

**GTE SYSTEM TELEPHONE COMPANIES**

Director-Tariffs  
600 Hidden Ridge (T)  
Irving, Texas 75038 (T)  
Issued: October 23, 1991

**TARIFF FCC NO. 1 (Z)**  
1st Revised Page 400  
Cancels Original Page 400

Effective: November 27, 1991

**ACCESS SERVICE**

**9. Interface Groups, Transmission Specifications and Channel Codes**

**9.1 Local Transport Interface Groups**

Ten Interface Groups are provided for terminating the Local Transport at the customer's premises. Each Interface Group provides a specified premises interface code (e.g., two-wire, four-wire, DS1, etc.). At the option of the customer and where transmission facilities permit, the individual transmission path between the customer's premises and the first point of switching may be provided with optional features as set forth in 6.3.1 preceding.

As a result of the customer's access order and the type of Telephone Company transport facilities serving the customer's 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's premises. For example, if a voice frequency interface is ordered by the customer and the Telephone Company facilities serving the customer's premises are digital, then Telephone Company channel bank equipment must be placed at the customer's premises in order to provide the voice frequency interface ordered by the customer.

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#### 9. Interface Groups, Transmission Specifications and Channel Codes (Cont'd )

##### 9.1 Local Transport Interface Groups (Cont'd)

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 Feature Group or Basic Serving Arrangement and whether the Access Service is routed directly or through an access tandem. All Interface Groups are provided with Data Transmission Parameters. (C)

Only certain premises interfaces are available at the customer's premises. The premises interfaces codes associated with the Interface Groups may vary among Feature Groups and Basic Serving Arrangements. The various premises interfaces codes which are available with the Interface Groups or Basic Serving Arrangements, and the Feature Groups with which they may be used, are set forth in 9.1.11 following. (C)

For each of the ten Interface Groups described following, the transmission path between the point of termination at the customer's premises and the first point of switching may be comprised of any form or configuration of plant and equipment 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.

##### 9.1.1 Interface Group 1 (USOC TPP1X)

Interface Group 1 provides a two-wire voice frequency transmission path at the point of termination at the customer's premises. Interface Group 1 is not provided in association with FGC, FGD, BSA-C and BSA-D when the first point of switching is an access tandem. In addition, Interface Group 1 is not provided in association with FGB, FGC, FGD, BSA-B, BSA-C or BSA-D when the first point of switching can only provide four-wire terminations. (C)

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**9. Interface Groups, Transmission Specifications and Channel Codes  
(Cont'd)**

**9.1 Local Transport Interface Groups (Cont'd)**

**9.1.1 Interface Group 1 (USOC TTP1X) (Cont'd)**

The interface is provided with loop supervisory signaling. When the interface is associated with FGA or BSA-A, such signaling will be loop start or ground start signaling. When the interface is associated with FGB, FGC, FGD, BSA-B, BSA-C or BSA-D, such signaling will be reverse battery signaling. When FGB, FGC, FGD, BSA-B, BSA-C or BSA-D access service is associated with a two-way calling interface, E&M signaling shall be used.

**9.1.2 Interface Group 2 (USOC TTP2X)**

Interface Group 2 provides four-wire voice frequency transmission at the point of termination at the customer's premises. The interface is provided with loop supervisory signaling. When the interface is associated with FGA or BSA-A, such signaling will be loop start or ground start signaling. When the interface is associated with FGB, FGC, FGD, BSA-B, BSA-C or BSA-D such signaling, except for two-way calling which is E&M signaling, will be reverse battery signaling.

**9.1.3 Interface Group 3 (USOC TPP3X)**

Interface group 3 provides group level analog transmission at the point of termination at the customer's premises. The interface is capable of transmitting electrical signals between the frequencies of 60 to 180 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 with a frequency bandwidth of approximately 300 to 3000 Hz.

The interface is provided with SF supervisory signaling for each individual transmission channel.

As of December 30, 1993, Interface Group 3 is available to existing customers only.

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### 9. Interface Groups, Transmission Specifications and Channel Codes (Cont'd)

#### 9.1 Local Transport Interface Groups (Cont'd)

##### 9.1.4 Interface Group 4 (USOC TPP4X)

Interface group 4 provides supergroup level analog transmission at the point of termination at the customer's premises. The interface is capable of 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 with a frequency bandwidth of approximately 300 to 3000 Hz.

The interface is provided with SF supervisory signaling for each individual transmission channel.

As of December 30, 1993, Interface Group 4 is available to existing (C)(x)  
customers only. (S)(y)

##### 9.1.5 Interface Group 5 (USOC TPP5X)

Interface Group 5 provides mastergroup level analog transmission at the point of termination at the customer's 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 with a frequency bandwidth of approximately 300 to 3000 Hz.

The interface is provided with SF supervisory signaling for each individual transmission channel.

As of December 30, 1993, Interface Group 5 is available to existing (C)(x)  
customers only. (S)(y)

(x) Issued under authority of Special Permission No. 93-1207 of the FCC.  
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**9. Interface Groups, Transmission Specifications and Channel Codes  
(Cont'd)**

**9.1 Local Transport Interface Groups (Cont'd)**

**9.1.6 Interface Group 6 (USOC TPP6X)**

Interface Group 6 provides DS1 level digital transmission at the point of termination at the customer's 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 with 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 bit stream supervisory signaling for each individual transmission channel.

**9.1.7 Interface Group 7 (USOC TPP7X)**

Interface Group 7 provides DS1C level digital transmission at the point of termination at the customer's 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 with 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 signals in D3/D4 format.

The interface is provided with bit stream supervisory signaling for each individual transmission channel.

As of December 30, 1993, Interface Group 7 is available to existing customers only. (C)(x)  
(S)(y)

(x) Issued under authority of Special Permission No. 92-1207 of the FCC.  
(y) Effective date December 30, 1993.

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### 9. Interface Groups, Transmission Specifications and Channel Codes (Cont'd)

#### 9.1. Local Transport Interface Groups (Cont'd)

##### 9.1.8 Interface Group 8 (USOC TPP8X)

Interface Group 8 provides DS2 level digital transmission at the point of termination at the customer's 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 with 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 signals in D3/D4 format.

The interface is provided with bit stream supervisory signaling for each individual transmission channel.

Interface Group 8 is provided on an Individual Case Basis. (N)

##### 9.1.9 Interface Group 9 (USOC TPP9X)

Interface Group 9 provides DS3 level digital transmission at the point of termination at the customer's 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 with 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 signals in D3/D4 format.

The interface is provided with bit stream supervisory signaling for each individual transmission channel.

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### 9. Interface Groups, Transmission Specifications and Channel Codes (Cont'd)

#### 9.1 Local Transport Interface Groups (Cont'd)

##### 9.1.10 Interface Group 10 (USOC TPPAX)

Interface Group 10 provides DS4 level digital transmission at the point of termination at the customer's 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 with 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 signals in D3/D4 format.

