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Outside Plant Construction and Maintenance

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CABLE TESTING—GENERAL

GENERAL RULES FOR USING IDENTIFICATION TONE

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1. GENERAL

1.01 This section outlines the general rules to be followed in applying identification tone to cable conductors, and indicates the methods of detecting tone at sheath openings, splices or terminations.

1.02 Before sending tone in a working cable determine whether the cable contains repeater operated voice-frequency or carrier toll circuits, or any special circuits such as radio program, teletypewriter or other types of circuits which require special handling. Such circuits will be referred to as "Special Circuits" in the various cable testing sections.

2. SOURCES OF IDENTIFICATION TONE

2.01 The identification tone is classified as audible or inaudible, depending on whether or not it can be heard with an ordinary telephone receiver. The tone from the 11A oscillator and the 20C, 43A and 76-type test sets is audible. The tone from the 72A test set is a higher frequency tone and is inaudible.

2.02 **20C Test Set:** Grounded tone from a 20C test set should not be used for identification purposes in a working cable. The 20C set equipped with an approved network to filter and limit the output, is sometimes used in toll cables on a non-grounded basis.

2.03 **43A Test Set:** Tone from posts 1 and 2 is generally used for identification. The high level tone from posts 1 and 5 should not be used as a grounded tone for identification in a working cable, except as required with the 79-type test set. The high level tone can be used if non-grounded.

2.04 **76-Type Test Set:** Tone from the LOW and GND (ground) posts is generally used for identification. Tone from the GND and HIGH posts should not be used as a grounded tone for identification purposes in a working cable, except as required with the 79-type test set. The high level tone can be used if sent non-grounded.

2.05 **Method of Applying Tone:** There are two ways of sending audible tone on conductors:

(a) **Grounded Tone:** The tone source is connected through a condenser to the conductor under test, and to ground. This method is generally used in subscriber and inter-office trunk cables and in short quadded cables.

(b) **Non-grounded Tone:** The tone source is connected between the two conductors of a pair, two pairs of a quad, or between single conductors from the two pairs of a quad. This method is generally used in long toll cables.

3. PRECAUTIONS

3.01 Audible tone should not be sent on a busy pair or quad.

3.02 **Coaxial, Video, J or K Carrier Circuits:** Tone **must not** be connected to a working coaxial, video pair, or to a spiral-four disc-insulated quad unless the circuits have been taken out of service or rerouted, and the power supply, if any, has been disconnected.

3.03 **Other Carrier Circuits:** Inaudible tone from the 72-A test set may be applied in identifying other types of carrier circuits.

3.04 **Radio Circuits:** If audible identification tone must be sent in a cable containing radio program circuits, it is preferable to use the tone from the 76-type test set rather than tone from either the 20C or the 43A sets.

3.05 **Dial Circuits:** When sending audible tone in a cable containing dial subscriber circuits, it is advisable to send tone on the conductor that is used for the ring side of

the circuit. The tip side of the circuit may have such low resistance to ground that detection of the tone may be impossible.

3.06 **Battery Feeders:** Care must be taken in using tone for identifying conductors used as battery feeders. Sending grounded tone on such pairs may introduce noise in the extensions from the P.B.X. supplied by the battery feeders.

3.07 **Teletype, Electric Power Metering and Remote Control Circuits:** Cable conductors are used for many purposes other than telephone circuits. Serious interference may be caused by testing operations on the circuits listed above. Pairs or quads used for such circuits are specially marked at the main frame and are indicated on the transfer sheets. Local routines must be followed in working on such conductors.

4. AUDIBLE TONE FROM A SPLICE OR SHEATH OPENING

4.01 **Toll and Other Special Circuits:** Before applying audible tone at a splice or sheath opening the special circuits should first be disposed of by:

(1) Rerouting if possible.

(2) Identifying them from a termination when the circuits are free and then transferring the pairs.

(3) Segregating the special circuits in the cable by gauge, type of conductors (pairs, quads, etc.) or by color group or units in exchange cable.

4.02 **Interoffice Trunks and Subscriber Pairs:** Before connecting tone to an interoffice trunk or subscriber pair, a listening test should be made on the pair to make sure it is not busy.

5. AUDIBLE TONE FROM A TERMINATION

5.01 In cables or complements containing special circuits, identification tone must be sent from a termination where the identity of the circuits and the conductors is known. The tone is sent in accordance with the following rules:

(a) After a listening test on spare conductors and on conductors that are used for subscriber circuits or interoffice trunk circuits.

(b) After authorization has been obtained to reroute, transfer or open conductors that are used for special circuits.

6. DETECTION OF AUDIBLE TONE

6.01 There are three ways in which the audible tone on a conductor can be detected:

(a) Direct contact with the wire, terminal binding posts or springs, by using a needle point test pick or a test point connected to a listening circuit. This method is permitted only in dead cables.

(b) Direct contact with the wire, terminal binding posts or springs using a needle point test pick or a test point connected through a condenser to a listening circuit. This method is generally used in working cables or complements that do not contain special circuits.

(c) By means of a probe or exploring coil such as the 513A tool or 79-type test set and suitable amplifying apparatus such as the 107A amplifier or the audio-frequency circuit of the 71A test set. The probe and amplifier must be used in cables containing special circuits. When practicable, it should also be used in identifying subscriber circuits and interoffice trunk circuits.

7. USE OF INAUDIBLE TONE

7.01 Inaudible tone, from the 72A test set, is connected directly to working conductors, but on carrier circuits the tone output must be limited to specified values. The high-frequency tone will not operate through loading coils. Therefore, this tone cannot be used if there is a loading coil on the conductor between the sending point and the identifying point.

7.02 Inaudible tone on a conductor can be detected only by the use of a probe such as the 572A tool, and the 71A test set. This method is intended primarily for use at splices and sheath openings.

7.03 The inaudible tone may be connected to a conductor without a listening test, but conductors that are used for special circuits must not be opened unless specific authorization has been obtained. The 72A test set is not equipped with a listening circuit to determine if a circuit is in use.