

ACCESS SERVICE

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15. Interface Groups, Transmission Specifications and Channel Interfaces15.1 Local Transport Interface Groups

Interface Group 1 is provided with Type C Transmission Specifications, and Interface Groups 2 through 10 are provided with Type A or B Transmission Specifications, depending on the Basic Service Arrangement or Feature Group and whether the Access y Service 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 designated premises. The premises interfaces associated with the Interface Groups may vary among Basic Service Arrangements or Feature Groups. The various premises interfaces which are available with the Interface Groups, and the Basic Service Arrangements or Feature Groups with which they may be used, are set forth in 15.1 following.

15.1.1 Interface Group 1 (USOC TPPIX)

Interface Group 1, except as set forth in the following, provides two-wire voice frequency transmission at the point of termination at the customer's premises. The interface is capable of transmission of voice and associated telephone signals within the frequency bandwidth of approximately 300 to 3000 Hz.

Interface Group 1 is not provided in association with ATANEA or FGC and ATAXXX or FGD when the first point of switching is an access tandem. In addition, Interface Group 1 is not provided in association with an Access Trunk Arrangement or FGB, FGC or FGD when the first point of switching provides only four-wire terminations.

The transmission path between the point of termination at the customer designated premises and the first point of switching 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 300 to 3000 Hz.

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The interface is provided with loop supervisory signaling. When the interface is associated with ALA or FGA, such signaling will be loop start or ground start signaling. When the interface is associated with ATA950, ATANEA, ATAXXX, FGB, FGC or FGD, such signaling, except for two-way calling which is E&M signaling, will be reverse battery signaling.

15.1.2 Interface Group 2 (USOC TPP2X)

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 first point of switching 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 300 to 3000 Hz.

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The interface is provided with loop supervisory signaling. When the interface is associated with ALA or FGA, such signaling will be loop start or ground start signaling. When the interface is associated with ATA950, ATANEA, ATAXXX, FGB, FGC OR FGD, such signaling, except for two-way calling which is E&M signaling, will be reverse battery signaling.

15.1.3 Interface Group 3 (USOC TPP3X)

Interface Group 3 provides group level analog transmission at the point of termination at the customer designated premises. The interface is capable of transmitting electrical signals between the frequencies of 60 to 108 kHz, with the capability to channelize up to 12 voice frequency transmission paths. Certain frequencies within the bandwidth of the Interface Group are reserved for Telephone Company use, e.g., pilot and carrier group alarm tones. Before the first point of switching, the Telephone Company will provide multiplex equipment to derive 12 transmission paths of frequency bandwidth of approximately 300 to 3000 Hz.

The interface is provided with individual transmission path SF supervisory signaling.

15.1.4 Interface Group 4 (USOC TPP4X)

Interface Group 4 provides supergroup level analog transmission at the point of termination at the customer designated premises. The interface is capable of

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(Cont'd)15.1 Local Transport Interface Groups (Cont'd)15.1.4 Interface Group 4 (USOC TPP4X) (Cont'd)

transmitting electrical signals between the frequencies of 312 to 552 kHz, with the capability to channelize up to 60 voice frequency transmission paths. Certain frequencies within the bandwidth of the Interface Group are reserved for Telephone Company use, e.g., pilot and carrier group alarm tones. Before the first point of switching, the Telephone Company will provide multiplex and channel bank equipment to derive 60 transmission paths of frequency bandwidth of approximately 300 to 3000 Hz.

The interface is provided with individual transmission path SF supervisory signaling.

15.1.5 Interface Group 5 (USOC TPP5X)

Interface Group 5 provides mastergroup level analog transmission at the point of termination at the customer designated premises. The interface is capable of transmitting electrical signals between the frequencies of 564 to 3084 kHz, with the capability to channelize up to 600 voice frequency transmission paths. Certain frequencies within the bandwidth of the Interface Group are reserved for Telephone Company use, e.g., pilot and carrier group alarm tones. Before the first point of switching, the Telephone Company will provide multiplex and channel bank equipment to derive 600 transmission paths of frequency bandwidth of approximately 300 to 3000 Hz.

The interface is provided with individual transmission path SF supervisory signaling.

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Interface Group 6 provides DS1 level digital transmission at the point of termination at the customer designated premises. The interface is capable of transmitting electrical signals at a nominal 1.544 Mbps, with the capability to channelize up to 24 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 24 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, at the first point of switching, a DS1 signal in D3/D4 format.

The interface is provided with individual transmission path bit stream supervisory signaling.

(A) (USOC SLKS7)

Interface Group 6, used in conjunction with SS7, provides interconnection for common channel signaling access capability. It is also used in conjunction with 64CCC.

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Interface Group 7 provides DS1C level digital transmission at the point of termination at the customer designated premises. The interface is capable of transmitting electrical signals at a nominal 3.152 Mbps, with the capability to channelize up to 48 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 up to 48 voice frequency 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, at the first point of switching, DS1 signal in D3/D4 format.

The interface is provided with individual transmission path bit stream supervisory signaling.

15.1.8 Interface Group 8 (USOC TPP8X)

Interface Group 8 provides DS2 level digital transmission at the point of termination at the customer designated premises. The interface is capable of transmitting electrical signals at a nominal 6.312 Mbps, with the capability to channelize up to 96 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 in its office to derive up to 96 transmission paths of a frequency bandwidth of

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approximately 300 to 3000 Hz. When digital switching or analog switching with digital carrier terminations is provided, the Telephone Company will provide, at the first point of switching, DS1 signal in D3/D4 format.