The interface is provided with bit stream supervisory signaling for each individual transmission channel.

Interface Group 10 is provided on an Individual Case Basis.

(N)

##### 9.1.11 Available Premises Interface Codes

Following is a matrix showing which premises interface codes are available for each Interface Group as a function of the Telephone Company switch supervisory signaling and Feature Group. For explanations of these codes, see the Glossary of Channel Interface Codes in 9.3.1 following.

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9. Interface Groups, Transmission Specifications and Channel Codes  
 (Cont'd)

9.1 Local Transport Interface Groups (Cont'd)

9.1.11 Available Premises Interface Codes (Cont'd)

Interface Group	Telephone Company Switch Supervisory Signaling	Premises Interface Code	Feature Group				
			A	B	C	D	
1	LO	2LS2	X				
	LO	2LS3	X				
	GO	2GS2	X				
	GO	2GS3	X				
	LO, GO	2DX3	X				
	LO, GO	4EA3-E	X				
	LO, GO	4EA3-M	X				
	LO, GO	6EB3-E	X				
	LO, GO	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	
	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				

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**9. Interface Groups, Transmission Specifications and Channel Codes  
 (Cont'd)**

**9.1 Local Transport Interface Groups (Cont'd)**

**9.1.11 Available Premises Interface Codes (Cont'd)**

<u>Interface Group</u>	<u>Telephone Company</u>		<u>Premises Interface Code</u>	<u>Feature Group</u>			
	<u>Switch</u>	<u>Supervisory Signaling</u>		<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
2(Cont'd)	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	X	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	
	EA,	EB, EC	8EC2-M			X	X
	RV		4RV2-O	X	X	X	
	RV		4RV2-T	X	X	X	
	RV		4RV3-O	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	4DS9-32		X	X	X
	LO, GO		4DS9-31L	X			
	RV,	EA, EB, EC	4DS9-31L		X	X	X

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9. Interface Groups, Transmission Specifications and Channel Codes  
(Cont'd)9.1 Local Transport Interface Groups (Cont'd)9.1.11 Available Premises Interface Codes (Cont'd)

Interface Group	Telephone Company Switch Supervisory Signaling	Premises Interface Code	Feature Group			
			A	B	C	D
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

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**9. Interface Groups, Transmission Specifications, and Channel Codes**  
(Cont'd)

**9.2 Transmission Specifications for Switched Access Service**

The Telephone Company will maintain existing transmission specifications on functioning service configurations installed prior to the effective date of this tariff except that service configurations having performance specifications exceeding the standards listed in this provision will be maintained at performance levels specified in this tariff.

The transmission specifications contained in this Section are immediate action limits. Acceptance limits are set forth in Technical Reference TR-NPL-000334. This Technical Reference also provides the basis for determining Switched Access Service maintenance limits.

**9.2.1 Standard Transmission Specifications**

Following are descriptions of the three Standard Transmission Specifications available with Switched Access Services. The specific applications in terms of the Switched Access Arrangements and Interface Groups with which the Switched Access Arrangement Standard Transmission Specifications are provided are set forth in 6.2 preceding.

**(A) 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  $\pm 2.0$  dB.

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**9. Interface Groups, Transmission Specifications, and Channel Codes  
(Cont'd)**

**9.2 Transmission Specifications for Switched Access Service (Cont'd)**

**9.2.1 Standard Transmission Specifications (Cont'd)**

**(A) 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 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 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 dBm0 holding tone, is less than or equal to 45 dBrnCO.

**(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:

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**9. Interface Groups, Transmission Specifications, and Channel Codes  
(Cont'd)**

**9.2 Transmission Specifications for Switched Access Service (Cont'd)**

**9.2.1 Standard Transmission Specifications (Cont'd)**

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

**(5) Echo Control (Cont'd)**

	<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

**(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 B Transmission Specifications**

Type B 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  $\pm 2.5$  dB.

**(2) Attenuation Distortion**

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

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9. Interface Groups, Transmission Specifications, and Channel Codes  
(Cont'd)

9.2 Transmission Specifications for Switched Access Service (Cont'd)

9.2.1 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
401 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.

(5) Echo Control

Echo Control, identified as Impedance Balance for FGA, FGB, BSA-A and (C) BSA-B and Equal Level Echo Path Loss for FGC, FGD, BSA-C and BSA-D (C) 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 Switched Access Service, type of termination, and type of transmission path. They are greater than or equal to the following:

\* For FGC, FGD, BSA-C and BSA-D only Type B2 will be provided. For (C) FGA, FGB, BSA-A and BSA-B, Type B1 or B2 will be provided as set (C) forth in Technical Reference TR-NPL-000334.

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9. Interface Groups, Transmission Specifications, and Channel Codes  
 (Cont'd)

9.2 Transmission Specifications for Switched Access Service (Cont'd)

9.2.1 Standard Transmission Specifications (Cont'd)

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

(5) Echo Control (Cont'd)

	<u>Echo Return Loss</u>	<u>Singing Return Loss</u>	
POT to Access Tandem			
- Terminated in			
4-Wire trunk	21 dB	14 dB	
POT to End Office			
- Terminated in			
2-Wire trunk	16 dB	11 dB	
POT to End Office			
- Direct	16 dB	11 dB	
-Via Access Tandem			
■ For FGB and BSA-B access	8 dB	4 dB	(C)
■ For FGC and BSA-C access			(C)
(Effective			
4-Wire trans-			
mission path			
at end office)	16 dB	11 dB	
■ For FGC and BSA-C access			(C)
(Effective			
2-Wire trans-			
mission path			
at end office)	13 dB	6 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:

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

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9. Interface Groups, Transmission Specifications, and Channel Codes  
Cont'd)

9.2 Transmission Specifications for Switched Access Service (Cont'd)

9.2.1 Standard Transmission Specifications (Cont'd)

(C) Type C Transmission Specification

Type C 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  $\pm 3.0$  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 +5.5 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>	
	<u>Type B1</u>	<u>Type B2</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
401 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 FGC, FGD, BSA-C and BSA-D only Type C2 will be provided. For (C) FGA, FGB, BSA-A and BSA-B, Type C1 or C2 will be provided set forth (C) in Technical Reference TR-NPL-000334.

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9. Interface Groups, Transmission Specifications, and Channel Codes  
(Cont'd)

9.2 Transmission Specifications for Switched Access Service (Cont'd)

9.2.1 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	8 dB	4 dB
(for FGB and BSA-B only)		

(C)

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9. Interface Groups, Transmission Specifications, and Channel Codes  
(Cont'd)

9.2 Transmission Specifications for Switched Access Service (Cont'd)

9.2.2 Data Transmission Parameters

Two types of Data Transmission Parameters, i.e., Type DA and Type DB, are provided for the Switched Access Service arrangements. The specific applications in terms of the Feature Groups with which they are provided are set forth in 6.2 preceding. In addition, the Combined Access Service Arrangement is provided with Data Transmission Parameters. Following are descriptions of each parameter.

