

**MANUAL TRUNK TRANSMISSION TESTS**  
**USING REMOTE OFFICE TEST LINE**  
**NO. 5 CROSSBAR OFFICES**

**1. GENERAL**

**1.01** This section describes the method of making manual transmission measurements on trunks from remote offices equipped with the remote office test line (ROTL). The tests are made using a No. 5 crossbar office as the control office and the master test frame (MTF). The transmission measurements include loss and message circuit noise.

**1.02** The reasons for reissuing this section are listed below. Revision arrows are used to emphasize the more significant changes. Equipment Test List are not affected.

- (a) To add Electronic Translator System (ETS) feature.
- (b) To add Call Data Transmitter (CDT) feature.
- (c) To add paragraphs 1.19 through 1.22.
- (d) To make minor changes, as required.

**1.03** The tests covered are:

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**1.04** Transmission requirements for trunks are given on circuit layout cards, in local trunk records, or in appropriate sections.

**1.05** Local office records must be prepared to show the digits to be outpulsed from the control office to the ROTL. These digits depend upon the type of office in which the ROTL is located, the type of test to be performed, the trunk assignments, and in No. 5 crossbar offices, the route translation relay cross-connections in the ROTL office.

**1.06** When making loss measurements, the transmission loss indicated by the transmission measuring set (TMS) meter includes the loss of the connecting circuits used to complete the test connection. Hence, a corresponding correction must be applied to the meter reading to obtain the loss of the trunk under test. The connecting circuits include the access trunk, the loss of the buffer circuits in the ROTL, and the loss through the MTF and control office switching equipment.

**1.07** When making noise measurements, the loss of the connecting circuits must be added to the reading of the noise measuring set. In addition, 20 dB must be subtracted from the result to allow for the gain of the amplifier in ROTL. This amplifier is provided to increase the noise on the trunk under test to a level sufficiently above the noise on the access trunk so that the latter will have a negligible effect on the accuracy of the measurement.

**1.08** In each test, after a connection is established to the ROTL over the access trunk, subsequent transmission tests can be made without releasing the access trunk or the ROTL.

**1.09** The results of these test should be entered on the appropriate form.

**NOTICE**

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1.10 Precautions should be taken when performing these tests so that normal traffic will not be adversely affected.

1.11 Before performing message circuit noise measurements, the access trunk used for these measurements should be tested as covered in the section providing trunk transmission tests using the MTF to determine that the trunk noise does not exceed the noise immediate action limit specified for the trunk.

1.12 Access trunks containing N, O, ON, and T\_type carriers should not be used for measuring noise via a ROTL, since a significant error will be incurred. These trunks should also be avoided where possible for measurement of loss, particularly to 104-type test lines, because of possible errors being encountered.

1.13 Manual tests via ROTL can be made on trunks which have been made maintenance-busy by dialing the digit 4 as a prefix. If the remote office is step-by-step, this applies *only* to those trunks which have been made busy remotely via ROTL. If the remote office is No. 5 crossbar, it applies to trunks made maintenance busy remotely, or locally, within the office.

1.14 SD-REC1 and TMS1 keys on the test termination circuit (TTC) are in the normal position when the white line on each key is vertical. DC and DET keys are normal when the white line is horizontal.

1.15 **Lettered Steps:** A letter a, b, c, etc, added to a step number in Parts 3 and 4 of this section indicates an action which may or may not be required depending on local conditions. The condition under which a lettered step or a series of lettered steps should be made is given in the ACTION column, and all steps governed by the same condition are designated by the same letter within a test. Where a condition does not apply, all steps designated by that letter should be omitted.

1.16 The manner of selecting some circuits and test conditions at the MTF and its associated circuits varies depending on the apparatus options furnished with these circuits. Therefore, where variable means of selection are provided, precise instructions for the selection of circuits and test conditions are not given. Precise instructions for

the use of these variable means are given in Section 218-106-301.

1.17 The location statement, At MTF—, is used to refer to all apparatus located on the four basic bays of the MTF.

1.18 A statement between asterisks (\*\_\_\_\_\*) is added after action statements to clarify the function being simulated in the test procedures of Part 4.