The interface is provided with individual transmission path bit stream supervisory signaling.

15.1.9 Interface Group 9 (USOC TPP9X)

Interface Group 9 provides DS3 level digital transmission at the point of termination at the customer designated premises. The interface is capable of transmitting electrical signals at a nominal 44.736 Mbps, with the capability to channelize up to 672 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 up to 672 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, at the first point of switching, DS1 signal in D3/D4 format.

The interface is provided with individual transmission path bit stream supervisory signaling.

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(Cont'd)15.1 Local Transport Interface Groups (Cont'd)15.1.10 Interface Group 10 (USOC TPPAX)

Interface Group 10 provides DS4 level digital transmission at the point of termination at the customer designated premises. The interface is capable of transmitting electrical signals at a nominal 274.176 Mbps, with the capability to channelize up to 4032 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 up to 4032 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, at the first point of switching, DS1 signal in D3/D4 format. The interface is provided with individual transmission path bit stream supervisory signaling.

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15. Interface Groups, Transmission Specifications and Channel Interfaces
(Cont'd)15.1 Local Transport Interface Groups (Cont'd)15.1.11 Available Premises Interface Codes

Following is a matrix showing, for each Interface Group, which premises interface codes are available as a function of the Telephone Company switch supervisory signaling and Feature Group or Service Arrangement. For explanations of these codes, see the Glossary of Channel Interface Codes in 15.3.1 following.

Interface Group	Telephone Company Switch Supervisory Signaling	Premises Interface Code	Feature Group			
			A	B	C	D
			Basic Service Arrangement			
			ALA	ATA 950	ATA NEA	ATA XXX
1	L0	2LS2	X			
	L0	2LS3	X			
	G0	2GS2	X			
	G0	2GS3	X			
	L0, G0	2DX3	X			
	L0, G0	4EA3-E	X			
	L0, G0	4EA3-M	X			
	L0, G0	6EB3-E	X			
	L0, G0	6EB3-M	X			
	RV, EA, EB, EC	2DX3		X	X	X
	RV, EA, EB, EC	4EA3-E		X	X	X
	RV, EA, EB, EC	4EA3-M		X	X	X
	RV, EA, EB, EC	6EB3-E		X	X	X
	RV, EA, EB, EC	6EB3-M		X	X	X
	EA, EB, EC,	6EC3			X	X
	RV	2RV3-0		X	X	X
	RV	2RV3-T		X	X	X

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(Cont'd)15.1 Local Transport Interface Groups (Cont'd)15.1.11 Available Premises Interface Codes (Cont'd)

Interface Group	Telephone Company Switch Supervisory Signaling	Premises Interface Code	Feature Group			
			A	B	C	D
			Basic Service Arrangement			
			ALA	ATA 950	ATA NEA	ATA XXX
2	LO, GO	4SF2	X			
	LO, GO	4SF3	X			
	LO	4LS2	X			
	LO	4LS3	X			
	LO	6LS2	X			
	GO	4GS2	X			
	GO	4GS3	X			
	GO	6GS2	X			
	LO, GO	4DX2	X			
	LO, GO	4DX3	X			
	LO, GO	6EA2-E	X			
	LO, GO	6EA2-M	X			
	LO, GO	8EB2-E	X			
	LO, GO	8EB2-M	X			
	LO, GO	6EX2-B	X			
	RV, EA, EB, EC	4SF2		X	X	X
	RV, EA, EB, EC	4SF3		X		
	RV, EA, EB, EC	4DX2		X	X	X
	RV, EA, EB, EC	4DX3		X		
	RV, EA, EB, EC	6DX2			X	
	RV, EA, EB, EC	6EA2-E		X	X	X
	RV, EA, EB, EC	6EA2-M		X	X	X
	RV, EA, EB, EC	8EB2-E		X	X	X
	RV, EA, EB, EC	8EB2-M		X	X	X

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Interface Group	Telephone Company Switch Supervisory Signaling	Premises Interface Code	Feature Group			
			A	B	C	D
			Basic Service Arrangement			
			ALA	ATA 950	ATA NEA	ATA XXX
2 (Cont'd)	EA, EB, EC	8EC2-M			X	X
	RV	4RV2-0		X	X	X
	RV	4RV2-T		X	X	X
	RV	4RV3-0		X	X	
	RV	4RV3-T		x	X	
3	LO, GO	4AH5-B	X			
	RV, EA, EB, EC	4AH5-B		X	X	X
4*	LO, GO	4AH6-C	X			
	RV, EA, EB, EC	4AH6-C		X	X	X
5*	LO, GO	4AH6-D	X			
	RV, EA, EB, EC	4AH6-D		X	X	X
6	LO, GO	4DS9-15	X			
	LO, GO	4DS9-15L	X			
	RV, EA, EB, EC	4DS9-15		X	X	X
	RV, EA, EB, EC	4DS9-15L		X	X	X
7*	LO, GO	4DS9-31	X			
	RV, EA, EB, EC	4DS9-31		X	X	X
	LO, GO	4DS9-31L	X			
	RV, EA, EB, EC	4DS9-31L		X	X	X

* Interface groups 4, 5, and 7 are only available when ordered in conjunction with Feature Groups. They are not available with Basic Service Arrangements.

