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Interconnection - Unbundled Sub-Loops and Field Interconnection

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NOTICE

This publication describes Unbundled Sub-Loops and Field Interconnection. A Certified Local Exchange Carrier (CLEC) may order Unbundled Sub-Loops from QWEST to deliver services to their customers. The CLEC may interconnect with QWEST at field locations and/or in QWEST Wire Centers to access these Sub-Loops.

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1. Introduction

1.1 General

This publication describes Unbundled Sub-Loops and Field Interconnection. A Certified Local Exchange Carrier (CLEC) may order Unbundled Sub-Loops from Qwest to deliver services to their customers. The CLEC may interconnect with Qwest at field locations and/or in Qwest Wire Centers to access these Sub-Loops.

1.2 Reason for Reissue

- Update chapters to reflect SGAT (Statement of Generally Available Terms and Conditions) terminology.
- Add Remote collocation sections to Chapters 2 and 4.
- Add Sub-sections to chapter 4 for Joint Planned Remote Collocation, Leased Space Remote Collocation, Adjacent Remote Collocation and, Remote Collocation at VDSL sites.
- Add sections to Chapters 2 and 4 for Intra_Building Cable Dstribution Loop.
- Add sections to Chapters 2 and 4 MTE-POI
- Add NC/NCI codes to Table 3-2 and Table 3-6 for Remote Collocation and Intra-Building Distribution Loop.

1.3 Scope and Applicability of Document

This document provides technical information describing Unbundled Sub-Loops and Field Collocation. Network Channel and Network Channel Interface Codes are included for ordering Unbundled Sub-Loops. Other ordering information and administrative details are beyond the scope of this document

The products described in this publication are available to Certified Local Exchange Carriers/Co-Providers. The products are normally sold by contract. Contracts may include information that supercedes the information in this publication.

Some aspects of products mentioned in this publication are fully described in other technical publications. A list and ordering instructions for these publications is in the References chapter.

1.4 Document Organization

This document is organized as follows:

Chapter	Contents
1	Introduction
2	Unbundled Sub-Loops. Description of Unbundled Sub-Loops
3	Network Channel/Network Channel Interface Codes. General description of the codes and lists of applicable codes and combinations.
4	Field Connection Point. Description of interconnection method at a Field Connection Point.
5	Glossary
6	References and Trademarks

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2. Unbundled Sub-Loops

2.1 General Description

A loop is a facility the goes from a cross-connect frame in the Wire Center to a Network Interface (NI) in an End-User (i.e., a customer) premises. Figure 2-1 illustrates a typical arrangement. The cross-connect frame in the Wire Center is identified as a NI.

The Unbundled Loop has similar characteristics. Further information about Unbundled Loops may be found in Qwest PUB 77384, *Interconnection - Unbundled Loop*.

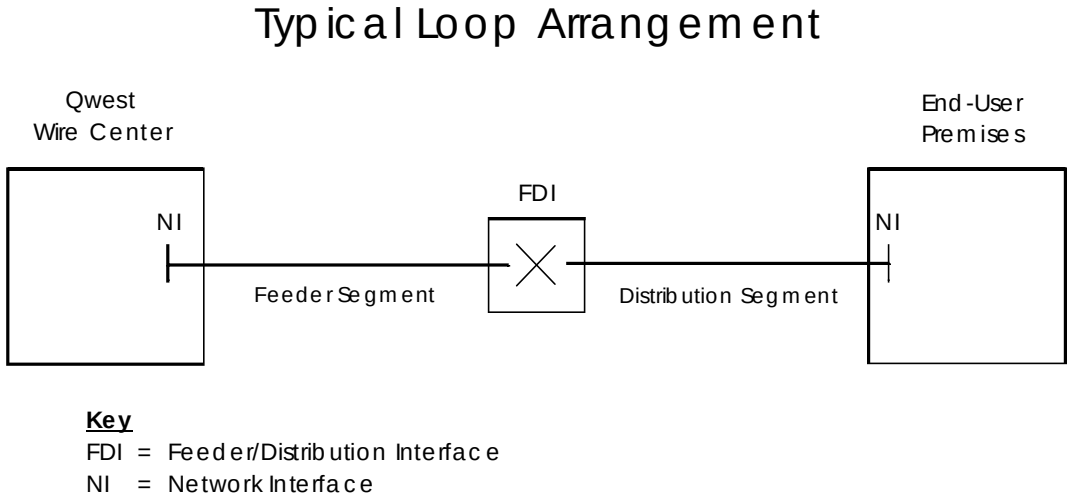

Figure 2-1 Typical Loop Arrangement

The typical loop consists of two segments or portions, the feeder segment and the distribution segment. The two segments are connected together in the field at a cross-connect device called a Feeder/Distribution Interface (FDI). The FDI is sometimes called a Serving Area Interface.

The Unbundled Sub-Loop product consists to two Unbundled Network Elements (UNEs) called the Unbundled Feeder Loop (UFL) and the Unbundled Distribution Loop (UDL).

Certified Local Exchange Carriers (CLECs) may purchase UFLs and/or UDLs to meet their needs when a full Unbundled Loop is not required. The arrangement is illustrated in Figure 2-2.

Loops that do not have an FDI to separate the Feeder and Distribution segments are not candidates for Sub-Loop Unbundling.