1.19 When the office is arranged for LAMA-C or ETS, the distributors and scanners associated with the marker and trunk used in the test call must be in service or in a *maintenance-busy* condition—not in an *out-of-service* condition. To change a scanner or distributor from an *out-of-service* to a *maintenance-busy* condition, use the procedure given in the following sections for the office arrangement.

218-798-308—Taking LAMA-C Equipment Out-of-Service.

218-799-701—Taking ETS Equipment Out-of-Service.

1.20 When the trunk under test is arranged for ETS, the first completed test call from the MTF will cause the TST bit to be set in the trunk register associated with the selected trunk, enabling trunk supervisory scanning to be repeated on the FT, CS, and S1 lamps at the MTF trunk test circuit. As long as the TST bit is set in the trunk register, supervision will continue to be repeated on the lamps, even on service calls. The TST bit will remain set in the trunk register until (1) a test call is made from the MTF to another trunk, or (2) the command **STOP:TRK TST** is entered at the maintenance TTY.

1.21 When CDT (calling data transmitter) billing system is provided in the office, this trunk may or may not handle billable calls. When it is arranged for billable calls, supervisory scan points will be assigned and supervision will be repeated from the scan points on test calls to the MTF by CS and S1 lamps.

1.22 When CDT is provided, there may be several configurations in the office—single controller, dual controller with the trunk assigned to one controller, or dual controller and the trunk is assigned to both controllers. When assigned to

both controllers in a dual controller configuration, one test must be made to each controller to verify scan points for each controller.♦

## 2. APPARATUS

2.01 The apparatus required for each test is listed in Table A. The details of each item are covered in the paragraph indicated by the number in parentheses. The calibrating and operating procedures for the test sets may be found in the section covering each test set.

TABLE A

| APPARATUS                                       | TESTS |    |   |
|---|-------|----|---|
|   | A     | B  | C |
| Test Circuit (2.02 through 2.05)                | 1     | 1  | 1 |
| Transmission and Noise Measuring Circuit (2.06) | 1     | 1  | 1 |
| Transmission Measuring Set (2.07)               | 1     | 1  | 1 |
| Noise Measuring Set (2.08)                      |       | 1  |   |
| Cord (2.09)                                     | 2     | 2  | 2 |
| Cord (2.10)                                     | 1     | *1 |   |
| Cord (2.11)                                     |       | †1 |   |
| Cord (2.12)                                     |       | 1  |   |
| 322A (Make-busy) Plug                           | 1     | 1  | 1 |
| Test Receiver (2.13)                            | 1     | 1  | 1 |

\* Required when using 3C NMS.

† Required when using 3A NMS.

**Note:** ♦If another type of measuring set is used in lieu of the recommended

**set, it should be ascertained that its accuracy is as good or better than that recommended. If another type of set is used, reference should be made to the manufacturer's instruction manual for operating and calibrating procedures pertaining to the set.♦**

- 2.02 Master test control circuit, SD-25800-01.
- 2.03 MTF telephone, key, and lamp circuit, SD-25744-01.
- 2.04 Jack, lamp, and key circuit, SD-25762-01.
- 2.05 Test termination circuit (TTC), SD-96540-01.
- 2.06 Transmission and noise measuring circuit (TNM), SD-95900-01.
- 2.07 23A, 23B, 23C, or 23D transmission measuring set (TMS) J94023A, J94023B, J94023C, J94023D ♦or equivalent.♦
- 2.08 3A or 3C noise measuring set (NMS) ♦(Section 103-611-100 or 103-611-101) or equivalent, equipped with C-message and flat weighting network.♦
- 2.09 Patching cord, P3E cord, 3 feet long, equipped with two 310 plugs (3P7B cord).
- 2.10 Patching cord, P3E cord, 6 feet long, equipped with two 310 plugs (3P7A cord).
- 2.11 Patching cord, P2AE cord, 4 feet long, equipped with one 310 plug and one 289B plug (2P16A cord).
- 2.12 Patching cord, 893 cord, 6 feet long, equipped with two 360A tools (1W13B cord) and two KS-6278 connecting clips.
- 2.13 716D test receiver, equipped with a 310 plug.