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Interface Group	Telephone Company Switch Supervisory Signaling	Premises Interface Code	Feature Group			
			A	B	C	D
			Basic Service Arrangement			
			ALA	ATA 950	ATA NEA	ATA XXX
8*	LO, GO	4DS0-63	X			
	LO, GO	4DS0-63L	X			
	RV, EA, EB, EC	4DS0-63		X	X	X
	RV, EA, EB, EC	4DS0-63L		X	X	X
9	LO, GO	4DS6-44	X			
	LO, GO	4DS6-44L	X			
	RV, EA, EB, EC	4DS6-44		X	X	X
	RV, EA, EB, EC	4DS6-44L		X	X	X
10*	LO, GO	4DS6-27	X			
	LO, GO	4DS6-27L	X			
	RV, EA, EB, EC	4DS6-27		X	X	X
	RV, EA, EB, EC	4DS6-27L		X	X	X

15.1.12 Supervisory Signaling

For Interface Groups 1 and 2

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

For Interface Group 2

SF Supervisory Signaling, or
Tandem Supervisory Signaling

* Interface groups 8 and 10 are only available when ordered in conjunction with Feature Groups. They are not available with Basic Service Arrangements.

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15. Interface Groups, Transmission Specifications and Channel Interfaces
(Cont'd)15.1 Local Transport Interface Groups (Cont'd)15.1.12 Supervisory Signaling (Cont'd)

For Interface Groups 6 and 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 Utility central offices. Generally such signaling is available only where the entry switch provides an analog, i.e., nondigital, interface to the transport termination.

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15. Interface Groups, Transmission Specifications and Channel Interfaces
(Cont'd)15.2 Transmission Specifications Switched Access Service15.2.1 Standard Transmission Specifications

Following are descriptions of the Standard Transmission Specifications available with Basic Service Arrangements Switched Access Service Feature Groups. The specific applications in terms of the Service Arrangements or Feature Groups and Interface Groups with which the Switched Access Standard Transmission Specifications are provided as set forth in 6.2.1.C, 6.2.2.C, 6.2.3.C and 6.2.4.C preceding.

(A) Type A Transmission Specifications

Type A Transmission Specifications are provided with the following parameters:

(1) Loss Deviation

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

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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:

<u>Route Miles</u>	<u>C-Message Noise</u>
less than 50	32 dBrnC0
51 to 100	34 dBrnC0
101 to 200	37 dBrnC0
201 to 400	40 dBrnC0
401 to 1000	42 dBrnC0

(4) C-Notch Noise

The maximum C-notch noise, utilizing a -16 dBm0 holding tone, is less than or equal to 45 dBrnC0.

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15. Interface Groups, Transmission Specifications and Channel Interfaces
(Cont'd)15.2 Transmission Specifications Switched Access Service (Cont'd)15.2.1 Standard Transmission Specifications (Cont'd)(A) 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:

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

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(Cont'd)15.2 Transmission Specifications Switched Access Service (Cont'd)15.2.1 Standard Transmission Specifications (Cont'd)(A) Type A 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:

<u>Echo Return Loss</u>	<u>Singing Return Loss</u>
5 dB	2.5 dB

(B) Type A 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 bank relative to loss at 1004 Hz is -2.0 dB to +4.0 dB.

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15. Interface Groups, Transmission Specifications and Channel Interfaces
(Cont'd)15.2 Transmission Specifications Switched Access Service (Cont'd)15.2.1 Standard Transmission Specifications (Cont'd)(B) Type B Transmission Specifications (Cont'd)(3) C-Message Noise

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

<u>Route Miles</u>	<u>C-Message Noise*</u>	
	<u>Type B1</u>	<u>Type B2</u>
less than 50	32 dBrnC0	35 dBrnC0
51 to 100	33 dBrnC0	37 dBrnC0
101 to 200	35 dBrnC0	40 dBrnC0
201 to 400	37 dBrnC0	43 dBrnC0
400 to 10	39 dBrnC0	45 dBrnC0

(4) C-Notch Noise

The maximum C-Notch Noise, utilizing a -16 dBm0 holding tone is less than or equal to 47 dBrnC0.

(5) Echo Control

Echo Control, identified as Impedance Balance for ALA or FGA and ATA950 or FGB and Equal Level Echo Path Loss for ATANEA and ATAXXX, FGC and FGD 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

* For access trunk arrangements NEA and XXX or for FGC and FGD only Type B2 will be provided. For Access Line arrangement or Access Trunk Arrangement 950 or for FGA and B, Type B1 or B2 will be provided as set forth in Technical Reference TR-NPL-000334.

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(Cont'd)15.2 Transmission Specifications Switched Access Service (Cont'd)15.2.1 Standard Transmission Specifications (Cont'd)(B) Type B Transmission Specifications (Cont'd)(5) Echo Control (Cont'd)

or via an access tandem. The ERL and SRL also differ by Access Arrangement or Feature Group, type of termination, and type of transmission path. They are greater than or equal to the following:

	Echo <u>Return Loss</u>	Singing <u>Return Loss</u>
POT to Access Tandem		
- Terminated in 4-Wire trunk	21 dB	14 dB
- Terminated in 2-Wire trunk	16 dB	11 dB
POT to End Office		
- Direct	16 dB	11 dB
- Via Access Tandem		
o For ATA950 or FGB Access	8 dB	4 dB
o For ATANEA or FGC Access (Effective 4-Wire transmission path at end office)		
o For ATANEA or FGC Access (Effective 4-Wire transmission path at end office)	16 dB	11 dB
	13 dB	6 dB

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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:

<u>Echo</u> <u>Return Loss</u>	<u>Singing</u> <u>Return Loss</u>
5 dB	2.5 dB

(C) Type C Transmission Specifications

Type C 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
 ± 3.0 dB.

