Impulse Noise Counts

The Impulse Noise Counts exceeding a 65 dBrnCO threshold in 15 minutes is no more than 15 counts.

(4) Intermodulation Distortion

The Second Order (R2) and Third Order (R3) Intermodulation Distortion products are equal to or greater than:

Second Order (R2)	33 dB
Third Order (R3)	37 dB

LOCAL TRANSPORT AND TERMINATION SERVICES

7. Local Transport and Termination Interfaces and Transmission Specifications (Cont'd)

7.1 LTTS (Cont'd)

7.1.3 Data Transmission Parameters

(A) Data Transmission Parameters Type DA (Cont'd)

(5) Phase Jitter

The Phase Jitter over the 4-300 Hz frequency band is less than or equal to 5` peak-to-peak.

(6) Frequency Shift

The maximum Frequency Shift does not exceed -2 to +2 Hz.

(B) Data Transmission Parameters Type DB

(1) Signal to C-Notched Noise Ratio

The signal to C-Notched Noise Ratio is equal to or greater than 30 dB.

(2) Envelope Delay Distortion

The maximum Envelope Delay Distortion for the frequency bands and route miles specified is:

	604 to 2804 Hz
less than 50 route miles	800 microseconds
equal to or greater than 50 route miles	1000 microseconds

	1004 to 2404 Hz
less than 50 route miles	320 microseconds
equal to or greater than 50 route miles	500 microseconds

LOCAL TRANSPORT AND TERMINATION SERVICES

7. Local Transport and Termination Interfaces and Transmission Specifications (Cont'd)

7.1 LTTS (Cont'd)

7.1.3 Data Transmission Parameters

(B) Data Transmission Parameters Type DB (Cont'd)

(3) Impulse Noise Counts

The Impulse Noise Counts exceeding a 67 dBrnCO threshold in 15 minutes is no more than 15 counts.

(4) Intermodulation Distortion

The Second Order (R2) and Third Order (R3) inter-modulation Distortion products are equal to or greater than:

Second Order (R2)	31 dB
Third Order (R3)	34 dB

(5) Phase Jitter

The Phase Jitter over the 4-300 Hz frequency band is less than or equal to 7` peak-to-peak.

(6) Frequency Shift

The maximum Frequency Shift does not exceed -2 to +2 Hz.