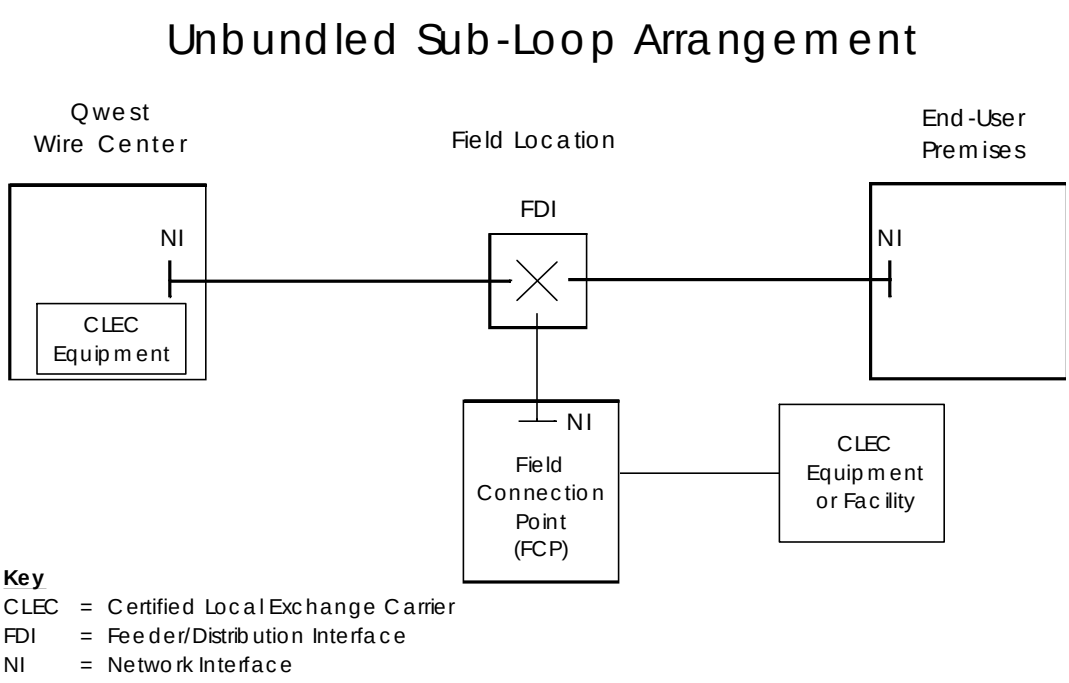

Figure 2-2 Unbundled Sub-Loops

A Field Connection Point (FCP) is established at the FDI location to enable the CLEC to interconnect at the field location. The UFL goes from the NI in the Wire Center to the FCP at the field location. A UDL goes from the FCP to the NI at the End-User premises.

Figure 2-2 does not show the jumpers placed in the FDI to connect the two loop segments to the FCP.

The CLEC may collocate equipment in the Wire Center to connect to the UFL. Further information about Collocation may be found in PUB 77386, *Interconnection and Collocation for Transport and Switched Unbundled Network Elements and Finished Services.*

The CLEC will connect a cable from the FCP to their own equipment or facility for access to either UFLs or UDLs. Information about this connection may be found in Chapter 4. The CLEC must establish interconnection at the FCP prior to ordering UFL or UDL elements.

The UFL is available as a DS1 Digital +facility. This UNE is described in Section 2.2. The UDL is described in Section 2.3.

2.2 High Capacity Unbundled Feeder Loop (DS1 Digital)

2.2.1 Description

The UFL is a transmission path between a NI in the Wire Center to the FCP in the field. The NI in the Wire Center is the DS1 InterConnection Distribution Frame (ICDF) as described in PUB 77386. The NI in the FCP is a cross-connect or similar device and is described in Chapter 4.

The UFL is a DS1 Digital loop. It transports bi-directional DS1 signals with a nominal transmission rate of 1.544 Mbit/s. DS1 Digital Loops will typically have one of the following configurations:

- Metallic-based span with High-Bit-Rate Digital Subscriber Line (HDSL) or T-1 carrier equipment.
- Channel of a fiber-based system.
- Combination of both fiber and metallic-based facilities.

The selection of transport configurations will be made by Qwest based on available technology.

The CLEC gains access to the Wire Center NI (the DS1 ICDF) by some form of Collocation as described in PUB 77386.

2.2.2 Expected Channel Performance

Performance shall meet end-to-end accuracy and availability objectives stated in ANSI T1.510-1994, *Network Performance Parameters for Dedicated Digital Services.*

2.2.3 Network Channel (NC) Codes

The NC codes for the UFL are listed in Table 3-1 in the following chapter. The table lists the line code and frame format in the *Description* column.

2.2.4 Network Channel Interface (NCI) Codes

There are two NCI codes that may be used with the UFL at the Central Office end; 04QB9.11 and 04QB9.11R. At the Field end, 04QE9.11 and a traditional set of 04DS9.** codes are available. These codes are identified in Table 3-4.

The “QB” codes are used at the ICDF in the Wire Center. The version with the “R” in the ninth position denotes *with Regeneration.* Further information about this subject may be found in PUB 77386.

The “QE” code is available at typical FCP sites using equipment cabinets or outside plant enclosures. The code denotes a *Field Location.* Regeneration is not available at the FCP end of the UFL. Further information about this interface is in Chapter 4.

The "DS" code would be available at environmentally suitable FCP sites such as equipment rooms, or Environmentally Controlled Vaults (EVC). Further information about this interface is in Chapter 4.

2.2.5 Valid NC/NCI combinations

Valid NC and NCI code combinations may be found in Table 3-5. UFLs may be ordered using the combination of codes on a row of the table. Each line represents a particular Line Code and Frame Format of the DS1.

2.3 Unbundled Distribution Loop

2.3.1 Description

The UDL provides transport between the FCP and the End-User's premises as illustrated in Figure 2-2.

An UDL is normally a metallic cable facility. Loops that are not at least partly metallic normally can not be segmented into Feeder and Distribution portions. However, there may be exceptions.

These loops may have bridged tap, loading and mixed gauged cables. The loops are suitable for most analog voice applications.

If Qwest loop does not meet the CLEC's requirements for non-standard (i.e., non-analog voice) applications; the CLEC has the option of requesting Qwest unload an available loop and remove bridged tap. The CLEC must clearly specify the type of conditioning that needs to occur. Such special conditioning could include load coil removal and specific bridged tap removal.

Alternatively, the CLEC may order a finished private line transport service.

Chapters 4 and 5 of PUB 77384 describe the analog transmission parameters of a full Unbundled Loop. The transmission parameters of the distribution segment used with the UDL should be improved over the full loop parameters. However, the actual limits may vary almost as much as the ranges listed in PUB 77384.

Qwest reserves the right to make some cables unavailable to CLECs based on Spectrum Management considerations.

2.3.2 Applications

Many types of services may be transported on a metallic loop facility. While the primary application may be analog voice channels, certain analog (with bandwidth greater than 300 to 3000 Hz) or digital applications may successfully operate on the metallic pairs. The CLEC has the responsibility to evaluate the capabilities of the loop for their application. However, no service may be placed on the pair that interferes with other services normally expected to appear on loop cables.

Qwest reserves the right to identify CLEC services that interfere with other network services and disconnect them if necessary. In these situations, Qwest will notify the CLEC.

2.3.3 NC and NCI Codes

Table 3-2 lists the NC codes available with UDL. Table 3-4 lists the NCI Protocol Codes and their options for use with UDL. The full NCI codes and their compatible NC codes are listed in Table 3-6. This includes codes for Intra-Building Distribution Loop, also known as Inside Wire (IW)

2.4 Remote Collocation

Remote Collocation allows CLECs to physically collocate in a Qwest Remote Premises that is located at a distance from a Qwest Wire Center, Central Office building. Such Remote Premises include controlled environmental vaults, controlled environmental huts, cabinets, pedestals and other remote terminals. Remote Collocation would be used only to access Unbundled Network Elements (UNEs), within Qwest's owned or leased Outside Plant premises. For this Technical Publication the UNEs in focus are Unbundled Sub-Loops.