(2) Attenuation Distortion

The maximum attenuation distortion in the 404 to 2804 Hz frequency bank relative to loss at 1004 Hz is
-2.0 dB to +5.5 dB.

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15. Interface Groups, Transmission Specifications and Channel Interfaces
(Cont'd)15.2 Transmission Specifications Switched Access Service (Cont'd)15.2.1 Standard Transmission Specifications (Cont'd)(C) Type C Transmission Specifications (Cont'd)(3) C-Message Noise

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

<u>C-Message Noise*</u>		
<u>Route Miles</u>	<u>Type C1</u>	<u>Type C2</u>
less than 50	32 dBrnC0	38 dBrnC0
51 to 100	33 dBrnC0	39 dBrnC0
101 to 200	35 dBrnC0	41 dBrnC0
201 to 400	37 dBrnC0	43 dBrnC0
400 to 1000	39 dBrnC0	45 dBrnC0

(4) C-Notch Noise

The maximum C-Notch Noise, utilizing a -16 dBm0 holding tone is less than or equal to 47 dBrnC0.

* For Access Trunk Arrangements NEA and XXX or for FGC and FGD only Type C2 will be provided. For Access Line Arrangement or Access Trunk Arrangement 950 or for FGA and FGB, Type C1 or C2 will be provided as set forth in Technical Reference PUB 62500.

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(Cont'd)15.2 Transmission Specifications Switched Access Service (Cont'd)15.2.1 Standard Transmission Specifications (Cont'd)(C) Type C Transmission Specifications (Cont'd)(5) Echo Control

Echo Control, identified as Return 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:

	<u>Echo Return Loss</u>	<u>Singing Return Loss</u>
POT to Access Tandem	13 dB	6 dB
POT to End Office		
- Direct	13 dB	6 dB
- Via Access Tandem (for FGB only)	8 dB	4 dB

15.2.2 Data Transmission Parameters

Two types of Data Transmission Parameters, i.e., Type DA and Type DB, are provided for the Feature Group arrangements. The specific applications in terms of the Feature Groups with which they are provided are set forth in 6.2.1.(C.), 6.2.2.(C.), 6.2.3.(C.), and 6.2.4.(C.) preceding. Following are descriptions of each.

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(Cont'd)15.2 Transmission Specifications Switched Access Service (Cont'd)15.2.2 Data Transmission Parameters (Cont'd)(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.

(2) Envelope Delay Distortion

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

	<u>604 to 2804 Hz</u>
less than 50 route miles	500 microseconds
equal to or greater than 50 route miles	900 microseconds

	<u>1004 to 2404 Hz</u>
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 dBrnC0 threshold in 15 minutes is no more than 15 counts.

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(Cont'd)15.2 Transmission Specifications Switched Access Service (Cont'd)15.2.2 Data Transmission Parameters (Cont'd)(A) Data Transmission Parameters Type DA (Cont'd)(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

(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 DA(1) Signal to C-Notched Noise Ratio

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

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15. Interface Groups, Transmission Specifications and Channel Interfaces
(Cont'd)15.2 Transmission Specifications Switched Access Service (Cont'd)15.2.2 Data Transmission Parameters (Cont'd)(B) Data Transmission Parameters Type DB (Cont'd)(2) Envelope Delay Distortion

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

	<u>604 to 2804 Hz</u>	
less than 50 route miles		800 microseconds
equal to or greater than 50 route miles		1000 microseconds
	<u>1004 to 2404 Hz</u>	
less than 50 route miles		320 microseconds
equal to or greater than 50 route miles		500 microseconds

(3) Impulse Noise Counts

The Impulse Noise Counts exceeding a 67 dBnC0 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)	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.

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15. Interface Groups, Transmission Specifications and Channel Interfaces
(Cont'd)

15.2 Transmission Specifications Switched Access Service (Cont'd)

15.2.2 Data Transmission Parameters (Cont'd)

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

(6) Frequency Shift

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

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15. Interface Groups, Transmission Specifications and Channel Interfaces
(Cont'd)15.3 Special Access Channel Interface and Network Channel Codes

This section explains the Channel Interface codes and Network Channel codes that the customer must specify when ordering Special Access Service. Included is an example which explains the specific characters of the code, a glossary of Channel Interface codes, impedance levels, Network Channel codes and compatible Channel Interfaces.

Example: If the customer specifies a NT Network Channel Code and a 2DC8-3 Channel Interface at the customer's premises, the following is being requested:

NT = Metallic Channel with a Predefined Technical
Specification Package (1)
2 = Number of physical wires at customer premises
DC = Facility interface for direct current or voltage
8 = Variable impedance level
3 = Metallic facilities (DC continuity) for direct current
low frequency control signals or slow speed data (30 baud)