(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 30 route miles		500 microseconds
equal to or greater than 30 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.

(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

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9. Interface Groups, Transmission Specifications, and Channel Codes  
(Cont'd)

9.2 Transmission Specifications for Switched Access Service (Cont'd)

9.2.2 Data Transmission Parameters (Cont'd)

(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.

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9. Interface Groups, Transmission Specifications, and Channel Codes  
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9.2 Transmission Specifications for Switched Access Service (Cont'd)

9.2.2 Data Transmission Parameters (Cont'd)

(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:

	<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 dBrnC0 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.

(6) Frequency Shift

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

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**9. Interface Groups, Transmission Specifications and Channel Codes**  
(Cont'd)

**9.3 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 2DS8-3 Channel Interface at the customer's premises, the following is being requested:

- NT = Metallic Circuit with a Predefined Technical Specification Package (1)
- 2 = Number of physical wires at customer premises
- DS = 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)

**ACCESS SERVICE**

**9. Interface Groups, Transmission Specifications and Channel Codes**  
 (Cont'd)

**9.3 Channel Interface and Network Channel Codes** (Cont'd)

**9.3.1 Glossary of Channel Interface Codes and Options**

<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)
CT	-	Centrex Tie Trunk Termination
DA	-	data stream in VF frequency band at customer's end user's point of termination
DB	-	data stream in VF frequency band at customer's point of termination
	10	VF for TG1 and TG2
	43	VF for 43 Telegraph Carrier type signals, TG1 and TG2 DC -direct current or voltage
	1	monitoring interface with series RC combination (McCulloch format)
	2	Telephone Company energized alarm channel
	3	Metallic facilities (DC continuity) for direct current/low frequency control signals or slow speed data (30 baud)
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
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
	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

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9. Interface Groups, Transmission Specifications and Channel Codes  
 (Cont'd)

9.3 Channel Interface and Network Channel Codes (Cont'd)

9.3.1 Glossary of Channel Interface Codes and Options (Cont'd)

<u>Code</u>	<u>Option</u>	<u>Definition</u>	
DS (Cont'd)			
-	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)	
-	63L	6.312 Mbps (DS2) with SF signaling	
DU	-	digital access interface	
-	19	19.2 kbps	(N)
-	24	2.4 kbps	
-	48	4.8 kbps	
-	56	56.0 kbps	
-	64	64 kbps	(N)
-	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	
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.	

**ACCESS SERVICE**

**9. Interface Groups, Transmission Specifications and Channel Codes  
 (Cont'd)**

**9.3 Channel Interface and Network Channel Codes (Cont'd)**

**9.3.1 Glossary of Channel Interface Codes and Options (Cont'd)**

<u>Code</u>	<u>Option</u>	<u>Definition</u>
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
IA -		E.I.A. (25 pin RS-232)
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
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 Telephone Company 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

Effective: November 27, 1991

## ACCESS SERVICE

9. Interface Groups, Transmission Specifications and Channel Codes  
(Cont'd)9.3 Channel Interface and Network Channel Codes (Cont'd)9.3.1 Glossary of Channel Interface Codes and Options (Cont'd)

<u>Code</u>	<u>Option</u>	<u>Definition</u>
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
TT	-	telegraph/teletypewriter interface at either customer POT or customer's end user POT
	-2	20.0 milliamperes
	-3	3.0 milliamperes
	-6	62.5 milliamperes
TV	-	television interface
	-1	combined (duplexed) video and one audio signal
	-2	combined (duplexed) video and two audio signals
	-5	video plus one (or two) audio 5 kHz signal(s) or one (or two) two wire

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

**ACCESS SERVICE****9. Interface Groups, Transmission Specifications and Channel Codes  
(Cont'd)****9.3 Channel Interface and Network Channel Codes (Cont'd)****9.3.1 Glossary of Channel Interface Codes and Options (Cont'd)**

<u>Code</u>	<u>Option</u>	<u>Definition</u>
WA -	15	video plus one (or two) audio 15 kHz signal(s) wideband bandwidth interface at customer's end user POT
-	1	limited bandwidth
-	2	nominal passband from 29000 to 44000 Hz
WB -		wideband data interface at customer POT
-	18S	18.75 kbps, synchronous
-	19A	up to 19.2 kbps asynchronous
-	19S	19.2 kbps synchronous
-	23A	up to 230.4 kbps, asynchronous
-	23S	230.4 kbps, synchronous
-	40S	40.8 kbps, synchronous
-	50A	up to 50.0 kbps, asynchronous
-	50S	50.0 kbps synchronous
WC -		wideband data interface at customer's end user POT 18.75 kbps, synchronous
-	18	POT 18.75 kbps, synchronous
-	19	for 12-wire interface: 19.2 kbps, synchronous for 10-wire interface: up to 19.2 kbps,
-	23	asynchronous up to 230.4 kbps, asynchronous
-	23S	230.4 kbps, synchronous
-	40	40.8 kbps, synchronous
-	50	for 12-wire interface: 50.0 kbps, synchronous for 10-wire interface: up to 50.0 kbps, asyn-
WD -		chronous wideband bandwidth interface at customer POT
-	1	nominal passband from 300 to 18000 Hz
-	2	nominal passband from 28000 to 44000 Hz
-	3	nominal passband from 29000 to 44000 Hz

ACCESS SERVICE

9. Interface Groups, Transmission Specifications and Channel Codes  
(Cont'd)

9.3 Channel Interface and Network Channel Codes (Cont'd)

9.3.2 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's 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.

**ACCESS SERVICE**

**9. Interface Groups, Transmission Specifications and Channel Codes  
 (Cont'd)**

**9.3 Channel Interface and Network Channel Codes (Cont'd)**

**9.3.3 Digital Hierarchy Channel Interface Codes (4DS)**

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, 4DS9, 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
4DS9-31	3.152	DS1C
4DS0-63	6.312	DS2
4DS6-44	44.736	DS3
4DS6-27	274.176	DS4

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ACCESS SERVICE

9. Interface Groups, Transmission Specifications and Channel Codes  
(Cont'd)

9.3 Channel Interface and Network Channel Codes (Cont'd)

9.3.4 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 various administrative purposes.