There are two variations of Remote Collocation: Joint Planned Remote and Leased Exiting Space. Joint Planned Remote involves a proactive collaboration between Qwest and the CLEC community for coordinated network planning for the future placement of outside plant infrastructure. Leased Exiting Space involves the assessment of existing outside plant infrastructure.

Remote Collocation is currently offered in all remote sites. Each site will have to be evaluated to determine if the CLEC's equipment can meet all of the technical requirements for a specific site in question. This includes Remote collocation at VDSL sites. Although a CLEC can collocate to a remote VDSL premise, the CLEC can only place equipment that is NEXTLEVEL VDSL equipment and will not interfere with the VDSL equipment.

Adjacent Remote Collocation is also permitted by a CLEC. Adjacent Remote Collocation allows CLECs to physically collocate equipment in or on a non-contiguous Qwest property adjacent to a Qwest Remote Premises (i.e. Remote Terminal, FDI or CEV) for the purpose of interconnecting with Qwest to purchase sub-loop elements.

2.4.1 Intra-Building Cable Distribution Loop

The Intra-Building Cable Distribution Loop is a 2 wire or 4 wire facility that extends from a building terminal or other accessible terminal that services one building on a property to the end-users network interface device (NID). Intra-Building Cable Distribution is also known as Inside Wire (IW) by the industry.

A CLEC obtains access to this Sub-Loop Unbundled Element at the established Multi-Tenant Environment-POI (MTE-POI) arrangement. See section 4.8 for information on MTE-POI.

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3. Network Channel/Network Channel Interface Codes

3.1 Network Channel (NC) Codes

3.1.1 General

Network Channel (NC) codes are a part of the Bellcore COMMON LANGUAGE® code set. The NC code is used to identify a channel used with the service. This section identifies the available channels and their NC codes.

3.1.2 Format

A NC code is a four-character code with two data elements:

Channel Code
Optional Feature Code

The format is illustrated in Figure 3-1.

Network Channel Code

Data Element	Channel Code		Optional Feature Code	
Character Position	1	2	3	4
Character Key	X	X	X or -	X or -

X = Alphanumeric
\- = Hyphen

Figure 3-1 Format Structure for NC Codes

The **Channel Code** (character positions 1 and 2) is a two-character alpha or alphanumeric code that describes the channel service in an abbreviated form. The channel code will frequently, but not always, be specified as the service code of the special service circuits or the transmission grade of the message trunk circuit. The NC channel code field is always filled.

The **Optional Feature Code** (character positions 3 and 4) is a two-character alpha or alphanumeric or hyphen code that represents the option codes available for each channel code. Varying combinations of this code will allow the customer to enhance the technical performance of the requested channel, or to further identify the type of service. It is also used to specify options such as conditioning, effective 4-wire, multiplexing, etc. The NC optional code field is always filled.

Further information about NC Codes may be found in ANSI T1.223-1997, *Information Interchange — Structure and Representation of Network Channel (NC) and Network Channel Interface (NCI) Codes for the North American Telecommunications System.*

3.1.3 Available Network Channel Codes

Tables 3-1 and 3-2 list the available Network Channel (NC) codes for Unbundled Feeder Loops and Unbundled Distribution Loops, respectively.

Table 3-1 Available Network Channel Codes — Unbundled Feeder Loops

Network Channel Code	Description * (Options)
HC--	SF and AMI
HCD-	ANSI ESF and AMI
HCE-	ANSI ESF and B8ZS
HCF-	Non-ANSI ESF and AMI
HCG-	Non-ANSI ESF and B8ZS
HCJ- **	Free Framing and B8ZS
HCZ-	SF and B8ZS

* The Channel Code of HC (high-capacity) represents a DS1 which provides for the transmission rate of 1.544 Mb/s.

** May not be supported in some locations.

Key
AMI = Alternate Mark Inversion
ANSI = American National Standards Institute
B8ZS = Bipolar with 8 Zero Substitution
ESF = Extended Superframe
SF = Superframe

Table 3-2 Available Network Channel Codes - Unbundled Distribution Loops

Network Channel Code	Description
LX--	Dedicated Facility without equipment
LX-N	Dedicated Facility without equipment. Contains no loading coils
LXBN	Dedicated Facility without equipment, building wiring. Contains no loading coils
UA--	Line Sharing Service: xDSL capable facility shared with an existing Plain Old Telephone Service. Per FCC 99-355

3.2 Network Channel Interface (NCI) Codes

3.2.1 General

Network Channel Interface (NCI) codes are a part of the COMMON LANGUAGE® code set. The NCI code is used to identify a network interface of a service in our mechanized systems.

3.2.2 Format

An NCI code is a maximum twelve-character code that consists of five (5) data elements:

Total Conductors
Protocol
Impedance
Protocol Options
Transmission Level Point(s) (TLP)

The first three fields are required; the last two are optional. The format is illustrated in Figure 3-2. The TLP fields are not used with Unbundled Sub-Loops.

Network Channel Interface Code

Total Conductors		Protocol		Impedance	Delimeter	Protocol Options			Delimiter	TLP Level	
										Transmit	Receive
1	2	3	4	5	6	7	8	9	10	11	12
N	N	A	A	X	•	X	X	X	•	X or -	X or -

A = Alpha
N = Numeric
X = Alphanumeric
• = Delimiter (normally a period)
- = Hyphen

Figure 3-2 Format Structure for NCI Codes

Total Conductors (character positions 1 and 2) is a two-character numeric code that represents the total number of physical conductors (e.g., wires or fibers) required at the interface.

Protocol (character position 3 and 4) is a two-character alpha code that defines requirements for the interface regarding signaling/transmission.

Impedance (character position 5) is a one-character alpha or numeric code representing the nominal reference impedance that will terminate the channel for the purpose of evaluating transmission performance. Values are listed in Table 3-3.

Table 3-3 NCI Impedance Values

Impedance in Ohms (Character Position 5)			
Data Value	**Code**	**Data Value**	**Code**
600	2	100	9
900	3 *	Multiple	M
135	5		

* Except for interface code 04DD3, the impedance character 3, when used with a 4-wire voice-frequency path at the POT, denotes a historical customer (IC) provided transmission termination rather than a 900 ohm impedance. Such terminations were provided by customers in accordance with FCC Docket No. 20099 settlement Agreement and by Automatic Transmission Test and Control Circuit used in the previous provisioning process.

Protocol Options (character positions 7, 8, and 9) is a one to three-character alpha, numeric, or alphanumeric code that describes additional features (e.g., bit rate or bandwidth) on the Protocol to be used. It is an optional field that is always left justified.