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<u>Code</u>	<u>Option</u>	<u>Definition</u>
AB -		accepts 20 Hz ringing signal at customer's point of termination
AC -		accepts 20 Hz ringing signal at customer's end user's point of termination
AH -		analog high capacity interface
-	B	60 khz to 108 khz (12 channels)
-	C	312 khz to 552 khz (60 channels)
-	D	564 khz to 3084 khz (600 channels)
CC -		Contact closure EC provided dry contact closure toward interface
CT -		Centrex Tie Trunk Termination
DA -		data stream in VF frequency band at customer's end
DB -		user's point of termination data stream in VF frequency band at customer's point of termination
DD -		DATAPHONE Select-A-Station (and TABS) interface at customer's point of termination
DE -		DATAPHONE Select-A-Station (and TABS) interface at the customer's end user's point of termination
DM -		Data stream in the VF band at CO location, interface at data modem in CO
	2	1200 Bps 212AR type modem operation
	3	1200 Bps 202T type modem operation
DS -		Digital hierarchy interface
	15	1.544 Mbps (DS1) format per PUB 41451 plus D4
	15E	8-bit PCM encoded in one 64 kbps of the DS1 signal
	15F	8-bit PCM encoded in two 64 kbps of the DS1 signal

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<u>Code</u>	<u>Option</u>	<u>Definition</u>
-	15G	8-bit PCM encoded in three 64 kbps of the DS1 signal
-	15H	14/11-bit PCM encoded in six 64 kbps of the DS1 signal
-	15J	1.544 Mbps format per PUB 41451
-	15K	1.544 Mbps format per PUB 41451 plus extended framing format
-	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)
-	44L	44.736 Mbps (DS3) with SF signaling
-	63	6.312 Mbps (DS2)
-	63	6.312 Mbps (DS2) with SF signaling
DU -		digital access interface
-	24	2.4 kbps
-	48	4.8 kbps
-	56	56.0 kbps
-	56A	64 kbps
-	96	9.6 kbps
-	A	1.544 Mbps format per PUB 41451
-	B	1.544 Mbps format per PUB 41451 plus D4
-	C	1.544 Mbps format per PUB 41451 plus extended framing format
DX -		duplex signaling interface at customer's point of termination

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<u>Code</u>	<u>Option</u>	<u>Definition</u>
DY -		duplex signaling interface at customer's end user's point of termination
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
EX -	A	tandem channel unit signaling for loop start or ground start and customer supplies open end (dial tone, etc.) functions.
EX -	B	tandem channel unit signaling for loop start or ground start and customer supplies closed end (dial pulsing, etc.) functions.
GO -		ground start loop signaling - open end function by customer or customer's end user
GS -		ground start loop signaling - closed end function by customer or customer's end user
LA -		end user loop start loop signaling - Type A OPS registered port open end
LB -		end user loop start loop signaling - Type B OPS registered port open end

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<u>Code</u>	<u>Option</u>	<u>Definition</u>
LC -		end user loop start loop signaling - Type C OPS registered port open end
LO -		loop start loop signaling - open end function by customer or customer's end user
LR -		20 Hz automatic ringdown interface at customer with Utility provided PLAR
LS -		loop start loop signaling - closed end function by customer or customer's end user
NO -		no signaling interface, transmission only
PG -		program transmission - no dc signaling
-	1	nominal frequency from 50 to 15000 Hz
-	3	nominal frequency from 200 to 3500 Hz
-	5	nominal frequency from 100 to 5000 Hz
-	8	nominal frequency from 50 to 8000 Hz
PR		protective relaying*
RV -	0	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
TF -		telephotograph interface

* Available only for the transmission of audio tone protective relaying signals used in the protection of electric power systems during fault conditions.

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<u>Code</u>	<u>Option</u>	<u>Definition</u>
TV -		television interface
-	1	combined (diplexed) video and one audio signal
-	2	combined (diplexed) video and two audio signals
-	5	video plus one (or two) audio 5 kHz signal(s) or one (or two) two wire
-	15	video plus one (or two) audio 15 kHz signal(s)

15.3.2 Impedance

The nominal reference impedance with which the channel will be terminated for the purpose of evaluating transmission performance:

<u>Value (ohms)</u>	<u>Code(s)</u>
110	0
150	1
600	2
900	3+
135	5
75	6
124	7
Variable	8
100	9

- + For those interface codes with a 4-wire transmission path at the customer designated POT, rather than a standard 900 ohm impedance, the code (3) denotes a customer provided transmission equipment termination. Such terminations were provided to customers in accordance with the F.C.C. Docket No. 20099 Settlement Agreement.

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Customers selecting the multiplexed four-wire DSX-1 or higher facility interface option at the customer designated premises will be requested to provide subsequent system and channel assignment data. The various digital bit rates in the digital hierarchy employ the channel interface code 4DS8, 4DS0 or 4DS6 plus the speed options indicated below:

<u>Interface Code and Speed Option</u>	<u>Nominal Bit Rate (Mbps)</u>	<u>Digital Hierarchy Level</u>
4DS8-15	1.544	DS1
4DS8-31	3.152	DS1C
4DS0-63	6.312	DS2
4DS6-44	44.736	DS3
4DS6-27	274.176	DS4

15.3.4 Service Designator/Network Channel Code Conversion Table

The purpose of this table is to show the relationship between the service designator codes (e.g. VGC, MT2, etc.) and the network channel codes that are used for:

<u>Service Designator Code</u>	<u>Network Channel Code</u>
MTC	MQ
MT1	NT
MT2	NU
MT3	NV
TGC	NQ

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(Cont'd)

<u>Service Designator</u> <u>Code</u>	<u>Network Channel</u> <u>Code</u>
VGC	LQ
VGW	SE
VG1	LB
VG2	LC
VG3	LD
VG4	LE
VG5	LF
VG6	LG
VG7	LH
VG8	LJ
VG9	LK
VG10	LN
VG11	LP
VG12	LR
APC	PQ
AP1	PE
AP2	PF
AP3	PJ
AP4	PK
TVC	TQ
TV1	TV
TV2	TW
DA1	XA

