

**GENERAL INTRODUCTION**  
**INSTALLATION AND MAINTENANCE**  
**VOICE AND VOICEBAND DATA CIRCUITS**

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**1. GENERAL**

**1.01** This is the first in a series of sections issued to provide transmission and signaling test considerations, requirements, limits, and procedures for installing and maintaining network voice and voiceband data circuits. Telephone company testing of circuits that terminate in customer premises outlined in these sections includes only that portion of the circuit up to the network interface. The circuit testing procedure does not include customer premises terminal equipment.

**1.02** This practice is reissued for the following reasons:

- (a) Deletes all references to tariff considerations, Section 313-100-101
- (b) Deletes reference to circuits having customer premises centrex (centrex CU)
- (c) Corrects Fig. 1, 2, 3, 4, 5, and 7 by showing correct position of network interface (NI) and providing necessary symbols for optional arrangements.

Revisions arrows are used to emphasize the more significant changes.

**1.03** It is strongly recommended that the Bell System Practice (BSP) user become familiar with the current installation and maintenance philosophy as outlined in these sections. To meet telephone company responsibilities as expressed or implied in the applicable tariff while at the same time avoiding unnecessary or uncompensated cost, it is imperative that all procedures be administered as outlined in these sections.

**2. BELL SYSTEM PRACTICES DIVISION CONTENT**

**A. Transmission and Signaling Considerations and Tests**

**2.01** Section 313-110-100 covers the following information concerning transmission considerations and tests:

- (a) Purpose of transmission tests
- (b) Transmission terminology
- (c) Testing implications (channels vs end-to-end service)
- (d) Common tests

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## SECTION 313-100-100

- (e) Customer premises physical interface considerations
- (f) Measurement considerations.

**2.02** The information in Section 313-110-101, covering signaling considerations and testing, is as follows:

- (a) Purpose of signaling tests
- (b) Signaling terminology
- (c) Channel signaling tests vs end-to-end service
- (d) Customer premises physical signaling interface
- (e) Common signaling tests
- (f) Signaling measurement considerations.

### **B. Installation Test Requirements and Limits**

**2.03** Section 313-120-100 outlines the transmission installation test requirements and limits as follows:

- (a) Transmission testing arrangements
- (b) Overall tests requirements
- (c) Forms and records
- (d) Test limits.

**2.04** Section 313-120-101 contains signaling installation test requirements and limits as follows:

- (a) Signaling test arrangements
- (b) Overall tests requirements
- (c) Forms and records
- (d) Signaling test limits.

### **C. Transmission and Signaling Test Procedures**

**2.05** Section 313-130-100 covers the transmission and signaling test procedures for voice bandwidth circuits extending from one central office

(CO) to another (CO-CO). The test information and procedures are as follows:

- (a) Central office responsibilities
- (b) Procedure selection
- (c) Test details
- (d) Central office test procedures
  - Switched Access Remote Testing System (SARTS) testing
  - Manual testing
- (e) Trouble testing procedures
- (f) Test equipment recommendations.

**2.06** Section 313-130-101 provides transmission and signaling test procedures for voice bandwidth circuits terminated at customer premises locations (network channel termination) and telephone company wire centers. The test procedure information is presented as follows:

- (a) Central office responsibilities
- (b) Procedure selection
- (c) Test details
- (d) Central office test procedures
  - SARTS testing
  - Manual testing
- (e) Customer premises testing
- (f) Trouble testing procedures
- (g) Test equipment recommendations.

**2.07** Section 313-130-102 provides transmission and signaling test procedures for voice bandwidth circuits provided between two customer premises locations. The procedure information is presented in the same format as shown in paragraph 2.06.

## **3. CIRCUIT DEFINITIONS**

**3.01** The following paragraphs contain descriptions of several common types of special ser-

vice circuits. These general circuit types are the criteria for selecting the appropriate section for performing installation and maintenance tests (Part 4). These circuits will fall into one of three types:

- One type of circuit extends from a customer premises (CP) network interface (NI) appearance to a telephone company central office. In this section, these will be referred to as CP-CO circuits.
- The second type circuit is between two telephone company central offices; these are designated CO-CO circuits.
- The third type is between two customer premises network interface appearances; these will be identified as CP-CP.