Transmission Level Point(s) (character positions 8 through 12) is assigned one or two-character alpha code corresponding to a value for Transmission Level Point(s) (TLPs) from either the Exchange Carrier/service provider or customer end. TLPs may not be specified for services described in this publication.

Further information about NCI Codes may be found in ANSI T1.223-1997.

3.2.3 Available Network Channel Interface Codes

Table 3-4 lists the NCI codes valid for Unbundled Feeder and Distribution Loops.

Table 3-4 Available NCI Codes

Protocol		Definition
Code 3 4	Option 7 8 9	
DU		Digital Access Interface
	001	Spectrum Management Class 1 Signal per ANSI T1.417
	002	Spectrum Management Class 2 Signal per ANSI T1.417
	003	Spectrum Management Class 3 Signal per ANSI T1.417
	004	Spectrum Management Class 4 Signal per ANSI T1.417
	005	Spectrum Management Class 5 Signal per ANSI T1.417
	006	Spectrum Management Class 6 Signal per ANSI T1.417
	007	Spectrum Management Class 7 Signal per ANSI T1.417
	008	Spectrum Management Class 8 Signal per ANSI T1.417
	009	Spectrum Management Class 9 Signal per ANSI T1.417
	LS5	Loop Start, voiceband Signal and a High Frequency Portion with Spectrum Management Class 5, Signal per ANSI T1.417
NO		Voice Band Transmission with No Signaling Provided by Qwest
QB		Central Office Manual Cross-Connect Termination with No Sub-rating Capability
	11	DS1 to DS1; This Code May or May Not Meet DS1 Signal Levels as Specified by GR-342-CORE
	11R	With regeneration
QE		Field Location Manual Cross-Connect Termination with no Sub-rating Capability
	001	Spectrum Management Class 1 Signal per ANSI T1.417
	002	Spectrum Management Class 2 Signal per ANSI T1.417
	003	Spectrum Management Class 3 Signal per ANSI T1.417
	004	Spectrum Management Class 4 Signal per ANSI T1.417
	005	Spectrum Management Class 5 Signal per ANSI T1.417
	006	Spectrum Management Class 6 Signal per ANSI T1.417
	007	Spectrum Management Class 7 Signal per ANSI T1.417
	008	Spectrum Management Class 8 Signal per ANSI T1.417
	009	Spectrum Management Class 9 Signal per ANSI T1.417
	11	DS1 to DS1; This Code May or May Not Meet DS1 Signal Levels as specified by GR-342-CORE. For Qwest applications, the signal **will** meet DSX-1 template requirements per ANSI Standard T1.102
QR		Line sharing, customer provides the non-Central Office based splitter function. This NCI represents two Points of Termination
	L05	Loop Start Signaling and Spectrum Management Class 5 per ANSI T1.417

3.3 Valid Network Channel/Network Channel Interface Combinations

This section describes valid combinations of NC and NCI codes.

3.3.1 Unbundled Feeder Loops

Section 2.2 described the Unbundled Feeder Loops. Table 3-5 lists valid combinations of NC and NCI codes. Within the same row; any Wire Center End code is compatible with any FCP End code.

Table 3-5 Valid NC/NCI Combinations - Unbundled Feeder Loops

Network Channel Code	Frame Format and Line Code	Network Channel Interface Codes	
		Wire Center End	FCP End
HC--	SF and AMI	04QB9.11 04QB9.11R	04QE9.11 04DS9.15
HCD-	ANSI ESF and AMI	04QB9.11 04QB9.11R	04QE9.11 04DS9.1K
HCE-	ANSI ESF and B8ZS	04QB9.11 04QB9.11R	04QE9.11 04DS9.1S
HCF-	Non-ANSI ESF and AMI	04QB9.11 04QB9.11R	04QE9.11 04DS9.15K
HCG-	Non-ANSI ESF and B8ZS	04QB9.11 04QB9.11R	04QE9.11 04DS9.15S
HCJ-	Free Framing and B8ZS *	04QB9.11 04QB9.11R	04QE9.11 04DS9.15J
HCZ-	SF and B8ZS	04QB9.11 04QB9.11R	04QE9.11 04DS9.15B

* May not be supported in some locations.

Key
AMI = Alternate Mark Inversion
ANSI = American National Standards Institute
B8ZS = Bipolar with 8 Zero Substitution
ESF = Extended Superframe
FCP = Field Connection Point
SF = Superframe

3.3.2 Unbundled Distribution Loops

Section 2.3 described the Unbundled Distribution Loops including Intra-Building Distribution Loop. Table 3-6 lists valid combinations of NC and NCI codes. Within the same row; any Wire Center End code is compatible with any FCP End code.

Table 3-6 Valid NC/NCI Combinations - Unbundled Distribution Loops

Network Channel Code	NCI Code		Description
	End-User NI	Qwest FCP-NI	
LX--	02NO2	02QD2.OOF	Distribution Loop, No Signaling; Transmission Only
LX--	04NO2	04QD2.OOF	Distribution Loop, No Signaling; Transmission Only
LX-N	02DU5.001	02QE5.001	Distribution Loop, without loading coils, Spectrum Management Class 1 per ANSI T1.417
LX-N	02DU5.002	02QE5.002	Distribution Loop, without loading coils, Spectrum Management Class 2 per ANSI T1.417
LX-N	02DU5.003	02QE5.003	Distribution Loop, without loading coils, Spectrum Management Class 3 per ANSI T1.417
LX-N	02DU5.004	02QE5.004	Distribution Loop, without loading coils, Spectrum Management Class 4 per ANSI T1.417
LX-N	02DU9.005	02QE9.005	Distribution Loop, without loading coils, Spectrum Management Class 5 per ANSI T1.417
LX-N	02DU9.006	02QE9.006	Distribution Loop, without loading coils, Spectrum Management Class 6 per ANSI T1.417
LX-N	02DU5.007	02QE5.007	Distribution Loop, without loading coils, Spectrum Management Class 7 per ANSI T1.417
LX-N	02DU5.008	02QE5.008	Distribution Loop, without loading coils, Spectrum Management Class 8 per ANSI T1.417
LX-N	02DU9.009	02QE9.009	Distribution Loop, without loading coils, Spectrum Management Class 9 per ANSI T1.417
LX-N	02DUM.LS 5	02QE9.005	Distribution Loop, without loading coils Spectrum Management Class 5 per ANSI T1.417 and one POTS Channel
LXBN	02NO2	02QD2.OOF	Distribution Loop, Building Wiring, No Signaling; Transmission Only
LXBN	02DU5.001	02QE5.001	Distribution Loop, Building Wiring, without loading coils, Spectrum Management Class 1 per ANSI T1.417
LXBN	02DU5.002	02QE5.002	Distribution Loop, Building Wiring, without loading coils, Spectrum Management Class 2 per ANSI T1.417