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(Cont'd)15.3.4 Service Designator/Network Channel Code Conversion Table
(Cont'd)

<u>Service Designator Code</u>	<u>Network Channel Code</u>
DA2	XB
DA3	XG
DA4	XH
HC0	HS
HC1	HC
HC1C	HD
HC2	HE
HC3	HF
HC4	HG

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15. Interface Groups, Transmission Specifications and Channel Interfaces
(Cont'd)15.3 Special Access Channel Interface and Network Channel Codes
(Cont'd)15.3.5 Compatible Channel Interfaces(C) Voice Grade

<u>Compatible CIs</u>		<u>Compatible CIs</u>		<u>Compatible CIs</u>	
2AB2	2AC2	2DB2	2DA2	2LR2	2LR2
2AB3	2AC2	2DB3	2DA2	2LR3	2LR2
2CT3	2DY2	2DX3	2LA2	2LS	2GS
	4DS8*	2LB2	2LS		
	4DX2		2LC2		4GS
	4DX3		2L03		4LS
	4DY2		2LS2		
	4EA2-E	2LS3	2LS2	2LA2	
	4EA2-M	2LB2			
	4SF2	2G02	2GS2		2LC2
	4SF3		2GS3		
	6DX2		2LS3	2LA2	
	6DY2	2G03	2GS2		2LB2
	6DY3		2GS3		2LC2
	6EA2-E				
	6EA2-M	2GS	2GS	2N02	2DA2
	6EB2-E	2LS	2N02		
	6EB2-M	4GS			
	6EB3-E	4LS	2N03	2N02	
	8EB2-E		2PR2		
	8EB2-M	2L02	2LS2		
	8EC2		2LS3	2TF3	2TF2
	9DY2				
	9DY3	2L03	2LS2		
	9EA2		2LS3		
	9EA3				

* See 15.3.3 preceding for explanation

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(Cont'd)15.3 Special Access Channel Interface and Network Channel Codes
(Cont'd)15.3.5 Compatible Channel Interfaces
(Cont'd)(C) Voice Grade (Cont'd)

Compatible CIs		Compatible CIs		Compatible CIs		
4AB2	2AC2	4DS8- *	2AC2	4DS8*	4DG2	
	4AB2		2DA2		4LR2	
	4AC2		2DY2		4LS2	
	4SF2		2G02		4N02	
4AB3	2AC2		2G03		4PR2	
			2GS2		4RV2-T	
			2GS3		4SF2	
			2LA2		4SF3	
4AC2	2AC2		2LB2		4TF2	
			2LC2		6DA2	
			2L02		6DY2	
			2L03		6DY3	
4DA2	4DA2		2LR2		6EA2-E	
4DB2	2DA2		2LS2		6EA2-M	
			2LS3		6EB2-E	
			2N02		6EB2-M	
			2PR2		6GS-2	
			4DA2		6LS2	
			4DB2		8EB2-E	
			4N02		8EB2-M	
			4PR2		9DY2	
4DD3	2DE2		4DE2		9DY3	
			4DX2		9EA2	
			4DX3		9EA3	
			4DY2			
			4EA2-E			
			4EA2-M			

* See 15.3.3 for explanation.

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(Cont'd)15.3.5 Compatible Channel Interfaces
(Cont'd)(C) Voice Grade (Cont'd)

<u>Compatible CIs</u>		<u>Compatible CIs</u>		<u>Compatible CIs</u>	
4DX2	2DY2	4DX2	8EB2-E	4DX3	8EB2-M
	2LA2		8EB2-M		
	2LB2		9DY2		
	2LC2		9DY3		
	2L03		9EA2		
	2LS2		9EA3		
	2LS3				
	2LV2-T		2DY2	4DY2	2DY2
	2RX2		2LA2		
	4DY2		2LB2		
	4DA2-E		2LC2		
	4EA2-M		2L03		
	4LS2		2LS2		
	4RV2-T		2LS3		
	4SF2		2RV2-T		
	4SF3		4DX2		
	6DY2		4DX3		
	6DY3		4DY2		
	6EA2-E		4EA2-E		
	6EA2-M		4EA2-M		
6EB2-E	6EB2-E	6EB2-M	4LS2		
	6EB2-M		4RV2-T		
	6LS2		4SF2		
			4SF3		
			6DY2		
			6DY3		
6EB2-M		6LS2	6EA2-E		
			6EA2-M		
			6EB2-E		
			6EB2-M		
8EB2-E		8EB2-M	6LS2		
			8EB2-E		

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(Cont'd)15.3.5 Compatible Channel Interfaces
(Cont'd)(C) Voice Grade (Cont'd)

<u>Compatible CIs</u>		<u>Compatible CIs</u>		<u>Compatible CIs</u>	
4EA2-E	2DY2	4EA3-E	2DY2	4G02	2G02
	4DY2		4DY2		2G03
	4EA2-E		4EA2-E		2GS2
	4EA2-M		4EA2-M		2GS3
	4SF2		4SF2		4GS2
	6DY2		6DY2		4SF2
	6DY3		6DY3		6GS2
	6EB2-E		6EA2-E	4G03	2G02
	6EB2-M		6EA2-M		2GS2
	8EB2-E		6EB2-E		2GS3
	8EB2-M		6EB2-M		4GS2
	9DY2		8EB2-E		4SF2
	9DY3		8EB2-M		6GS2
4EA2-M	2DY2		9DY2	4GS	
	4DY2		9DY3		
	4EA2-M		9EA2		2GS
	4SF2		9EA3		2LS
	6DY2				4GS
	6DY3				4LS
	6EB2-E				
	6EB2-M				
	8EB2-E				
	8EB2-M				
	9DY2				
	9DY3				