**A. Two-Point Circuits**

**3.02 Access Lines to Network Switch Ports (Fig. 1):** A voice circuit configured to connect a customer premises or telephone company exchange service switching vehicle to switched network service, such as:

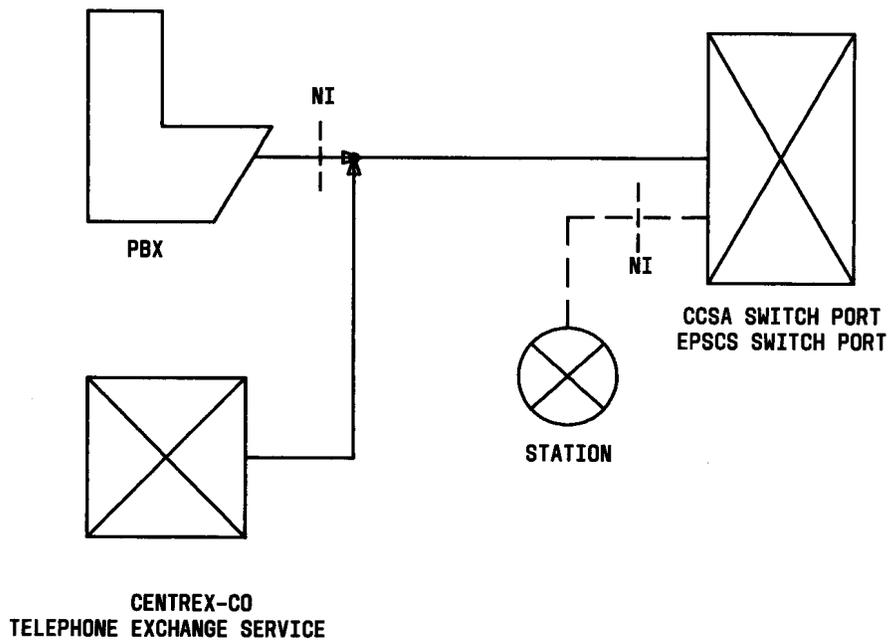
- PBX or equivalent to a Common Control Switching Arrangement (CCSA) switch port, CP-CO

- PBX or equivalent to an Enhanced Private Switched Communications Service (EPSCS) switch port, CP-CO
- Centrex to a CCSA switch port, may be CP-CO or CO-CO depending on centrex location
- Centrex to an EPSCS switch port, may be CP-CO or CO-CO depending on centrex location
- Telephone exchange service to a network switch port, CO-CO.

**3.03 Data Circuit (Fig. 2):** A transmission path similar to a basic circuit with specified technical parameters may be used to transmit point-to-point data with or without voice coordination (CP-CP).

**3.04 Direct Station Line to Network Switch Ports (Fig. 1):** A voice circuit configured to provide access to a CCSA or EPSCS network switch port from a customer premises terminal station set, or equivalent equipment (CP-CO).