KEY
FCP = Field Connection Point
NI = Network Interface

Table 3-6 (Continued) Valid NC/NCI Combinations - Unbundled Distribution Loops

Network Channel Code	NCI Code		Description
	End-User NI	Qwest FCP-NI	
LXBN	02DU5.003	02QE5.003	Distribution Loop, Building Wiring, without loading coils, Spectrum Management Class 3 per ANSI T1.417
LXBN	02DU5.004	02QE5.004	Distribution Loop, Building Wiring, without loading coils, Spectrum Management Class 4 per ANSI T1.417
LXBN	02DU9.005	02QE9.005	Distribution Loop, Building Wiring, without loading coils, Spectrum Management Class 5 per ANSI T1.417
LXBN	02DU9.006	02QE9.006	Distribution Loop, Building Wiring, without loading coils, Spectrum Management Class 6 per ANSI T1.417
LXBN	02DU5.007	02QE5.007	Distribution Loop, Building Wiring, without loading coils, Spectrum Management Class 7 per ANSI T1.417
LXBN	02DU5.008	02QE5.008	Distribution Loop, Building Wiring, without loading coils, Spectrum Management Class 8 per ANSI T1.417
LXBN	02DU9.009	02QE9.009	Distribution Loop, Building Wiring, without loading coils, Spectrum Management Class 9 per ANSI T1.417
UA--	02DUM.LS5	04QRM.L05	Line Shared distribution Loop, Customer Provided Splitter, Spectrum Management Class 5 per ANSI T1.417 and one POTS Channel.

KEY
FCP = Field Connection Point
NI = Network Interface

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4. Field Connection Point (FCP)

4.1 Field Interconnection

Certified Local Exchange Carriers (CLECs) may interconnect with Qwest at several locations. This chapter describes the Point of Interconnection (POI) and Network Interface (NI) used in the field away from a Qwest Wire Center. This POI or NI is called the Field Connection Point (FCP).

The FCP is a cabinet or pedestal located near the loop Feeder/Distribution Interface (FDI) or equivalent. There may be some circumstances where more than one such enclosure may be required.

The FDI provides access to a loop and permits field access to Unbundled Feeder Loops (UFLs) and Unbundled Distribution Loops (UDLs) as described in Chapter 2. The FDI is sometimes known as a Serving Area Interface (SAI).

Figure 4-1 illustrates a typical arrangement. In this illustration, the UFL and UDL are shown separately with FDI jumpers in place. The figure also shows a CLEC's equipment or facility connected to the FCP by a CLEC-provided cable.

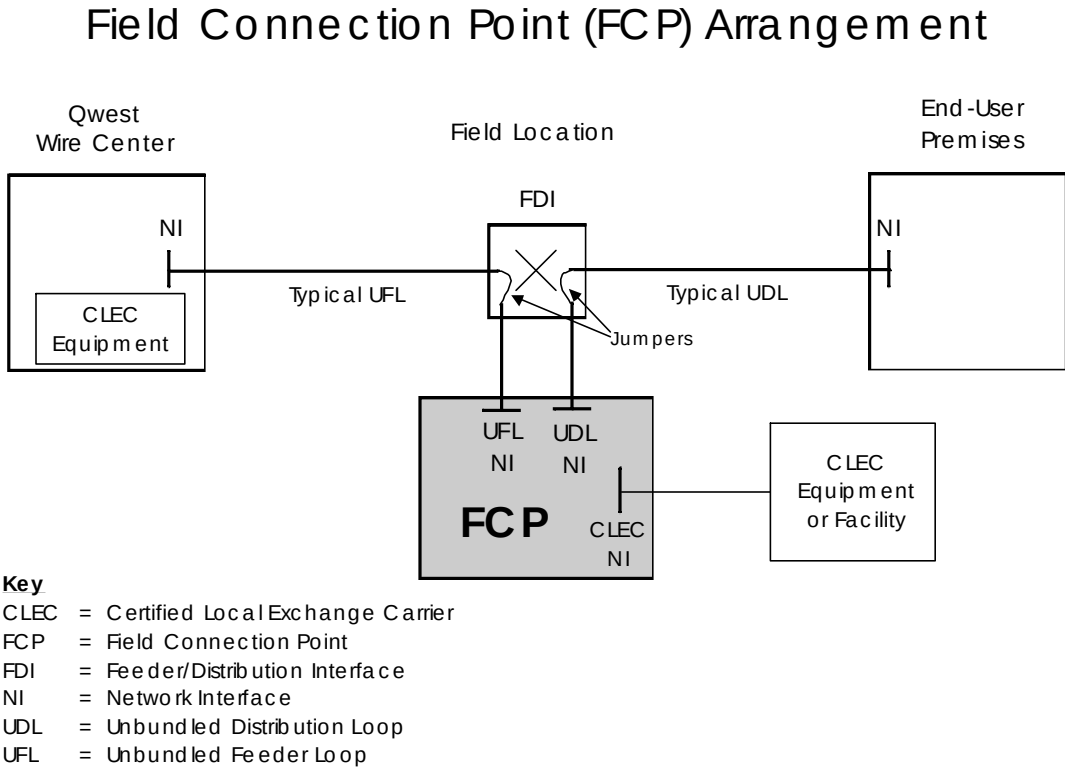
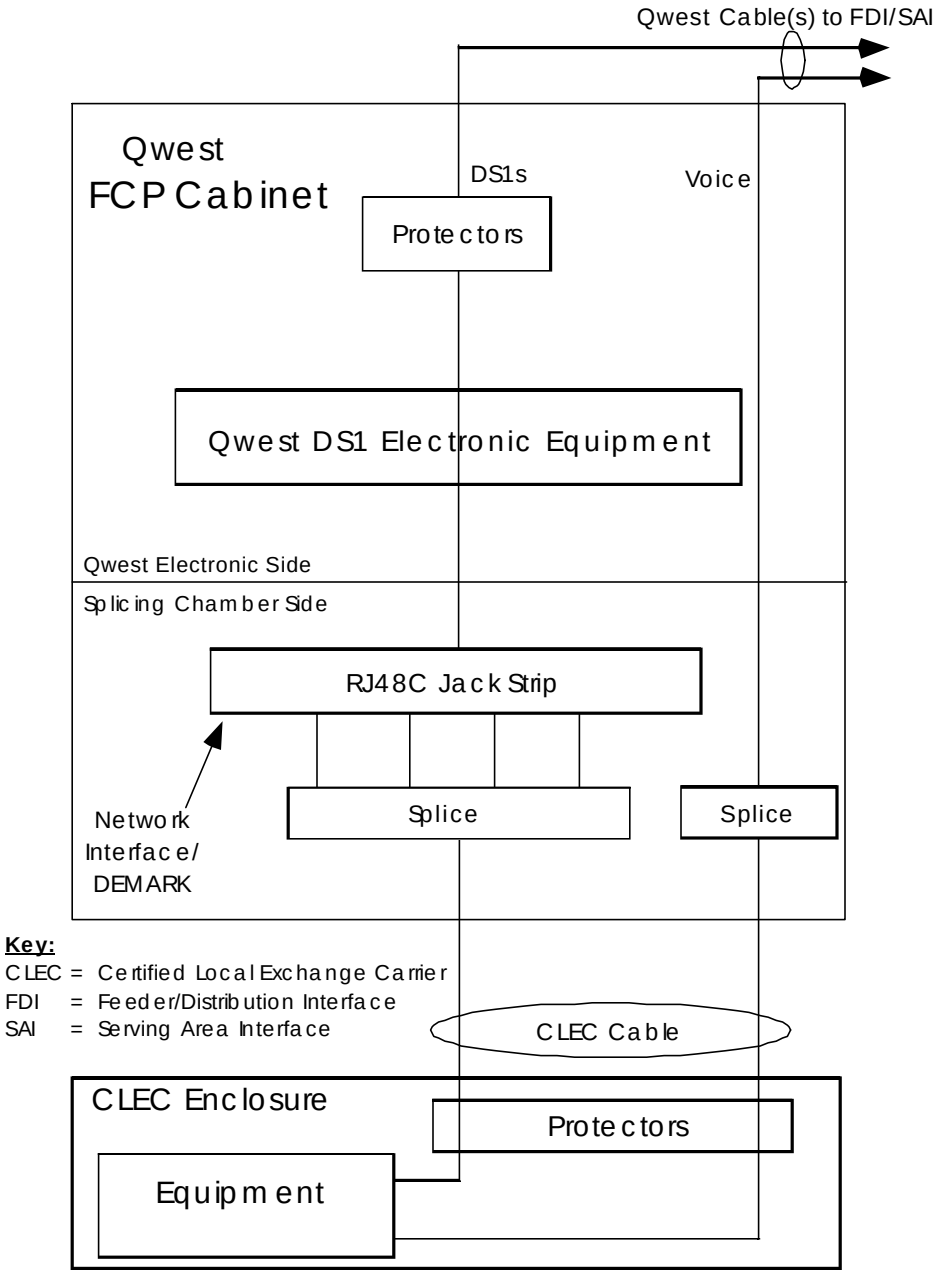