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(Cont'd)15.3.5 Compatible Channel Interfaces
(Cont'd)(C) Voice Grade (Cont'd)

<u>Compatible CIs</u>		<u>Compatible CIs</u>		<u>Compatible CIs</u>	
4L02	2LS2	4LS3	2LA2	4SF2	2L03
	2LS3		2LB2		2LR2
	4LS2		2LC2		2LS2
	4SF2		2L02		2LS3
	6LS2		2L03		2RV2-T
4L03			4SF2		4AC2
	2LS2	4N02			4DY2
	2LS3		2DA2		4LS2
	4LS2		2DE2		2RV2-T
	4SF2		2N02		4SF2
	6LS2		4DA2		6DY2
4LR2	2LR2		4DE2		6DY3
	4LR2		4N02		6GS2
	4SF2		6DA2		9DY2
4LR3		4RV2-0			9DY3
	2LR2		2RV2-T		
	4LR2		4RV2-T	4SF3	2DY2
	4SF2		4SF2		2G03
4LS		4SF2			2GS2
	2GS		2AC2		2GS3
	2LS		2DY2		2LA2
	2GS		2GS2		2LB2
	2LS		2GS3		2LC2
4LS2			2LA2		2L03
			2LB2		2LR2
			2LC2		

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(Cont'd)15.3.5 Compatible Channel Interfaces
(Cont'd)(C) Voice Grade (Cont'd)

Compatible CIs		Compatible CIs		Compatible CIs		
4SF3	2LS2	6DA	4DA2	6DY3	2DY2	
	2LS3		6DA2		4DY2	
	2RV2-T	6DX2			6DY2	
	4DY2		2DY2	6DY3		
	4EA2-E		4DY2	6EA2-E	2AC2	
	4EA2-M		4EA2-E			
	4GS2					
	4LR2		4EA2-M	2DY2		
	4LS2		4SF2	2LA2		
	4RV2-T		6DY2	2LB2		
	4SF2		6DY3	2LC2		
	4SF3		6EA2-E	2L03		
	6DY2		6EA2-M	2LS2		
	6DY3		6EB2-E	2LS3		
	6EB2-E		6EB2-M	2RV2-T		
	6EB2-M		8EB2-E	4AC2		
	6GS2		8EB2-M	4DY2		
	6LS2		9DY2	4EA2-E		
	9DY2		9DY3	4EA2-M		
	9DY3		9EA2	4LS2		
	9EA2		9EA3	4RV2-T		
	9EA3			4SF2		
4TF2	2TF2	6DY2	2DY2	4SF3		
			4DY2	6DY2		
			6DY2	6DY3		
			6EA2-E			
			6EA2-M			

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(Cont'd)15.3.5 Compatible Channel Interfaces
(Cont'd)(C) Voice Grade (Cont'd)

<u>Compatible CIs</u>		<u>Compatible CIs</u>		<u>Compatible CIs</u>	
6EA2-E	6EB2-E	6EA2-M	6DY2	6EB3-2	2DY2
	6EB2-M		6DY3		4DY2
	6LS2		6EA2-M		4EA2-E
	8EB2-E		6EB2-E		4EA2-M
	8EB2-M		6EB2-M		4SF2
	9DY2		6LS2		6DY2
	9DY3		8EB2-E		6DY3
			8EB2-M		6EA2-E
6EA2-M	2AC2	6EB2-E	9DY2	6EX2-A	6EA2-M
	2DY2		9DY3		8EB2-E
	2LA2				8EB2-M
	2LB2		2DY2		9DY2
	2LC2		4DY2		9DY3
	2L03		4SF2		9EA2
	2LS2		6DY2		9EA3
	2LS3		6DY3		
	2RV2-T		6EB2-E		2GS2
	4AC2		6EB2-M		2GS3
	4DY2		9DY2		2LS2
	4EA2-E		9DY3		2LS3
	4EA2-M				4GS2
	4LS2	6EB2-M	2DY2		4LS2
	4RV2-T		4DY2		4SF2
	4SF2		4SF2		6GS2
	4SF3		6DY2		6LS2
			6DY3		
			6EB2-M		
			9DY2		
			9DY3		

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15. Interface Groups, Transmission Specifications and Channel Interfaces
(Cont'd)15.3 Special Access Channel Interface and Network Channel Codes
(Cont'd)15.3.5 Compatible Channel Interfaces
(Cont'd)(C) Voice Grade (Cont'd)

<u>Compatible CIs</u>		<u>Compatible CIs</u>		<u>Compatible CIs</u>	
6EX2-B	2G03	8EB2-E	2AC2	8EB2-M	2AC2
	2LA2		2DY2		2DY2
	2LB2		2LA2		2LA2
	2LC2		2LB2		2LB2
	2L02		2LC2		2LC2
	2L03		2L03		2L03
	2LR2		2LS2		2LS2
	4LR2		2LS3		2LS3
	4SF2		2RV2-T		2RV2-T
6G02			4AC2		4AC2
	2G02		4DY2		4DY2
	2GS2		4LS2		4LS2
	2GS3		4RV2-T		4RV2-T
	4GS2		4SF2		4SF2
	4SF2		4SF3		4SF3
6L02	6GS2		6DY2		6DY2
			6DY3		6DY3
	2LS2		6EB2-E		6EB2-E
	2LS3		6EB2-M		6EB2-M
	4LS2		6LS2		6LS2
	4SF2		8EB2-E		8EB2-M
6LS2	6LS2		8EB2-M		9DY2
			9DY2		9DY3
	2LA2		9DY3		
	2LB2				
	2LC2				
	2L02				
	2L03				
	4SF2				