## 3. PREPARATION

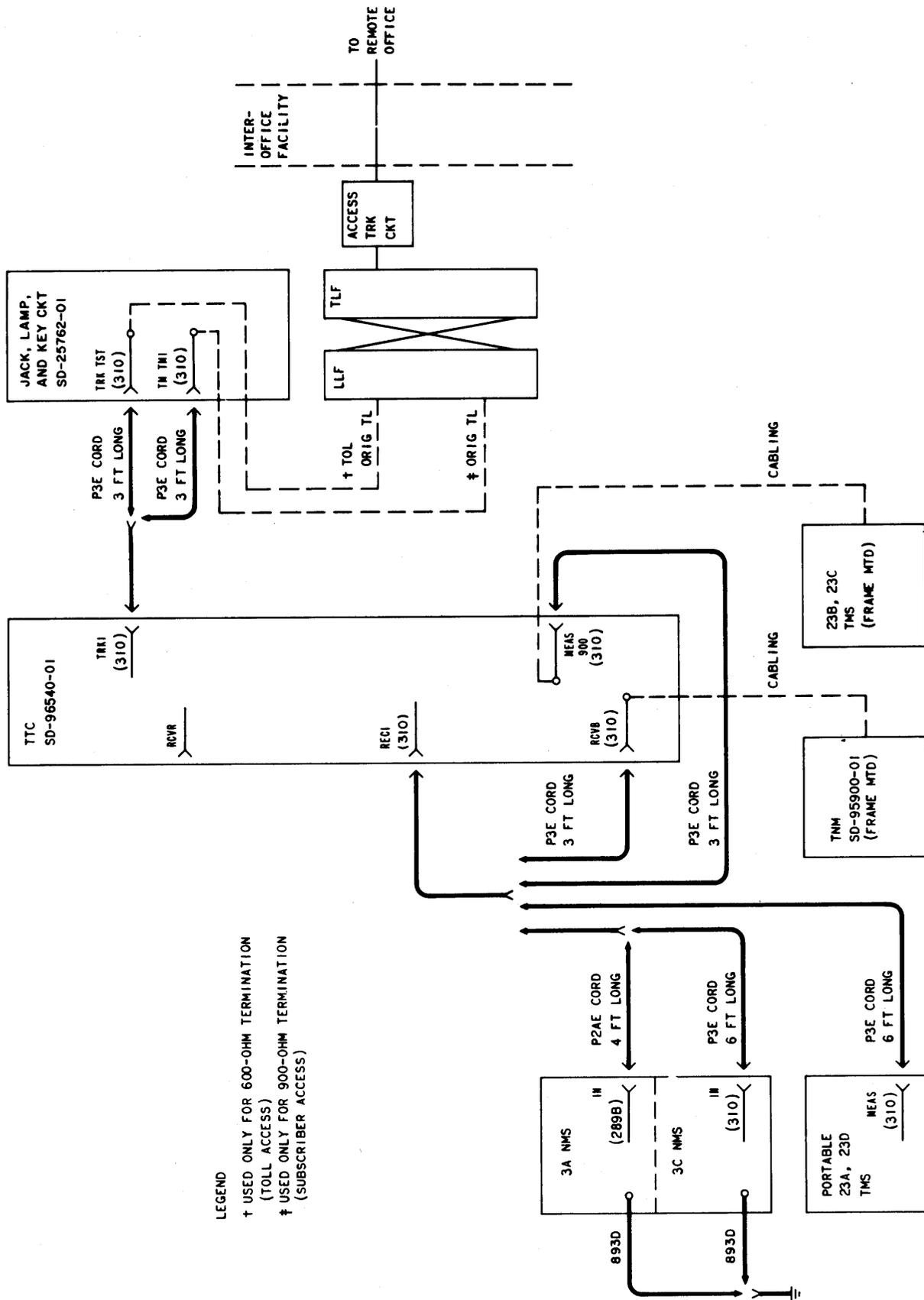
### STEP

### ACTION

### VERIFICATION

**Note 1:** All test equipment shall be known to be correctly calibrated.

| STEP             | ACTION   | VERIFICATION            |
|------------------|--|-------------------------|
|                  | <i>Note 2:</i> Refer to paragraphs 1.11, 1.12, 1.16, and 1.17 and see Fig. 1.  |                         |
| <b>All Tests</b> |  |                         |
| 1a               | If 23A or 23D TMS is used—<br>At 23A or 23D TMS—<br>Operate DIAL-MEAS-SLV or DIAL-MEAS-EXT key to MEAS.  |                         |
| 2a               | Operate INPUT key to 600 (toll access mode) or 900 (subscriber access mode).   |                         |
| 3a               | At TTC—<br>Patch MEAS 310 jack on 23A or 23D TMS to REC1 jack on TTC, using 6-foot long P3E cord.  |                         |
| 4b               | If 23B or 23C TMS is used—<br>At TTC—<br>Patch MEAS 600 jack (toll access mode) or MEAS 900 jack (subscriber access mode) to REC1 jack on TTC, using 3-foot long P3E cord. |                         |
| 5                | At MTF—<br>Restore all keys and switches.  |                         |
| 6                | Momentarily operate RL key.  | All lamps extinguished. |
| 7                | Operate FS, TS, KY keys.   |                         |
| 8                | Select access trunk to be used in test. (Refer to paragraphs 1.11 and 1.12.)   |                         |
| 9                | Operate GPA/GPB key as required when trunk is in allotted subgroup.  |                         |
| 10               | Select marker to be used in test.  |                         |
| 11c              | If access trunk is to be seized in a subscriber access mode of operation—<br>Select class of service and rate treatment for access to trunk.                               |                         |
| 12d              | If access trunk is to be seized in toll access mode of operation—<br>Select TOL subclass of test.  |                         |
| 13               | Select MISC class of test.   |                         |



LEGEND  
 † USED ONLY FOR 600-OHM TERMINATION (TOLL ACCESS)  
 ‡ USED ONLY FOR 900-OHM TERMINATION (SUBSCRIBER ACCESS)

Fig. 1

| STEP | ACTION   | VERIFICATION |
|------|--|--------------|
| 14   | Select A through K digits as required to direct call to ROTL in remote office.   |              |
| 15   | ◆Select originating class of call and associated translator indication.  |              |
| 16e  | If ETS provided—<br>Operate PCS key.<br>*Allows selected class of service to be used.*   |              |
| 17e  | Operate PTS key.<br>*Allows selection of trunk.*   |              |
| 18f  | If trunk is to be tested for CDT—<br>Operate CDTT key.   |              |