**3.05 Foreign Exchange (Fig. 3):** A voice circuit configured to enable telephone exchange ser-



**Fig. 1—Access and Direct Station Lines to Network Switch Ports**

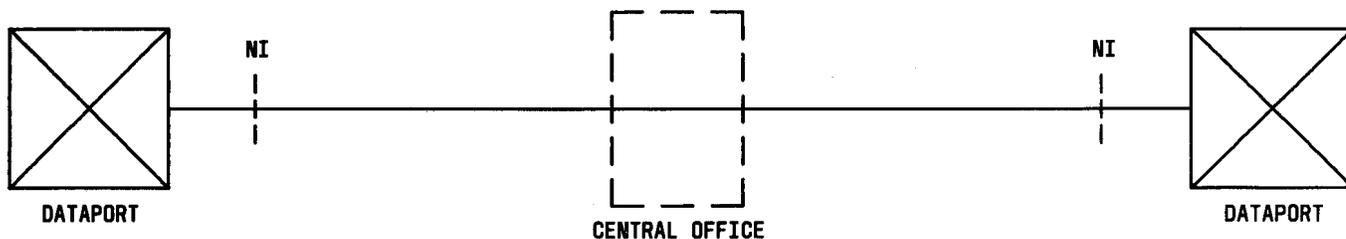


Fig. 2—Data Circuit Configuration

vice to be furnished from an exchange remote from the customer's normal exchange. The following are types of foreign exchange circuit configurations:

- Lines (CP-CO)
- PBX or equivalent trunks (CP-CO)
- Centrex trunks which may be either CP-CO or CO-CO, depending on centrex location.

**3.06 Other Common Carrier (OCC) Central Office Connection (Fig. 4):** A voice circuit configured to connect telephone company central office appearances to OCCs (CO-CP) for:

- Telephone exchange service
- Centrex
- Exchange network facilities interstate access (ENFIA) and Wide Area Telecommunications Service (WATS)
- CCSA switch port
- EPSCS switch port
- Voice bridge port
- Data bridge port
- Telephoto bridge port
- DATAPHONE® Data Communications Service.

**3.07 OCC Premises Connection (Fig. 4):** A voice circuit configured to connect an operating center of an OCC to another customer premises (CP-CP) for establishing a through path to:

- PBX, Automatic Call Distribution (ACD), or equivalent
- Tel Set, telephone system, or equivalent

- Loudspeaker, or equivalent
- Metering equipment, or equivalent
- Customer-provided communications system
- Radio transceiver
- Data equipment
- Telephoto equipment.

**3.08 OCC Voice-Grade Facility (VGF):** A voice circuit configured to establish a through path to connect two OCC operating centers (CP-CP). The VGF has no telephone company provided functions (primary or secondary) in its design, such as 2- to 4-wire conversion, signaling, or echo suppression. These functions are provided by the OCC as required.

**3.09 Off-Premises Stations (Fig. 5):** A voice circuit to connect a remotely located station, or equivalent, to a centrex, PBX, or equivalent (CP-CP).

**3.10 Attendant Services:** A voice circuit configured to connect telephone company toll operator positions with customer premises station lines, PBX trunks, or equivalent.

**3.11 Trunks Between Network Switch Ports (Fig. 6):** A voice circuit configured to interconnect two CCSA or EPSCS network switch ports (CO-CO).

**3.12 Radio Transceiver Line:** A voice circuit configured to connect customer premises terminal equipment to a radio transceiver located at another customer premises or at a telephone company serving wire center.

**3.13 Tie Trunks (Fig. 7):** A voice circuit configured to interconnect customer switching vehicles, or equivalents, such as:

- PBX to PBX (CP-CP)