Figure 4-1 Typical FCP Arrangement

The FCP may be shared by multiple CLECs.

Figure 4-2 illustrates a conceptual FCP cabinet and the connections with the CLEC's equipment.



Note: Splices normally use one of several types of commonly available connector modules.

Figure 4-2 Conceptual FCP Cabinet Arrangement

The figure illustrates both DS1 and analog voice paths through the cabinet. The cabinet is divided with separate space for Qwest electronic equipment and for the splices and RJ48C DS1 jacks. Both Qwest and the CLEC will provide protectors to protect their own equipment.

The size and configuration of the cabinet may vary depending on the specific application. Additional information about the FCP and interconnection may be specified for a specific site as provided in individual contracts between Qwest and co-providers.

4.2 Unbundled Feeder Loop Network Interface

For interfaces where the space is not environmentally controlled, the DS1 UFL will be terminated on a RJ48C jack (receptacle) in an FCP as illustrated in Figure 4-2. The jack provides test access at the NI.

The signal presented to the CLEC at the NI will be a non-powered DS1 signal. This applies for all methods of transport used to deliver the DS1 to the FCP NI. All Qwest transport equipment employed in moving a UFL signal from the Central Office to the FCP, for example; High-Bit Rate Digital Subscriber Line (HDSL), T-1 Carrier or optically based equipment shall be on the network side of the NI.

The signal at the NI is represented by the Network Channel Interface (NCI) code 04QE9.11 which has the accepted definition: *Field Location Manual Cross-Connect Termination with no Sub-rating Capability, DS1-to-DS1; this code may or may not meet DS1 Signal Levels as specified by GR-342-CORE*. For Qwest installations, the signal will always meet DSX-1 templated signals as specified in ANSI Standard T1.102. See Chapter 3 for information on NCI codes.

The NI is similar to the 04QB9.11 NI described in PUB 77386. The primary difference is that the FCP NI is located in the field and not in a Wire Center (central office). The type of cross-connect may be physically different. Chapters 8 and 15 of PUB 77386 should be consulted for further information concerning the 04QB9.11 NCI and related design issues.

This NI **IS NOT** related to the DS1 NI defined by the NCI code of the form *04DU9*. The NCI code of the form *04DU9* applies only to NIs at End-User (EU) locations. Further information about this NI may be found in PUB 77375, *1.544 Mbit/s Channel Interfaces.*

The "QE" NI is more closely related to the NCI of the form *04DS9*, but it employs mechanical interfaces that are typical of EU installations. The signal at the Qwest interface will be a DSX-1 templated signal as described in GR-342-CORE or ANSI T1.102-1993, *Digital Hierarchy - Electrical Interfaces*.

The CLEC shall provide equipment (as required) to transport the DS1 within their network. . The CLEC shall determine any needs for equipment beyond the Qwest NI.

Some factors critical to the analysis include:

- The cable between the FDI and the FCP NI is 24 gauge cable. See Section 4.4 for additional information.
- The NI cross-connect presents a standard DSX-1 templated signal.
- The type and gauge of cable provided by the CLEC to connect their equipment to the FDP NI must be considered.
- The capabilities of the CLEC's equipment must be considered.

Qwest will provide design information (e.g., cable length and gauge) from the last piece of electronic equipment if requested by the CLEC. This electronic equipment may be located in the FCP enclosure or in a nearby enclosure. (ed. Note: as we use standard NI's do we need these points??

The design of these DS1 NIs may require some joint design work or exchange of information between the CLEC and Qwest if manual Line Buildout (LBO) options must be set on their respective equipment.

For interfaces where the FCP space is environmentally controlled, the DS1 UFL will be terminated using a traditional DSX-1 interface. Examples of environmentally controlled space include Environmentally Controlled Vaults (ECV), Environmentally Controlled Cabinets (ECC) and most equipment rooms. The signal at this type of NI is represented by the Network Channel Interface (NCI) code of the family 04DS9. The signal and the mechanical interface shall comply with ANSI Standard T1.102. Further information about this NI may be found in PUB 77375, *1.544 Mbit/s Channel Interfaces.*

4.3 Unbundled Distribution Loop Network Interface

The NI for the UDL will be a splice located in the FCP. The splice will typically use modular connectors. NCI codes for this NI are in Chapter 3.