<u>Service Designator Code</u>	<u>Network Channel Code</u>
MTC	MQ
MT1	NT
MT2	NU
MT3	NV
TGC	NQ
TG1	NW
TG2	NY
VGC	LQ
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

ACCESS SERVICE

9. Interface Groups, Transmission Specifications and Channel Codes  
(Cont'd)

9.3 Channel Interface and Network Channel Codes (Cont'd)

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

<u>Service Designator</u> Code	<u>Network Channel</u> Code
WA1	WJ
WA1T	WQ
WA2	WL
WA2A	WR
WA3	WN
WA4	WP
WD1	WB
WD2	WE
WD3	WF
DA1	XA
DA2	XB
DA3	XG
DA4	XH
HCO	HS
HC1	HC
HC1C	HD
HC2	HE
HC3	HF
HC4	HG

**ACCESS SERVICE**

**9. Interface Groups, Transmission Specifications and Channel Codes**  
 (Cont'd)

**9.3 Channel Interface and Network Channel Codes** (Cont'd)

**9.3.5 Compatible Channel Interfaces**

The following tables show the channel interface codes (CIs) which are compatible:

**(A) Metallic**

<u>Compatible CIs</u>		<u>Compatible CIs</u>	
4AH5-B	2DC8-1	4AH6-D	2DC8-2
4AH5-B	24C8-2	2DC8-1	2DC8-2
4AH6-C	2DC8-1	2DC8-3	2DC8-3
4AH6-C	2DC8-2	4DS9-*	2DC8-1
4AH6-D	2DC8-1	4DS9-*	2DC8-2

**(B) Telegraph Grade**

<u>Compatible CIs</u>		<u>Compatible CIs</u>		<u>Compatible CIs</u>	
4AH5-B	10IA8	4AH6-D	4TT2-6	4DB2-43+	4TT2-2
4AH5-B	2TT2-2	2DB2-10	10IA8	4DS9-*	10IA8
4AH5-B	4TT2-2	2DB2-10	2TT2-2	4DS9-*	2TT2-2
4AH5-B	2TT2-6	2DB2-10	4TT2-2	4DS9-*	4TT2-2
4AH5-B	4TT2-6	2DB2-43+	10IA8	4DS9-*	2TT2-6
4AH6-C	10IA8	2DB2-43+	2TT2-2	4DS9-*	4TT2-6
4AH6-C	2TT2-2	2DB2-43+	2TT2-6	2TT2-2	2TT2-2
4AH6-C	4TT2-2	2DB2-43+	4TT2-2	2TT2-3	2TT2-2
4AH6-C	2TT2-6	4DB2-10	10IA8	2TT2-3	4TT2-2
4AH6-C	4TT2-6	4DB2-10	2TT2-2	2TT2-6	2TT2-6
4AH6-D	10IA8	4DB2-10	4TT2-2	2TT2-6	4TT2-2
4AH6-D	2TT2-2	4DB2-43+	10IA8	4TT2-2	4TT2-2
4AH6-D	4TT2-2	4DB2-43+	2TT2-6	4TT2-6	2TT2-6
4AH6-D	2TT2-6				

\* See 7.5.3 preceding for explanation.

+ Supplemental Channel Assignment information required.

Effective: November 27, 1991

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9. Interface Groups, Transmission Specifications and Channel Codes  
 (Cont'd)

9.3 Channel Interface and Network Channel Codes (Cont'd)

9.3.5 Compatible Channel Interfaces (Cont'd)

(C) Voice Grade

<u>Compatible CIs</u>		<u>Compatible CIs</u>		<u>Compatible CIs</u>	
4AB2	4AB2				
4AB2	4AC2	4AH5-B	6DA2	4AH6-D	2DY2
4AB3	4AC2	4AH5-B	4DA2	4AH6-C	9DY2
4AB2	2AC2	4AH5-B	2DA2	4AHG-C	9DY3
4AB3	2AC2			4AH6-C	6DY2
2AB2	2AC2	4AH6-D	4DE2	4AH6-C	6DY3
2AB3	2AC2	4AH6-C	4DE2	4AH6-C	4DY2
		4AH5-B	4DE2	4AH6-C	2DY2
4AB2	4SF2	4AH6-D	2DE2	4AH5-B	9DY2
4AB3	4SF2	4AH6-C	2DE2	4AH5-B	9DY3
		4AH5-B	2DE2	4AH5-B	6DY2
				4AH5-B	6DY3
4AH6-D	4AC2	4AH6-D	4DX3	4AH5-B	4DY2
4AH6-D	2AC2	4AH6-C	4DX3	4AH5-B	2DY2
4AH6-C	4AC2	4AH5-B	4DX3		
4AH6-C	2AC2	4AH6-D	4DX2	4AH6-D	9EA2
4AH5-B	4AC2	4AH6-C	4DX2	4AH6-D	9EA3
4AH5-B	2AC2	4AH5-B	4DX2	4AH6-D	6EA2-E
				4AH6-D	6EA2-M
4AH6-D	2CT3			4AH6-D	4EA2-E
				4AH6-D	4EA2-M
4AH6-C	2CT3			4AH6-C	9EA2
4AH5-B	2CT3			4AJ7-C	9EA3
4AH6-D	6DA2			4AH6-C	6EA2-E
4AH6-D	4DA2	4AH6-D	9DY2		
4AH6-D	2DA2	4AH6-D	9DY3		
4AH6-C	6DA2	4AH6-D	6DY2		
4AH6-C	4DA2	4AH6-D	6DY3		
4AH6-C	2DA2	4AH6-D	4DY2		

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9. Interface Groups, Transmission Specifications and Channel Codes  
 (Cont'd)

9.3 Channel Interface and Network Channel Codes (Cont'd)

9.3.5 Compatible Channel Interfaces (Cont'd)

(C) Voice Grade (Cont'd)

<u>Compatible CIs</u>		<u>Compatible CIs</u>		<u>Compatible CIs</u>	
4AH6-C	6EA2-M	4AH6-D	6GS2	4AH6-D	2L02
4AH6-C	4EA2-E	4AH6-D	4GS2	4AH6-C	2L03
4AH6-C	4EA2-M	4AH6-D	2GS3	4AH6-C	2L02
4AH5-B	9EA2	4AH6-D	2GS2	4AH5-B	2L03
4AH5-B	9EA3	4AH6-C	6GS2	4AH5-B	2L02
4AH5-B	6EA2-E	4AH6-C	4GS2		
4AH5-B	6EA2-M	4AH6-C	2GS3	4AH6-B	4LR2
4AH5-B	4EA2-E	4AH6-C	2GS2	4AH6-D	2LR2
4AH5-B	4EA2-M	4AH5-B	6GS2	4AH6-C	4LR2
		4AH5-B	4GS2	4AH6-C	2LR2
4AH6-D	8EB2-E	4AH5-B	2GS3	4AH5-B	4LR2
4AH6-D	8EB2-M	4AH5-B	2GS2	4AH5-B	2LR2
4AH6-D	6EB2-E				
4AH6-D	6EB2-M	4AH6-D	2LA2	4AH6-D	6LS2
4AH6-C	8EB2-E	4AH6-C	2LA2	4AH6-D	4LS2
4AH6-C	8EB2-M	4AH5-B	2LA2	4AH6-D	2LS2
4AH6-C	6EB2-E			4AH6-D	2LS3
4AH6-C	6EB2-M	4AH6-D	2LB2	4AH6-C	6LS2
4AH5-B	8EB2-E	4AHG-C	2LB2	4AH6-C	4LS2
4AH5-B	8EB2-M	4AH5-B	2LB2	4AH6-C	2LS2
4AH5-B	6EB2-E			4AH6-C	2LS3
4AH5-B	6EB2-M	4AH6-D	2LC2	4AH5-B	6LS2
		4AH6-C	2LC2	4AH5-B	4LS2
		4AH5-B	2LC2	4AH5-B	2LS2
4AH6-D	2G02				
4AH6-D	2G03				
4AH6-C	2G02				
4AH6-C	2G02			4AH5-B	2LS3
4AH5-B	2G02	4AH6-D	2L03		
4AH5-B	2G03				