| 19f  | When trunk is assigned to CDT dual controllers, select controller—<br>Operate CCD 0/1 key.   |              |
| 20f  | When a trouble record is to be taken from the CDT translator access (TA) circuit—<br>Operate TREC key.   |              |
| 21f  | When the CDT controller operates with both shared and dedicated translator circuits and a particular translator circuit is to be used for the test—<br>Operate TAD key to select dedicated TA circuit or operate TS key to select shared TA circuit.<br><br><b>Note:</b> When a TA circuit is not selected, the controller will select the next available TA circuit.◆ |              |
| 22g  | If access trunk is to be seized in a subscriber access mode of operation—<br>Patch TRK1 jack on TTC to TM or TM1 jack on jack, lamp, and key circuit, using 3-foot long P3E cord.  |              |
| 23h  | If access trunk is to be seized in toll access mode of operation—<br>Patch TRK1 jack on TTC to TRK TST jack on jack, lamp, and key circuit, using 3-foot long P3E cord.  |              |
| 24   | At TTC—<br>Connect test receiver to RCVR jack.   |              |
| 25i  | If TNM is used (subscriber access mode only)—  |              |

| STEP | ACTION  | VERIFICATION   |
|------|---|--|
|      | At TTC—<br>Patch RCVB jack to REC1 jack, using 3-foot long P3E cord.  |  |
| 26   | At TTC—<br>Operate SD-REC1 key to REC1 (horizontal).  |  |
| 27   | Operate DET key (vertical).   |  |
| 28   | At MTF—<br>Momentarily operate ST key.  | AS lamp lighted.   |
|      | <p><b>⚠Caution:</b> <i>If three or more audible ring cycles are heard, it is an indication that a customer's phone has been reached. Before proceeding with further transmission testing, verify the test number with the remote office.</i></p>  |  |
| 29   | At TTC—<br>Operate DC key (vertical).   |  |
| 30   | Operate RL key for 1 second.  | 1300-Hz tone heard while RL key is operated, followed by 2225-Hz tone for 1 second. TD lamp lighted. |
| 31   | At MTF—<br>Dial digit 8.  | 1004-Hz tone heard for 10 seconds. TD lamp extinguished.   |
| 32   | At TTC—<br>Operate TMS1 key (horizontal).   |  |
| 33   | At TMS or TNM—<br>Record TMS or TNM reading.  |  |
|      | <p><b>Note:</b> The reading of the TMS or TNM should be stable and its measured far-to-near loss within <math>\pm 1.0</math> dB of the expected measured loss (EML). Trunks which deviate more than <math>\pm 3.7</math> dB from the EML should be removed from service immediately and another trunk should be selected and tested. (Refer to paragraphs 1.11 and 1.12.)</p> |  |
| 34   | At TTC—<br>Restore TMS1 key (vertical).   |  |
| 35   | Operate RL key for 1 second.  | 1300-Hz tone heard while RL key is operated, followed by 2225-Hz tone for 1 second. TD lamp lighted. |