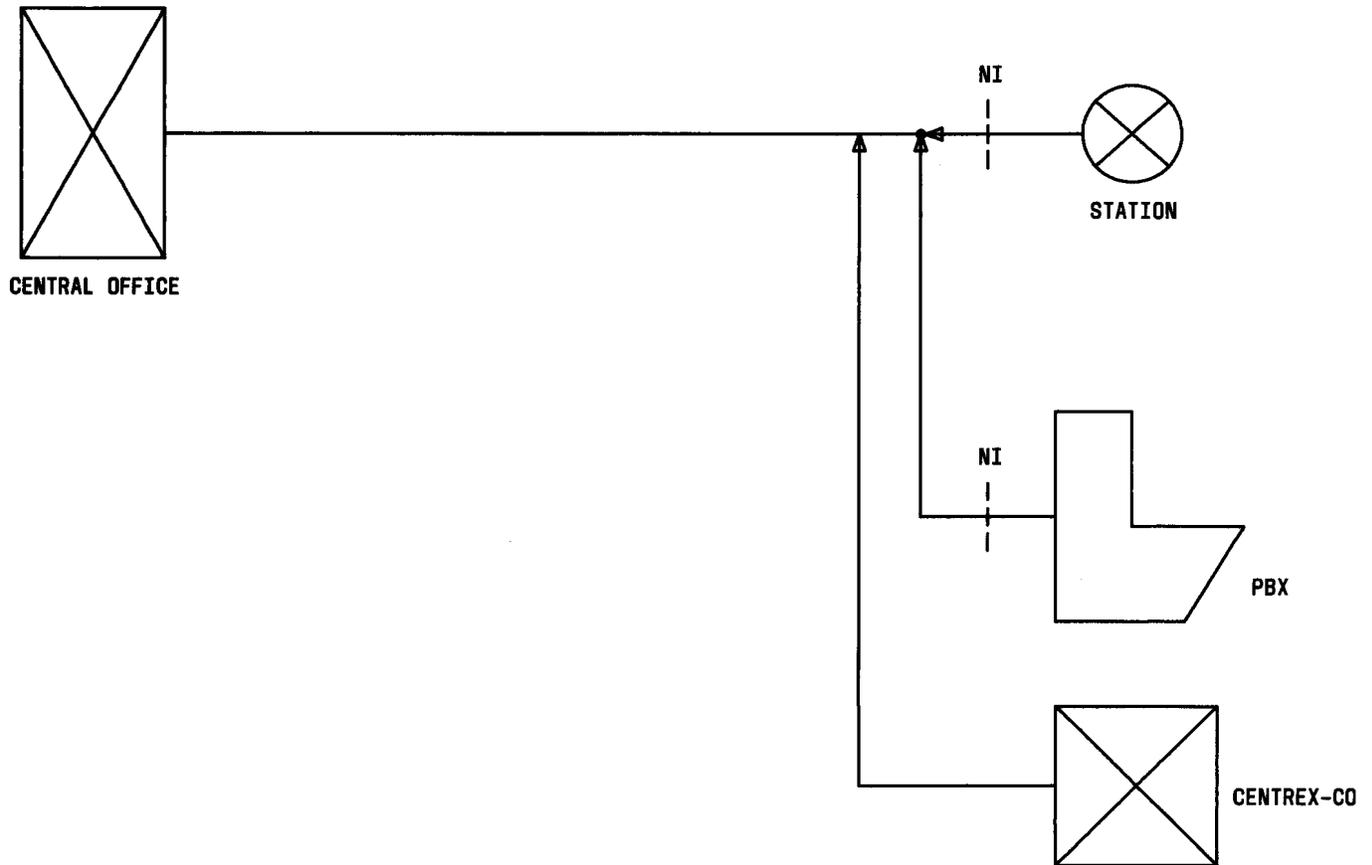


Fig. 3—Foreign Exchange Configuration

- PBX to centrex (CP-CO)
- Centrex to centrex (CO-CO).

- (c) Summation
- (d) Broadcast polling.

**B. Multipoint Circuits**

**3.14 Bridged Network Service:** A service consisting of a bridging arrangement which connects three or more voice-grade circuits to provide communications between three or more customer locations. This is accomplished by the use of bridged network arrangements located in specific telephone company offices. Circuits may also be bridged on customer premises, and customer premises bridges may be connected to a bridged network. Such bridges are considered terminal equipment. There are four types of bridged network arrangements:

- (a) Conference
- (b) Broadcast

**Note:** A multipoint circuit is made of both CO-CO and CP-CO segments.

**3.15 Conference Networks:** The conference network consists of three or more stations connected together so that voice transmissions from any one station are received by all other stations. This network will primarily be used for voice type service but may include various degrees of voice conditioning parameters.