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**9. Interface Groups, Transmission Specifications and Channel Codes  
 (Cont'd)**

**9.3 Channel Interface and Network Channel Codes (Cont'd)**

**9.3.5 Compatible Channel Interfaces (Cont'd)**

**(C) Voice Grade (Cont'd)**

<u>Compatible CIs</u>		<u>Compatible CIs</u>		<u>Compatible CIs</u>	
4AH6-D	4N02	4AH6-D	4TF2	2CT3	8EB2-E
4AH6-D	2N02	4AJ7-D	2TF2	2CT3	8EB2-M
4AH6-C	4N02	4AH6-C	4TF2		
4AH6-C	2N02	4AH6-C	2TF2	2CT3	6482-E
4AH5-B	4N02	4AH5-B	4TF2	2CT3	6EB2-M
4AH5-B	2N02	4AH5-B	2TF2		
				2CT3	6EB3-E
			2CT3	4DS9-*	
				2CT3	8EC2
		2CT3	6DX2		
		2CT3	4DX2	2CT3	4SF2
		2CTS	4DX3	2CT3	4SF3
4AH6-D	4PR2	2CT3	9DY3	6DA2	6DA2
4AH6-D	2PR2	2CT3	6DY3	6DA2	4DA2
4AH6-C	4PR2	2CT3	9DT2	4DA2	4DA2
4AH6-C	2PR2	2CT3	6DY2		
4AH5-B	4PR2	2CT3	4DY3	4DB2	6DA2
4AH5-B	2PR2	2CT3	2DY2	4DB2	4DA2
				4DB2	2DA2
4AH6-D	4RV2-T	2CT3	9EA3	2DB3	2DA2
4AH6-D	2RV2-T	2CT3	9EA2	2DB2	2DA2
4AH6-C	4RV2-T	2CT3	6EA2-E	4DB2	4DB2
4AH6-C	2RV2-T	2CT3	6EA2-M	4DB2	4N02
4AH5-B	4TV2-T	2CT3	4EA2-E	4DB2	2N02
4AH5-B	2RV2-T	2CT3	4EA2-M	2DB2	2N02
4AH6-D	4SF2			4DB2	4PR2
4AH6-C	4SF2			4DB2	2PR2
4AH5-B	4SF2			2DB2	2PR2
4AH6-D	4SF3				
4AH6-C	4SF3				
4AH5-B	4SF3				

\* See 9.3.3 preceding for explanation.

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9. Interface Groups, Transmission Specifications and Channel Codes  
(Cont'd)

9.3 Channel Interface and Network Channel Codes (Cont'd)

9.3.5 Compatible Channel Interfaces (Cont'd)

(C) Voice Grade (Cont'd)

Compatible CIs

4DD3 4DE2  
4DD3 2DE2

4DS8-\* 4AC2  
4DS8-\* 2AC2

4DS8-\* 6DA2  
4DS8-\* 4DA2  
4DS8-\* 2DA2

4DS8-\* 4DE2  
4DS8-\* EDE2

4DS8-\* 4DX3  
4DS8-\* 4DX2

Compatible CIs

4DS8-\* 9DY3  
4DS8-\* 9DY2  
4DS8-\* 6DY3  
4DS8-\* 6DY2  
4DS8-\* 4DY2  
4DS8-\* 2DY2

4DS8-\* 9EA2  
4DS8-\* 9EA3  
4DS8-\* 6EA2-E  
4DS8-\* 6EA2-M  
4DS8-\* 4EA2-E  
4DS8-\* 4EA2-E

\* See 9.3.3 preceding for explanation.

**ACCESS SERVICE**

**9. Interface Groups, Transmission Specifications and Channel Codes**  
 (Cont'd)

**9.3 Channel Interface and Network Channel Codes** (Cont'd)

**9.3.5 Compatible Channel Interfaces** (Cont'd)

**(C) Voice Grade** (Cont'd)

<u>Compatible CIs</u>		<u>Compatible CIs</u>		<u>Compatible CIs</u>	
4DS8-*	8EB2-E	4DS8-*	4N02	4DX3	9DY2
4DS8-*	8EB2-M	4DS8-*	2N02	4DX2	6DY3
4DS8-*	6EB2-E			4DX3	6DY3
4DS8-*	6EB2-M	4DS8-*	4PR2	4DX2	6DY2
		4DS8-*	2PR2	4DX3	6DY2
4DS8-*	2G02			4DX2	4DY2
4DS8-*	2G03	4DS8-*	4RV2-T	4DX3	4DY2
4DS8-*	6GS2	4DS8-*	2RV2-T	4DX2	2DY2
4DS8-*	4GS2			4DX3	2DY2
4DS8-*	2GS2	4DS8-*	4SF2		
4DS8-*	2GS3	4DS8-*	4SF3	6DX2	9EA3
				6DX2	9EA2
4DS8-*	2LA2	4DS8-*	4TF2	6DX2	6EA2-E
		4DS8-*	2TF2	6DX2	6EA2-M
4DS8-*	2LB2			6DX2	4EA2-E
		4DX2	4DX2	6DX2	4EA2-M
8DS8-*	2LC2	4DX3	4DX2	4DX2	9EA2
		4DX3	4DX3	4DX3	9EA2
4DS8-*	2L02			4DX2	9EA3
4DS8-*	2L03	6DX2	9DY3	4DX3	9EA3
		6DX2	9DY2	4DX2	6EA2-E
4DS8-*	4LR2	6DX2	6DY3	4DX3	6EA2-E
4DS8-*	2LR2	6DX2	6DY2	4DX2	6EA2-M
		6DX2	4DY2	4DX3	6EA2-M
4DS8-*	6LS2	6DX2	2DY2	4DX2	4EA2-E
4DS8-*	4LS2	4DX2	9DY3	4DX3	4EA2-E
4DS8-*	2LS2	4DX3	9DY3	4DX2	4EA2-M
4DS8-*	2LS3	4DX2	9DY2	4DX3	4EA2-M

\* See 9.3.3 preceding for explanation.