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15. Interface Groups, Transmission Specifications and Channel Interfaces
(Cont'd)15.3 Special Access Channel Interface and Network Channel Codes
(Cont'd)15.3.5 Compatible Channel Interfaces
(Cont'd)(C) Voice Grade (Cont'd)

<u>Compatible CIs</u>		<u>Compatible CIs</u>		<u>Compatible CIs</u>	
8EC2	2DY2	9DY2	2DY2	9EA3	2DY2
	4DY2		4DY2		4DY2
	4EA2-E		6DY2		4EA2-E
	4EA2-M		6DY3		4EA2-M
	4SF2		9DY2		6DY2
	6DY2				6DY3
	6DY3	9DY3	2DY2		6EA2-E
	6EA2-E		4DY2		6EA2-M
	6EA2-M		6DY2		6EB2-E
	6EB2-E		6DY3		6EB2-M
	6EB2-M		9DY2		8EB2-E
	8EB2-E		9DY3		8EB2-M
	8EB2-M				9DY2
	9DY2	9EA2	2DY2		9DY3
	9DY3		4DY2		9EA3
	9EA2		4EA2-E		
	9EA3		4EA2-M		
			6DY2		
			6DY3		
			6EA2-E		
			6EA2-M		
			6EB2-E		
			6EB2-M		
			8EB2-E		
			8EB2-M		
			9DY2		
			9DY3		
			9EA2		
			9EA3		

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15. Interface Groups, Transmission Specifications and Channel Interfaces
(Cont'd)15.3 Special Access Channel Interface and Network Channel Codes
(Cont'd)15.3.5 Compatible Channel Interfaces
(Cont'd)(D) Program Audio (Cont'd)Compatible CIs2PG2-1 2PG1-1
 2PG2-12PG2-3 2PG1-3
 2PG2-32PG2-5 2PG1-5
 2PG2-52PG2-8 2PG1-8
 2PG2-8Compatible CIs4DS8-15E 2PG1-3
 2PG2-34DS8-15F 2PG1-5
 2PG2-54DS8-15G 2PG1-8
 2PG2-84DS8-15H 2PG1-1
 2PG2-1

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(Cont'd)15.3 Special Access Channel Interface and Network Channel Codes
(Cont'd)15.3.5 Compatible Channel Interfaces
(Cont'd)(E) Video

	<u>Compatible CIs</u>		<u>Compatible CIs</u>		<u>Compatible CIs</u>
2TV6-1	4TV6-15 4TV7-15	4TV6-5	4TV6-5 4TV7-5	6TV6-5	6TV6-5 6TV7-5
2TV6-2	6TV6-15 6TV7-15	4TV6-15	4TV6-15 4TV7-15	6TV6-15	6TV6-15 6TV7-15
2TV7-1	4TV6-15 4TV7-15	4TV7-5	4TV6-5 4TV7-5	6TV7-5	6TV6-5 6TV7-5
2TV7-2	6TV6-15 6TV7-15	4TV7-15	4TV6-15 4TV7-15	6TV7-15	6TV6-15 6TV7-15

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15. Interface Groups, Transmission Specifications and Channel Interfaces
(Cont'd)15.3 Special Access Channel Interface and Network Channel Codes
(Cont'd)15.3.5 Compatible Channel Interfaces
(Cont'd)(F) Digital Data

<u>Compatible CIs</u>		<u>Compatible CIs</u>		<u>Compatible CIs</u>	
				4DU8-56	4DU5-56
4DS8-15	4DS8-15+	4DU5-24	4DU5-24	6DU5-24	6DU5-24
	4DU5-24	4DU5-48	6DU5-48	6DU5-48	6DU5-48
	4DU5-48			6DU5-56	6DU5-56
	4DU5-56	4DU5-96	4DU5-96	6DU5-96	6DU5-96
	4DU5-96				
	6DU5-24				
	6DU5-48				
	6DU5-96				

+ Available only as a cross connect of two individual channels of 1.544-Mbps facilities at a Telephone Company hub.

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15. Interface Groups, Transmission Specifications and Channel Interfaces
(Cont'd)15.3 Special Access Channel Interface and Network Channel Codes
(Cont'd)15.3.5 Compatible Channel Interfaces
(Cont'd)(G) High CapacityCompatible Cis

4DS0-63	4DS0-63 4DU8-A, B or C 6DU8-A, B or C
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4DS6-27	4DS6-27 4DU8-A, B or C 6DU8-A, B or C
---------	---

4DS6-44 4DU8-A, B or C 6DU8-A, B or C	4DS6-44
---	---------

4DS8-15	4DS8-15+ 4DU8-B 6DU8-8
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Compatible CIs

4DS8-15J	4DU8-A 6DU8-A
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4DS8-15K	4DU8-B 4DU8-C 6DU8-B 6DU8-C
----------	--------------------------------------

4DS8-31	4DS8-31 4DU8-A, B or C 6DU8-A, B or C
---------	---

4DU8-A, B or C	4DU8-A, B or C
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