4.4 Cable to Feeder/Distribution Interface Description

The cable(s) between the FDI and the FCP is a 24 gauge copper cable. This cable is normally less than 40 feet long. The length is dependent on the relative locations of the FDI and FCP. Actual lengths can be obtained from Qwest if needed.

Pairs for UFL are available in 100 pair multiples. These will be subdivided into two 50-pair groups for the purposes of DS1 transmit and receive. Qwest will assign these two 50-pair groups to non-adjacent binder groups within the cable whenever possible. The CLEC should maintain this non-adjacent binder group integrity in their cable or facility.

Pairs for UDL are also available in 100 pair multiples. Qwest will assign these pairs using normal engineering principles. Some binder groups in the cable(s) may be reserved for UFL applications.

UFL pairs will be terminated on the cross-connect device described in Section 4.2.

UDL pairs will be spliced directly to the cable provided by the CLEC to connect to their equipment or facility.

The UFL and UDL connections in the FCP must be ordered and connections made prior to ordering any UFL or UDL elements. Qwest will provide cable and pair information to be used when ordering UFLs and UDLs.

4.5 Cable to CLEC's Equipment or Facility

The CLEC must provide electrical protection for the network at their equipment location. These protectors must meet industry standards and be designed to prevent foreign voltages and sneak current from entering the Qwest loop network. Qwest reserves the right to inspect these protector installations.

4.6 Remote Collocation

Remote Collocation allows CLECs to physically collocate in a Qwest Remote Premises that is at a distance from a Qwest Wire Center, Central Office building. Such Remote Premises include controlled environmental vaults, controlled environmental huts, cabinets, pedestals and other remote terminals.

Remote Collocation allows CLECs to place their equipment in Qwest's outside plant, where space is available. The purpose of interconnecting with Qwest in this manner is to access Unbundled Sub-Loop Elements. Upon request, Qwest will perform a feasibility study to determine if space is available at the specific Remote Collocation Site.

4.6.1 Joint Planned Remote Collocation:

This type of Remote Collocation offers space in a Remote Cabinet on a shelf incremental level. Qwest will construct the amount of space requested by responding CLECs. The space will include access to power, heat dissipation, terminations for feeder and distribution facilities to the Feeder Distribution Interface (FDI). Figure 4-3 illustrates a conceptual Joint Planned, Remote Cabinet.

4.6.2 Leased Space Remote Collocation:

This type of Remote Collocation takes place when CLECs wish to Remote Collocate in existing space. Any equipment placed by a CLEC must meet the requirements of the particular Remote Site, e.g., protection, termination , heat dissipation requirements, etc.

4.6.3 Remote Collocation at VDSL site

Where Qwest has deployed VDSL, CLEC’s can collocate to the specified remote premises. However, the CLEC can only place equipment that is NEXTLEVEL VDSL equipment and will not interfere with the VDSL equipment.

4.6.4 Adjacent Remote Collocation

Adjacent Remote Collocation allows CLEC to physically collocate equipment in or on a non-contiguous Qwest property adjacent to a Qwest Remote Premises (i.e. Remote Terminal, FDI or CEV) for the purpose of interconnecting with Qwest to purchase sub-loop elements

4.7 Intra-Building Cable Distribution Loop

The Intra-Building Cable Distribution Loop is a 2 wire or 4 wire facility that extends from a building terminal or other accessible terminal that services one building on a property to the end-users network interface device (NID). Intra-Building Cable Distribution is also known as Inside Wire (IW) by the industry (i.e. Telcordia).

A CLEC obtains access to this Sub-Loop Unbundled Elements at the established Multi-Tenant Environment-POI (MTE-POI) arrangement.

4.8 MTE POI

A Multi-Tenant Environment-POI is a network interface that occurs when a CLEC obtains access to the Unbundled Distribution Loop or Intra-Building Cable Loop from a MTE Terminal. The CLEC must create the cross-connect field at the building terminal that will allow the CLEC to connect its facilities to Qwest's Sub-loops. The demarcation point between CLEC and Qwest's facilities is known as the MTE-POI. Existing NC/NCI codes will apply for the MTE-POI network interfaces.

The CLEC is responsible for working with the MTE building owner to determine where to terminate its facilities within the MTE.

Access to Distribution Loops or Intra-building Cable Loops at an MTE Terminal within a non-Qwest owned MTE is done through a MTE-POI. Remote Collocation is not necessary because a CLEC can access the Sub-loop without placing facilities in a Qwest Premise.