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**ACCESS SERVICES**

**9. Interface Groups, Transmission Specifications and Channel Codes**  
 (Cont'd)

**9.3 Channel Interface and Network Channel Codes** (Cont'd)

**9.3.5 Compatible Channel Interfaces** (Cont'd)

**(C) Voice Grade** (Cont'd)

<u>Compatible CIs</u>		<u>Compatible CIs</u>		<u>Compatible CIs</u>	
6DX2	8EB2-E	4DX2	6LS2	9DY2	6DY3
6DX2	8EB2-M	4DX3	6LS2	9DY3	4DY2
6DX2	6EB2-E	4DX3	4LS2	9DY2	4DY2
6DX2	6EB2-M	4DX2	4LS2	9DY2	2DY2
4DX2	8EB2-E	4DX3	2LS3	9DY3	2DY2
4DX2	8EB2-M	4DX2	2LS3	6DY3	6DY3
4DX3	8EB2-E	4DX3	2LS2	6DY3	6DY2
4DX3	8EB2-M	4DX2	2LS2	6DY2	6DY2
4DX2	6EB2-E	2DX3	2LS2	6DY3	4DY2
4DX2	6EB2-M	2DX3	2LS3	6DY3	2DY2
4DX3	6EB2-E			6DY2	4DY2
4DX3	6EB2-M	4DX3	4RV2-T	6DY2	2DY2
		4DX2	4RV2-T	4DY2	2DY2
4DX2	2LA2	4DX3	2RV2-T	4DY2	4DY2
4DX3	2LA2	4DX2	2RV2-T		
2DX3	2LA2			6EA2-E	4AC2
		6DX2	4SF2	6EA2-M	4AC2
4DX2	2LB2	4DX2	4SF2	6EA2-E	2AC2
4DX3	2LB2	4DX3	4SF2	6EA2-M	2AC2
2DX3	2LB2	4DX2	4SF3		
		4DX3	4SF3	9EA2	9DY3
4DX2	2LC2			9EA2	9DY2
4DX3	2LC2	9DY3	9DY3	9EA2	6DY3
2DX3	2LC2	9DY3	9DY2	9EA2	6DY2
		9DY2	9DY2	9EA2	4DY2
4DX2	2LO3	9DY3	6DY3	9EA2	2DY2
4DX3	2LO3	9DY3	6DY2	9EA3	9DY3
2DX3	2LO3	9DY2	6DY2		

Effective: August 1, 1991

ACCESS SERVICES

9. Interface Groups, Transmission Specifications and Channel Codes  
 (Cont'd)

9.3 Channel Interface and Network Channel Codes (Cont'd)

9.3.5 Compatible Channel Interfaces (Cont'd)

(C) Voice Grade (Cont'd)

<u>Compatible CIs</u>		<u>Compatible CIs</u>		<u>Compatible CIs</u>	
9EA3	9DY2	4EA2-M	9DY2	4EA3-E	9EA2
9EA3	6DY3	4EA2-M	6DY3	4EA3-E	9EA3
9EA3	6DY2	4EA2-M	6DY2	4EA2-M	4EA2-M
9EA3	4DY2	4EA2-M	4DY2		
9EA3	2DY2	4EA2-M	2DY2	9EA2	8EB2-E
6EA2-E	9DY3			9EA2	8EB2-M
6EA2-E	9DY2	9EA2	9EA2	9EA2	6EB2-E
6EA2-E	6DY3	9EA2	9EA3	9EA2	6EB2-M
6EA2-E	6DY2	9EA2	6EA2-E	9EA3	8EB2-E
6EA2-E	4DY2	9EA2	6EA2-M	9EA3	8E82-M
6EA2-E	2DY2	9EA2	4EA2-E	9EA3	6EB2-E
6EA2-M	9DY3	9EA2	4EA2-M	9EA3	6EB2-M
6EA2-M	9DY2	9EA3	9EA3	6EA2-E	8EB2-E
6EA2-M	6DY3	9EA3	6EA2-E	6EA2-E	8EB2-M
6EA2-M	6DY2	9EA3	6EA2-M	6EA2-E	6EB2-E
6EA2-M	4DY2	9EA3	4EA2-E	6EA2-E	6EB2-M
6EA2-M	2DY2	9EA3	4EA2-M	6EA2-M	8EB2-E
4EA2-E	9DY3	6EA2-E	6EA2-E	6EA2-M	8E82-M
4EA2-E	9DY2	6EA2-E	6EA2-M	6EA2-M	6EB2-E
4EA3-E	9DY3	6EA2-M	6EA2-M	6EA2-M	6EB2-M
4EA3-E	9DY2	6EA2-E	4EA2-E	4EA2-E	8EB2-E
4EA3-E	6DY3	6EA2-E	4EA2-M	4EA2-E	8EB2-M
4EA3-E	6DY2	6EA2-M	4EA2-E	4EA3-E	8EB2-E
4EA3-E	4DY2	6EA2-M	4EA2-M	4EA3-E	8E82-M
4EA3-E	2DY2	4EA2-E	4EA2-E	4EA2-E	6EB2-E
4EA2-E	6DY3	4EA3-E	6EA2-E	4EA2-E	6EB2-M
4EA2-E	6DY2	4EA3-E	6EA2-M	4EA3-E	6EB2-E
4EA2-E	4DY2	4EA3-E	4EA2-E	4EA3-E	6EB2-M
4EA2-E	2DY2	4EA3-E	4EA2-M	4EA2-M	8EB2-E
4EA2-M	9DY3	4EA2-E	4EA2-M		

Effective: August 1, 1991

**ACCESS SERVICES**

**9. Interface Groups, Transmission Specifications and Channel Codes  
 (Cont'd)**

**9.3 Channel Interface and Network Channel Codes (Cont'd)**

**9.3.5 Compatible Channel Interfaces (Cont'd)**

**(C) Voice Grade (Cont'd)**

<u>Compatible CIs</u>		<u>Compatible CIs</u>		<u>Compatible CIs</u>	
4EA2-M	8EB2-M	9EA3	43F2	6EB3-E	9DY2
4EA2-M	6EB2-E	9EA2	4SF2	6EB3-E	9DY3
4EA2-M	6EB2-M	6EA2-E	4SF3	6EB2-E	6DY2
		6EA2-M	4SF3	6EB3-E	6DY2
6EA2-E	2LA2	6EA2-E	4SF2	6EB2-E	6DY3
6EA2-M	2LA2	6EA2-M	4SF2	6EB3-E	6DY3
		4EA3-E	4SF2	6EB2-E	4DY2
6EA2-E	2LB2	4EA2-E	4SF2	6EB3-E	2DY2
6EA2-M	2LB2	4EA2-M	4SF2	6EB3-E	4DY2
				6EB2-M	9DY2
6EA2-E	2LC2	8EB2-E	4AC2	6EB2-M	9DY3
6EA2-M	2LC2	8EB2-M	4AC2	6EB2-M	6DY2
		8EB2-E	2AC2	6EB2-M	6DY3
6EA2-E	2LO3	8EB2-M	2AC2	6EB2-M	4DY2
6EA2-M	2LO3			6EB2-E	2DY2
		8EB2-E	9DY3	6EB2-M	2DY2
6EA2-E	6LS2	8EB2-E	9DY2		
6EA2-M	6LS2	8EB2-E	6DY3	6EB3-E	9EA2
6EA2-E	4LS2	8EB2-E	6DY2	6EB3-E	9EA3
6EA2-M	4LS2	8EB2-E	4DY2	6EB3-E	6EA2-E
6EA2-E	2LS2	8EB2-E	2DY2	6EB3-E	6EA2-M
6EA2-M	2LS2	8EB2-M	9DY3	6EB3-E	4EA2-E
6EA2-E	2LS3	8EB2-M	9DY2	6EB3-E	4EA2-M
6EA2-M	2LS3	8EB2-M	6DY3		
		8EB2-M	6DY2	8EB2-E	8EB2-E
6EA2-E	4RV2-T	8EB2-M	4DY2	8EB2-E	8EB2-M
6EA2-M	4RV2-T	8EB2-M	2DY2	8EB2-M	8EB2-M
6EA2-E	2RV2-T	6EB2-E	9DY2	8EB2-E	6EB2-E
6EA2-M	2RV2-T	6EB2-E	9DY3	8EB2-E	6EB2-M