**3.16 Broadcast Networks:** The broadcast network consists of a single master station which transmits to two or more remote stations. There is no

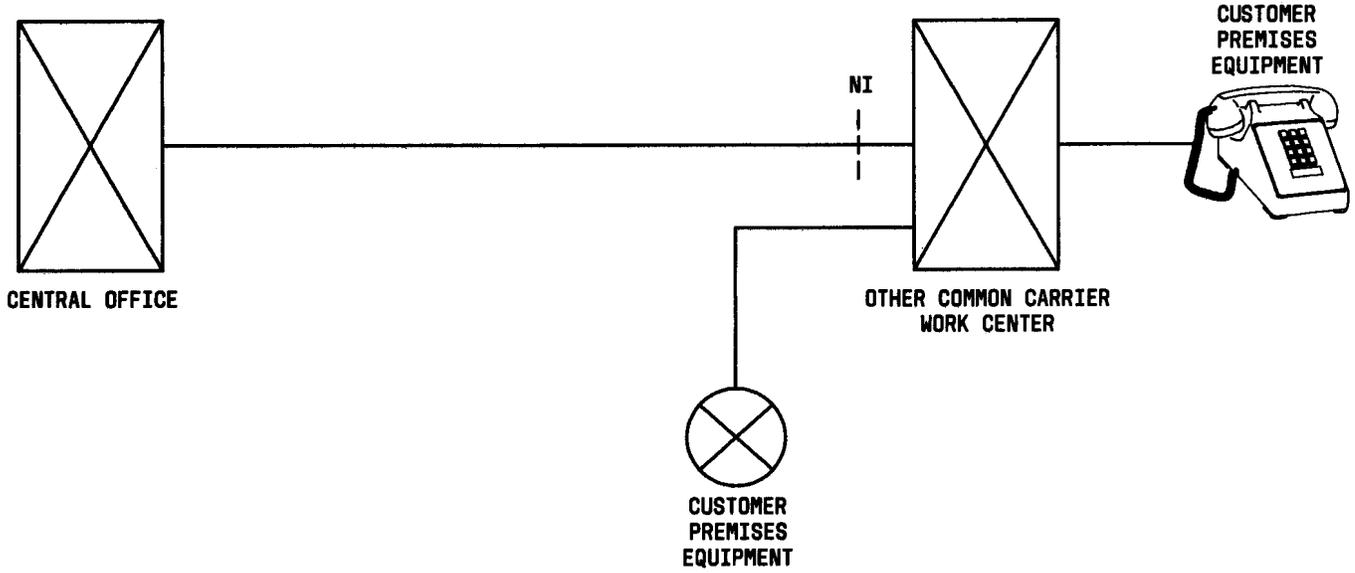


Fig. 4—Other Common Carrier Central Office Connecting and Premises Connecting Configuration