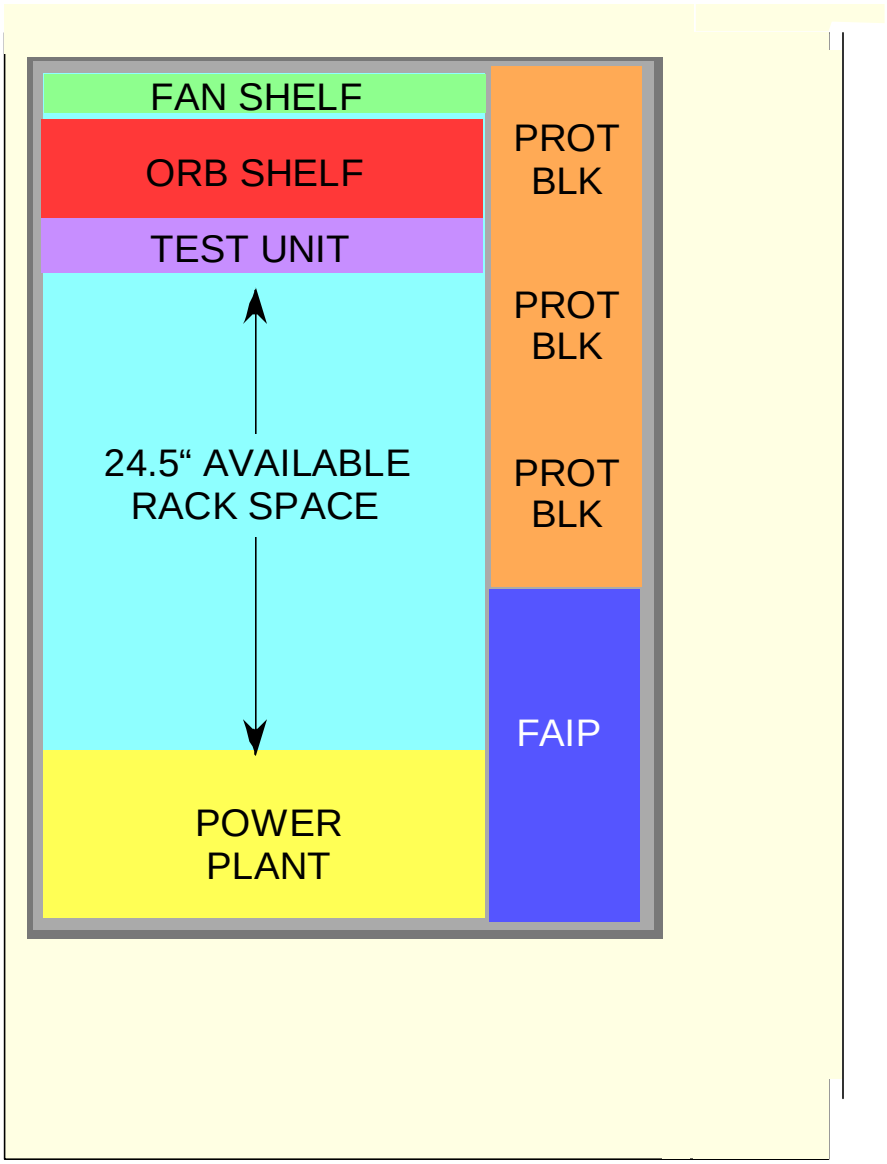


Figure 4-3 Conceptual Remote Collocation Cabinet Layout

CONTENTS

5. Definitions

5.1 Acronyms

AMI	Alternate Mark Inversion
ANSI	American National Standards Institute
B8ZS	Bipolar with 8 Zero Substitution
DS0	Digital Signal Level 0 (64 kbit/s) (1 voice channel)
DS1	Digital Signal Level 1 (1.544 Mbit/s)
DSX-1	Digital Signal Level 1 Cross-connect
EVC	Environmentally Controlled Vault
ESF	Extended Super Frame
FCP	Field Connection Point
FDI	Feeder/Distribution Interface
HDSL	High-Bit Rate Digital Subscriber Line
NC	Network Channel
NCI	Network Channel Interface
NI	Network Interface
SAI	Serving Area Interface
SF	Superframe Format

5.2 Glossary

Alternate Mark Inversion (AMI)

A one (mark) pulse which is the opposite polarity as its predecessor.

American National Standards Institute (ANSI)

An organization supported by the telecommunications industry to establish performance and interface standards.

Bipolar With 8 Zero Substitution (B8ZS)

Bipolar 8 Zero Substitution is an application of BPRZ and is an exception to the Alternate Mark Inversion (AMI) line-code rule. It is one method of providing bit independence for digital transmission by providing a minimum 1s density of 1 in 8 bits.

Carrier

An organization whose function is to provide telecommunications services. Examples are: Local Exchange Carriers, Interexchange Carriers, Cellular Carriers, etc.

Central Office (CO)

A local switching system (or a portion thereof) and its associated equipment located at a wire center.

Channel

An electrical or photonic, in the case of fiber optic based transmission systems, communications path between two or more points of termination.

Digital Hierarchy Level

The level in the digital hierarchy. The levels and the respective bit rates are:

Level	Bit Rate	Level	Bit Rate
DS0	64.0 kbit/s	DS3	44.736 Mbit/s
DS1	1.544 Mbit/s	DS4NA	139.264 Mbit/s
DS1C	3.152 Mbit/s	DS4	274.176 Mbit/s
DS2	6.312 Mbit/s		

Extended Superframe (ESF) Format

An Extended Superframe consists of twenty-four consecutive DS1 frames. Bit one of each frame (the F-bit) is time shared during the 24 frames to describe a 6 bit frame pattern, a 6 bit Cyclic Redundancy Check (CRC) remainder, and a 12 bit data link. The transfer rate of each is 2 kbit/s, 2 kbit/s, and 4 kbit/s respectively.

Facilities

Facilities are the transmission paths between the demarcation points serving customer locations, a demarcation point serving a customer location and a Qwest Central Office, or two Qwest offices.

Impedance

The total opposition offered by an electric circuit to the flow of an alternating current of a single frequency. It is a combination of resistance and reactance and is measured in ohms.

Multiplexer (Mux)

An equipment unit to multiplex, or do multiplexing: Multiplexing is a technique of modulating (analog) or interleaving (digital) multiple, relatively narrow bandwidth channels into a single channel having a wider bandwidth (analog) or higher bit-rate (digital). the term Multiplexer implies the demultiplexing function is present to reverse the process so it is not usually stated.

Network Channel (NC) Code

The Network Channel (NC) code is an encoded representation used to identify both switched and non-switched channel services. Included in this code set are customer options associated with individual channel services, or feature groups and other switched services.

Network Channel Interface (NCI) Code

The Network Channel Interface (NCI) code is an encoded representation used to identify five (5) interface elements located at a Point of Termination (POT) at a central office or at the Network Interface at a customer location. The Interface code elements are: Total Conductors, Protocol, Impedances, Protocol Options, and Transmission Level Points (TLP). (At a digital interface, the TLP element of the NCI code is not used.)

Premises

Denotes a building or portion(s) of a building occupied by a single customer or End-User either as a place of business or residence.

Superframe Format (SF)

A superframe consists of 12 consecutive DS1 frames. Bit one of each frame (the F-bit) is used to describe a 12-bit framing pattern during the 12 frames.

Wire Center

A building in which one or more central offices, used for the provision of local exchange services, are located.

CONTENTS

Chapter and Section **Page**

6. References

6.1 American National Standards Institute Documents

ANSI T1.102-1993 *Digital Hierarchy Electrical Interfaces.*

ANSI T1.107-1995 *Digital Hierarchy - Formats Specifications.*

ANSI T1.223-1997 *Information Interchange — Structure and Representation of Network Channel (NC) and Network Channel Interface (NCI) Codes for the North American Telecommunications System.*

ANSI T1.403-1999 *Network-to-Customer Installation - DS1 Metallic Interface.*

ANSI T1.510-1999 *Network Performance Parameters for Dedicated Digital Services for Rates Up to and Including DS3 - Specifications.*

6.2 Telcordia Documents

GR-342-CORE *High-Capacity Digital Special Access Service Transmission Parameter Limits And Interface Combinations.* Issue 1, December 1995.

6.3 Qwest Technical Publications

PUB 77375 *1.544 Mbit/s Channel Interfaces.* Issue D, October 1995.

PUB 77384 *Interconnection - Unbundled Loop.* Issue I, June 2001.

PUB 77386 *Interconnection and Collocation for Transport & Switched Unbundled Network Elements and Finished Services.* Issue E, June 2001.

6.4 Ordering Information

All documents are subject to change and their citation in this document reflects the most current information available at the time of printing. Readers are advised to check status and availability of all documents.

Those who are not Qwest employees may order;

American National Standards Institute (ANSI) documents from:

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