Effective: August 1, 1991

**ACCESS SERVICES**

**9. Interface Groups, Transmission Specifications and Channel Codes  
 (Cont'd)**

**9.3 Channel Interface and Network Channel Codes (Cont'd)**

**9.3.5 Compatible Channel Interfaces (Cont'd)**

**(C) Voice Grade (Cont'd)**

<u>Compatible CIs</u>		<u>Compatible CIs</u>		<u>Compatible CIs</u>	
8EB2-M	6EB2-E	8EB2-E	4RV2-T	8EC2	8EB2-M
8EB2-M	6EB2-M	8EB2-M	4RV2-T	8EC2	6EB2-E
6EB2-E	6EB2-E	8EB2-E	2RV2-T	8EC2	6EB2-M
6EB2-E	6EB2-M	8EB2-M	2RV2-T		
6EB3-E	8EB2-E			8EC2	4SF2
6EB3-E	8EB2-M	8EB2-E	4SF2	6EX2-B	2G03
6EB2-M	6EB2-M	8EB2-M	4SF2	6EX2-A	6GS2
		8EB2-E	4SF3	6EX2-A	4GS2
8EB2-E	2LA2	8EB2-M	4SF3	6EX2-A	2GS2
8EB2-M	2LA2	6EB3-E	4SF2	6EX2-A	2GS3
		6EB2-E	4SF2		
8EB2-E	2LB2	6EB2-M	4SF2	6EX2-B	2LA2
8EB2-M	2LB2				
		8EC2	9DY2	6EX2-B	2LB2
8EB2-E	2LC2	8EC2	9DY3		
8EB2-M	2LC2	8EC2	6DY2	6EX2-B	2LC2
		84C2	6DY3		
8EB2-E	2L03	8EC2	4DY2	6EX2-B	2L02
8EB2-M	2L03	8EC2	2DY2	6EX2-B	2L03
8EB2-E	6LS2	8EC2	9EA2	6EX2-B	4LR2
8EB2-M	6LS2	8EC2	9EA3	6EX2-B	2LR2
8EB2-E	4LS2	8EC2	6EA2-E		
8EB2-M	4LS2	8EC2	6EA2-M	6EX2-A	6LS2
8EB2-E	2LS2	8EC2	4EA2-E	6EX2-A	4LS2
8EB2-M	2LS2	8EC2	4EA2-M	6EX2-A	2LS2
8EB2-E	2LS3			6EX2-A	2LS3
8EB2-M	2LS3	8EC2	8EB2-E		

Effective: August 1, 1991

**ACCESS SERVICES**

**9. Interface Groups, Transmission Specifications and Channel Codes  
 (Cont'd)**

**9.3 Channel Interface and Network Channel Codes (Cont'd)**

**9.3.5 Compatible Channel Interfaces (Cont'd)**

**(C) Voice Grade (Cont'd)**

<u>Compatible CIs</u>		<u>Compatible CIs</u>		<u>Compatible CIs</u>	
6EX2-A	4SF2	6L02	6LS2	4LR2	4SF2
6EX2-B	4SF2	6L02	4LS2	4LR3	4SF2
		6L02	2LS2		
6G02	6GS2	6L02	2LS3	6LS2	2LA2
6G02	4GS2	4L02	6LS2	4LS2	2LA2
6G02	2GS2	4L02	4LS2	4LS3	2LA2
6G02	2GS3	4L03	6LS2	2LS2	2LA2
4G02	6GS2	4L03	4LS2	2LS3	2LA2
4G03	6GS2	4L03	2LS3		
4G02	4GS2	4L03	2LS2	6LS2	2LB2
4G03	4GS2	4L02	2LS2	4LS2	2LB2
4G02	2GS2	4L02	2LS3	4LS3	2LB2
4G02	2GS3	2L03	2LS3	2LS2	2LB2
4G03	2GS2	2L03	2LS2	2LS3	2LB2
4G03	2GS3	2L02	2LS2		
2G02	2GS2	2L02	2LS3	6LS2	2LC2
2G03	2GS2			4LS2	2LC2
2G02	2GS3	6L02	4SF2	4LS3	2LC2
2G03	2GS3	4L02	4SF2	2LS2	2LC2
		4L03	4SF2	2LS3	2LC2
6G02	4SF2				
4G02	4SF2	4LR2	4LR1	6LS2	2L03
4G03	4SF2	4LR3	2LR2	6LS2	2L02
		4LR2	4LR2	4LS2	2L02
6GS2	2G02	4LR2	2LR2	4LS2	2L03
4GS2	2G02	2LR2	2LR2	4LS3	2L02
4GS3	2G02	2LR3	2LR2	4LS3	2L03
4GS2	2G03				

Effective: August 1, 1991

ACCESS SERVICES

9. Interface Groups, Transmission Specifications and Channel Codes  
 (Cont'd)

9.3 Channel Interface and Network Channel Codes (Cont'd)

9.3.5 Compatible Channel Interfaces (Cont'd)

(C) Voice Grade (Cont'd)

<u>Compatible CIs</u>		<u>Compatible CIs</u>		<u>Compatible CIs</u>	
6LS2	4SF2	4SF3	9DY2	4SF3	2LA2
4LS3	4SF2	4SF2	9DY3		
		4SF3	6DY3	4SF2	2LB2
4N02	6DA2	4SF2	6DY3	4SF3	2LB2
4N02	4DA2	4SF2	6DY3		
4N02	2DA2	4SF3	6DY2	4SF2	2LC2
2N02	2DA2	4SF2	4DY2	4SF3	2LC2
		4SF3	4DY2		
4N02	4DE2	4SF3	2DY2	4SF2	2L03
4N02	2DE2	4SF2	2DY2	4SF3	2L03
4N02	4N02	4SF3	9EA2	4SF2	2LR2
4N02	2N02	4SF3	9EA3	4SF3	4LR2
2N02	2N02	4SF3	4EA2-E	4SF3	2LR2
2N03	2N02	4SF3	4EA2-M		
				4SF3	6LS2
2N03	2PR2	4SF3	6EB2-E	4SF2	4LS2
		4SF3	6EB2-M	4SF3	4LS2
4RV2-0	4RV2-T	4SF3	2G03	4SF2	2LS2
4RV2-0	2RV2-T	4SF3	6GS2	4SF2	2LS3
4RV2-0	2RV2-T	4SF2	6GS2	4SF3	2LS2
		4SF2	6GS2	4SF3	2LS3
4RV2-0	4SF2	4SF3	4GS2		
		4SF2	2GS2	4SF3	4RV2-T
4SF2	4AC2	4SF2	2GS3	4SF2	4RV2-T
4SF2	2AC2	4SF3	2GS2	4SF2	2RV2-T
		4SF3	2GS3	4SF3	2RV2-T
4SF3	9DY3				
4SF2	9DY2	4SF2	2LA2	4SF3	4SF3