| STEP | ACTION | VERIFICATION |
|------|--------|--------------|
|------|--------|--------------|

## 4. METHOD

| STEP | ACTION | VERIFICATION |
|------|--------|--------------|
|------|--------|--------------|

## A. One-Way 1004-Hz Loss Measurement to 102-Type Test Line

- |     |  |   |
|-----|--|---|
| 36j | If no-test access is desired (refer to paragraph 1.13)—<br>At MTF—<br>Dial digit 4.  | At TTC—<br>TD lamp extinguished.  |
| 37  | At MTF—<br>Dial digit 3, followed by 4 digits as determined from office records.<br><br><i>Note:</i> These digits select trunk to be tested and associated test line. (Refer to paragraph 1.05.) | At TTC—<br>TD lamp extinguished after first digit is dialed.<br>1004-Hz tone heard.   |
| 38  | Operate TMS1 key (horizontal).   |   |
| 39  | At TMS or TMN—<br>Record TMS or TNM reading.   |   |
| 40  | Subtract reading obtained in Step 33 from reading obtained in Step 39 (far-to-near loss of trunk under test).  |   |
| 41  | At TTC—<br>Restore TMS1 key (vertical).  |   |
| 42  | Operate RL key for 1 second.   | 1004-Hz tone silenced.<br>1300-Hz tone heard while RL key is operated, followed by 2225-Hz tone for 1 second.<br>TD lamp lighted. |
| 43  | Repeat Steps 36j through 42 for all trunks to be tested in remote office.  |   |
| 44k | If no further tests are to be made—<br>Remove all patching cords.  |   |
| 45k | At TTC—<br>Momentarily operate RL key.   | TD lamp extinguished.   |
| 46k | At MTF—<br>Restore all keys and switches.  | All lamps extinguished.   |

| STEP   | ACTION   | VERIFICATION  |
|--|--|---|
| <b>B. One-Way 1004-Hz Loss and Message Circuit Noise Measurements to 100-Type Combined Milliwatt and Balance Test Line</b> |  |   |
| 36j  | If no-test access is desired (refer to paragraph 1.13)—<br>At MTF—<br>Dial digit 4.                            | At TTC—<br>TD lamp extinguished.  |
| 37   | At MTF—<br>Dial digit 3, followed by 4 digits as determined from office records.                               | At TTC—<br>TD lamp extinguished after first digit is dialed.<br>1004-Hz tone heard. |
| 38   | Operate TMS1 key (horizontal).   |   |
| 39   | At TMS or TNM—<br>Record TMS or TNM reading.   |   |
| 40   | Subtract reading obtained in Step 33 from reading obtained in Step 39 (far-to-near loss of trunk under test).  |   |
| 41k  | If 23-type TMS is used—<br>After 1004-Hz tone silenced—<br>At TTC—<br>Disconnect patching cord from REC1 jack. |   |
| 42l  | If 3A NMS is used—<br>At 3A NMS—<br>Set FUNCTION switch to NM 600 (toll access) or NM 900 (subscriber access). |   |
| 43l  | At TTC—<br>Patch IN jack on NMS to REC1 jack on TTC, using P2AE cord.  |   |
| 44m  | If 3C NMS is used—<br>At 3C NMS—<br>Set FUNCTION switch to NM 600/900.   |   |
| 45m  | At TTC—<br>Patch IN jack on NMS to REC1 jack on TTC, using 6-foot long P3E cord.                               |   |
| 46i  | If TNM is used (subscriber access mode only)—<br>At TNM—<br>Operate NM A+40 key.                               |   |
| 47   | At NMS or TNM—<br>Record noise measurement and character of noise.   |   |