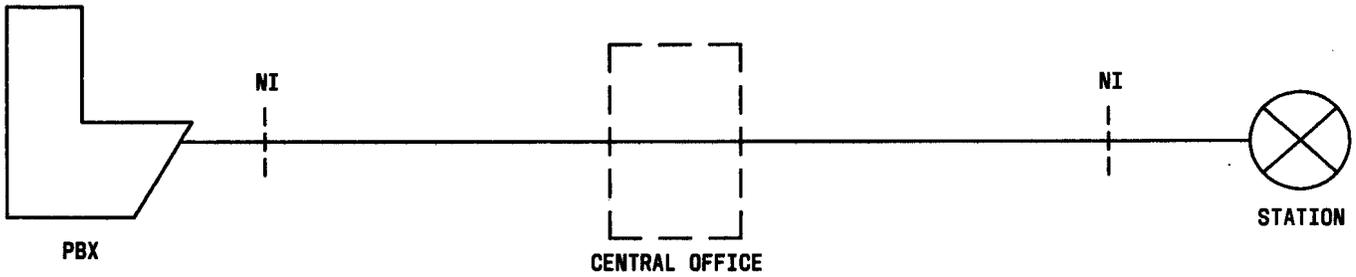


Fig. 5—PBX Off-Premises Station Configuration

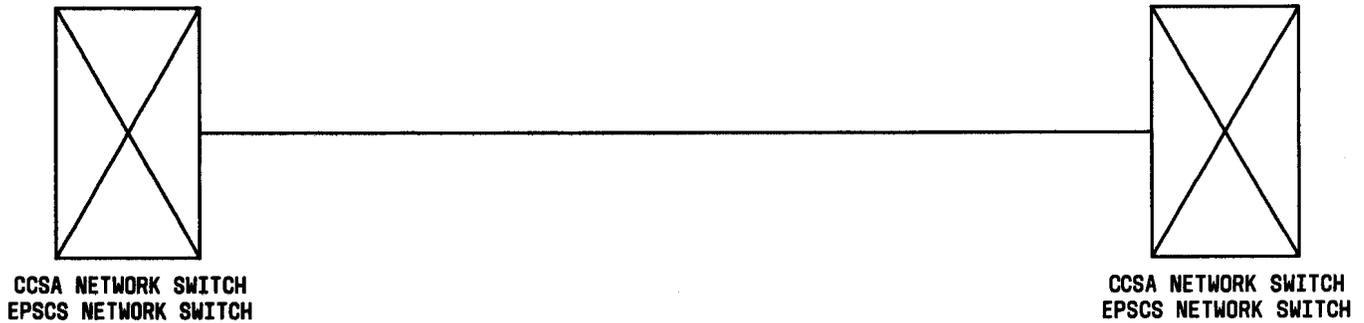


Fig. 6—CCSA and EPSCS Network Switch Port Configuration

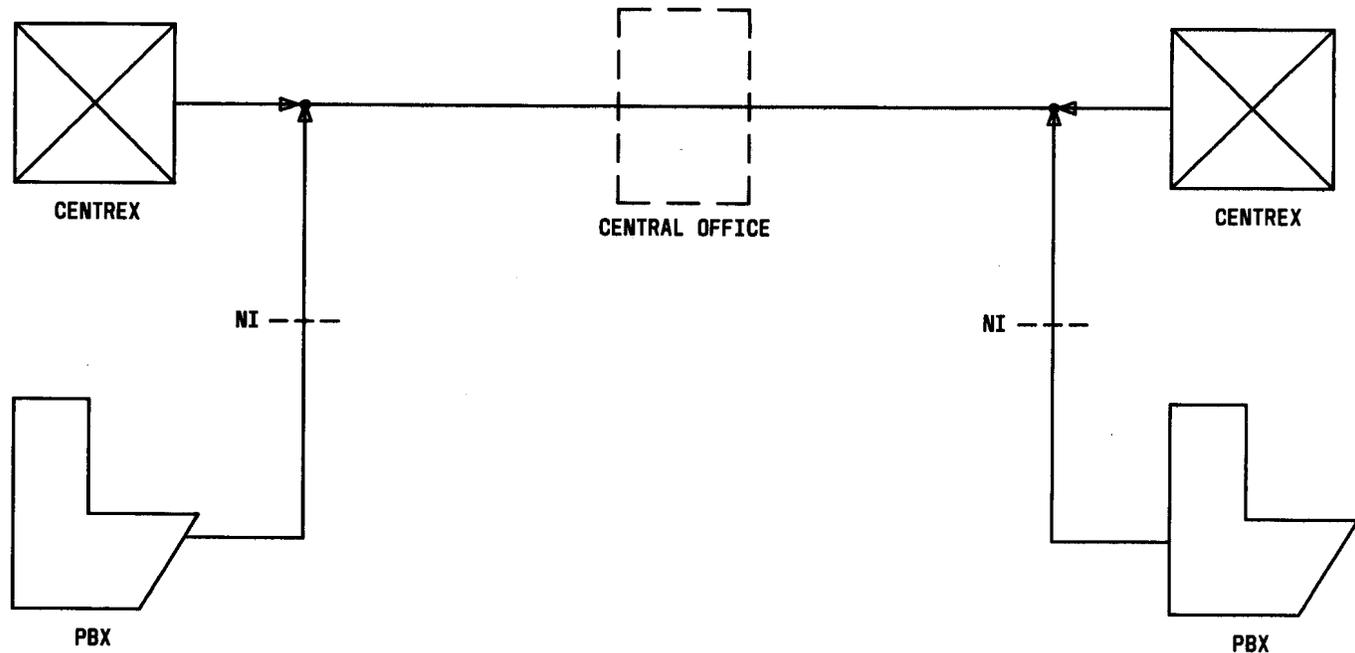


Fig. 7—Tie Trunk Configuration

return path from the remote stations to the master station, and the remote stations cannot communicate with each other. This network will be supportive of both voice and data communications and may include various categories of data or voice conditioning parameters.