Effective: August 1, 1991

**ACCESS SERVICES**

9. Interface Groups, Transmission Specifications and Channel Codes  
(Cont'd)

9.3 Channel Interface and Network Channel Codes (Cont'd)

9.3.5 Compatible Channel Interfaces (Cont'd)

(C) Voice Grade (Cont'd)

Compatible CIs

4SF3	4SF2
4SF2	4SF2

4TF2	4TF2
4TF2	2TF2
2TF3	2TF2

**ACCESS SERVICE**

**9. Interface Groups, Transmission Specifications and Channel Codes**  
 (Cont'd)

**9.3 Channel Interface and Network Channel Codes** (Cont'd)

**9.3.5 Compatible Channel Interfaces** (Cont'd)

(D) Program Audio

<u>Compatible CIs</u>		<u>Compatible CIs</u>		<u>Compatible CIs</u>	
4AH5-B	2PG1-3	4AH6-D	2PG1-3	4DS8-15F	2PG2-5
4AH5-B	2PG1-5	4AH6-D	2PG1-5	4DS8-15G	2PG2-8
4AH5-B	2PG1-8	4AH6-D	2PG1-8	4DS8-15H	2PG2-1
4AH5-B	2PG2-3	4AH6-D	2PG2-3	2PG2-1	2PG1-1
4AH5-B	2PG2-5	4AH6-D	2PG2-5	2PG2-1	2PG2-1
4AH5-B	2PG2-8	4AH6-D	2PG2-8	2PG2-3	2PGI-3
4AH6-C	2PG1-3	4DS8-15E	2PG1-3	2PG2-3	2PG2-3
4AH6-C	2PG1-5	4DS8-15F	2PG1-5	2PG2-5	2PG1-5
4AH6-C	2PG1-8	4DS8-15G	2PG1-8	2PG2-5	2PG2-5
4AH6-C	2PG2-3	4DS8-15H	2PG1-1	2PG2-8	2PG1-8
8AH6-C	2PG2-5	4DS8-15E	2PG2-3	2PG2-8	2PG2-8

(E) Video

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

Effective: November 27, 1991

**ACCESS SERVICE**

**9. Interface Groups, Transmission Specifications and Channel Codes**  
 (Cont'd)

**9.3 Channel Interface and Network Channel Codes** (Cont'd)

**9.3.5 Compatible Channel Interfaces** (Cont'd)

**(F) Wideband Analog**

<u>Compatible CIs</u>		<u>Compatible CIs</u>		<u>Compatible CIs</u>	
4AH5-B	4AH5-B			4WD5-1	4WA5-1
4AH6-C	4AH5-B			4WD5-2	4WA5-I
4AH6-C	4AH6-C	4AH6-D	4AH6-D	4WD5-3	4WA5-2
	4AH6-D	4AH5-B	4AH5-B	4DS8-15	
	4AH6-D	4AH6-C	4AH5-B	4DU8-A,B, or C	
	4AH6-C	4DU8-A,B, or C			
		4AH6-D	4DU8-A,B, or C		

**(G) Wideband Data**

<u>Compatible CIs</u>		<u>Compatible CIs</u>		<u>Compatible CIs</u>	
8WB5-18S	12WC6-18	8WB5-23A	10WC6-23	8WB5-50A	10WC6-50
8WB5-19A	10WC6-19	8WB5-23S	12W6-23S	8WB5-50S	12WB6-50
8WB5-19S	12WC6-19	8WB5-40S	12W6-40		

Effective: April 2, 1993

ACCESS SERVICE

9. Interface Groups, Transmission Specifications and Channel Codes  
 (Cont'd)

9.3 Channel Interface and Network Channel Codes (Cont'd)

9.3.5 Compatible Channel Interfaces (Cont'd)

(H) Digital Data

(1) Digital Data

<u>Compatible CIs</u>		<u>Compatible CIs</u>		<u>Compatible CIs</u>		
4DS8-15	4DU8-15+	4DS8-15	4DS8-15	6DU5-48		
4DS8-15	4DU8-24	4DS8-15	6DU5-56	4DU5-96	4DU5-96	
4DS8-15	4DU8-48	4DS8-15	6DU5-96	6DU5-24	6DU5-24	
4DS8-15	4DU8-56	4DU5-24	4DU5-24	6DU5-48	6DU5-48	
4DS8-15	6DU5-96	4DU5-48	4DU5-48	6DU5-56	6DU5-56	
4DS8-15	6DU5-24	4DU8-56	4DU5-56	6DU5-96	6DU5-96	
4DS9-15B	4DU5-64	4DS9-15	4DU5-19	4DS6-44A	4DU5-19	(N)
		4DS6-44A	4DU5-64			(N)

+ Available only as a cross connect of two digital circuits at appropriate digital speeds at a Telephone Company hub.

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ACCESS SERVICE

9. Interface Groups, Transmission Specifications and Channel Codes  
 (Cont'd)

9.3 Channel Interface and Network Channel Codes (Cont'd)

9.3.5 Compatible Channel Interfaces (Cont'd)

(I) High Capacity

Compatible CIs

4DS0-63	4DS0-63
4DS0-63	6DU8-A, B or C
4DS0-63	4DU8-A, B or C
4DS6-27	4DS6-27
4DS6-27	6DU8-A, B or C
4DS6-27	4DU8-A, B or C
4DS6-44	4DS6-44
4DS6-44	6DU8-A, B or C
4DS6-44	4DU8-A, B or C
4DS8-15	4DS8-15+
4DS8-15	6DU8-B
4DS6-44A	4DU5-19
4DS6-44A	4DU5-64

Compatible CIs

4DS8-15	4DU8-8
4DS8-15J	6DU8-A
4DS8-15J	4DU8-A
4DS8-15K	6DU8-B
4DS8-15K	4DU8-B
4DS8-15K	6DU8-C
4DS8-15K	4D78-C
4DS9-31	4DS9-31
4DS9-31	6DU8-A, B or C
4DS9-4DU8-A, B or C	
4DU9-A, B or C	4DU8-A, B or C
4DS9-15	4DU5-19
4DS9-15B	4DU5-64

(N)  
 |  
 (N)

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