SECTION 218-246-503

| STEP | ACTION   | VERIFICATION  |
|------|--|---|
| 48   | Subtract 20 dB from the reading obtained in Step 47 and add the access trunk loss obtained in Step 33 (near-end noise of trunk under test).<br>Character of noise is heard in TTC test receiver. |   |
| 49   | At TTC—<br>Restore TMS1 key (vertical).  |   |
| 50   | Operate RL key for 1 second.   | 1300-Hz tone heard while RL key is operated, followed by 2225-Hz tone for 1 second.<br>TD lamp lighted. |
| 51   | Repeat Steps 36j through 50 for all trunks to be tested in remote office.  |   |
| 52n  | If no further tests are to be made—<br>Remove all patching cords.  |   |
| 53n  | At TTC—<br>Momentarily operate RL key.   | TD lamp extinguished.   |
| 54n  | At MTF—<br>Restore all keys and switches.  | All lamps extinguished.   |

**C. Two-Way 1004-Hz Loss Measurement and Far-End Noise Check to 104-Type Test Line**

|     |  |   |
|-----|--|---|
| 36j | If no-test access is desired (refer to paragraph 1.13)—<br>At MTF—<br>Dial digit 4.  | At TTC—<br>TD lamp extinguished.  |
| 37  | At MTF—<br>Dial digit 3, followed by 4 digits as determined from office records.<br><br><i>Note:</i> These digits select trunk to be tested and associated test line. (Refer to paragraph 1.05.) | At TTC—<br>After first digit dialed—<br>TD lamp extinguished.<br>2225-Hz tone heard until far-end measuring circuit is seized by 104-type test line.<br>TD lamp lighted.  |
| 38  | At TTC—<br>Operate TMS1 key (horizontal).  | 3 seconds after 2225-Hz tone silenced, 10-second burst of 1004-Hz tone heard.<br><br><i>Note:</i> ROTL sends 1004-Hz during this 3-second interval to be used to measure near-to-far loss of trunk under test. Measurement is stored by distant transmission measuring circuit. |

| STEP | ACTION  | VERIFICATION   |
|------|---|--|
| 39   | When first 1004-Hz tone is heard—<br>Record TMS or TNM reading.<br>*Combined loss of access trunk and far-to-near loss of trunk under test.*  |  |
| 40   | Subtract reading determined in Step 33 from reading determined in Step 39.<br>*Far-to-near transmission loss of trunk under test.*  |  |
| 41k  | If short burst of 2225-Hz tone is heard after first 1004-Hz tone transmission—<br>Add 10 dB to TMS or TNM reading (Step 42) for second 10-second 1004-Hz tone.  |  |
| 42   | When second 10-second 1004-Hz tone is heard—<br>Record TMS or TNM reading.<br>*Combined loss of access trunk plus the sum of near-to-far and far-to-near losses of trunk under test, less 10 dB if applicable. (Refer to Step 41k). |  |
| 43   | Subtract reading obtained in Step 40 from reading obtained in Step 42.<br>*Near-to-far transmission loss of trunk under test.*  |  |
| 44l  | If far-end noise check is desired—<br>Monitor test call for 5 seconds.  | If 2225-Hz tone is heard—<br>Far-end noise does not exceed 41 dBrnc.<br>If interrupted 2225-Hz tone is heard—<br>Far-end noise exceeds 41 dBrnc. |
| 45   | At TTC—<br>Restore TMS1 key (vertical).   |  |
| 46   | Operate RL key for 1 second.  | 1300-Hz tone heard while RL key is operated, followed by 2225-Hz tone for 1 second.<br>TD lamp lighted.  |
| 47   | Repeat Steps 36j through 46 for all other trunks to be tested in remote office.   |  |
| 48m  | If no further tests are to be made—<br>Remove all patching cords.   |  |
| 49m  | At TTC—<br>Momentarily operate RL key.  | TD lamp extinguished.  |
| 50m  | At MTF—<br>Restore all keys and switches.   | All lamps extinguished.  |



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