**3.17 Summation Network:** A summation network may be viewed as the opposite of a broadcast network (all transmissions are from remote stations to the master station).

**3.18 Broadcast Polling Network:** The broadcast polling network consists of a single master station and two or more remote stations associated with data modems. Transmissions from the master station are received by all remote stations which return transmissions only to the master station.

#### 4. BSP SECTION SELECTION AND USE

##### A. General Considerations

**4.01** When voice and voice-grade data circuits are to be installed, maintained, or changed, certain general considerations are important. Various sections in this division cover several important as-

pects of circuit planning and testing. In order to save time, experienced craft personnel may wish to proceed directly with test procedures and requirements. However, it is strongly recommended that unless service is affected, BSP sections are selected per the following paragraphs. This is to assure that each craft person remains thoroughly familiar with requirements for performing the tests.

**4.02** The user may choose from one of the three following applications:

- (1) Customer initiated installation
- (2) Telephone company initiated
- (3) Trouble analysis—maintenance.

**4.03** Customer initiated installation is covered by service orders. A person initiating service order analysis should have a thorough knowledge of transmission and signaling test considerations covered in Sections 313-110-100 and 313-110-101, respectively.

**4.04** Telephone company initiated facility changes may be classified as either circuit order work analysis (planning) or the result of routine testing.

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When circuit order work analysis is performed, transmission and signaling test considerations (Sections 313-110-100 and 313-110-101) should be followed for any routine testing.

**4.05** For trouble analysis and maintenance, the considerations found for transmission tests (Section 313-110-100) and signaling tests (Section 313-110-101) should be adhered to.

**B. Test Procedures and Requirements**

**4.06** The test procedures for voice and voiceband data circuits are divided into:

- (1) The type of circuit (Part 3) to be tested
- (2) The type of testing to be performed.

Installation requirements and limits are either transmission or signaling test affecting.

**4.07** One of the following sections contains the appropriate transmission and signaling test procedures for the type to be tested:

- (a) Section 313-130-100, procedures for circuits terminated between two telephone company wire centers (CO-CO)
- (b) Section 313-130-101, procedures for circuits terminated between a customer premises location and telephone wire center (CP-CO)
- (c) Section 313-130-102, procedures for circuits terminated between two customer premises locations (CP-CP).

**4.08** Transmission installation test requirements and limits are found in Section 313-120-100. Signaling installation test requirements and limits are given in Section 313-120-101.

**5. REFERENCES**

**5.01** The following sections contain additional information concerning voice and voiceband data circuits and/or facilities.

<b>SECTION</b>	<b>SUBJECT</b>
179-100-100	Transmission and Signaling Leads
179-100-3ZZ	D Channel Bank Signaling Compatibility
 <b>DIVISION/LAYER</b>	
179-36Y-ZZZ	F-Type Signaling System
179-4YY-ZZZ	G-Type Signaling System
332-YYY-ZZZ	E6 and V4 Repeaters
332-912-ZZZ	Metallic Facility Terminal (MFT)
356-YYY-ZZZ	Analog Multiplex Terminal Equipment
358-YYY-ZZZ	L1 Carrier System and Associated Equipment
359-YYY-ZZZ	L3, L4, L4S, L5, and L5E Carriers
362-3YY-ZZZ	N1, O, and ON Carrier Systems
363-2YY-ZZZ	Digital Subscriber Carrier System
365-8YY-ZZZ	T1 Carrier Systems