MANUAL TWO-WAY TRANSMISSION MEASUREMENT AND FAR-END NOISE CHECK USING 104-TYPE FAR-END EQUIPMENT

This section describes the general steps necessary to make a manual 2-way transmission measurement and a far-end noise check, using 104-type test lines and far-end transmission measuring and noise checking equipment.

This section is reissued for the following reasons:

(a) To provide test procedures for 104-type test lines which return test progress tone (TPT) and to eliminate procedures for test lines which return flash only. (All test lines should have been converted to return TPT.)

(b) To revise the test procedures to include 104-type test lines used with No. 1- and No. 3-type toll switchboards.

(c) To standardize the noise checks in terms of a single value, since all test lines are now strapped for the same value, and to state the noise check in equivalent dBrnc.

The far-end transmission measuring and noise checking equipment and 104-type test lines are described in Section 103-235-100. A typical manual transmission measurement setup using 104-type test lines associated with the far-end transmission measuring and noise checking equipment is shown in Fig. 1.

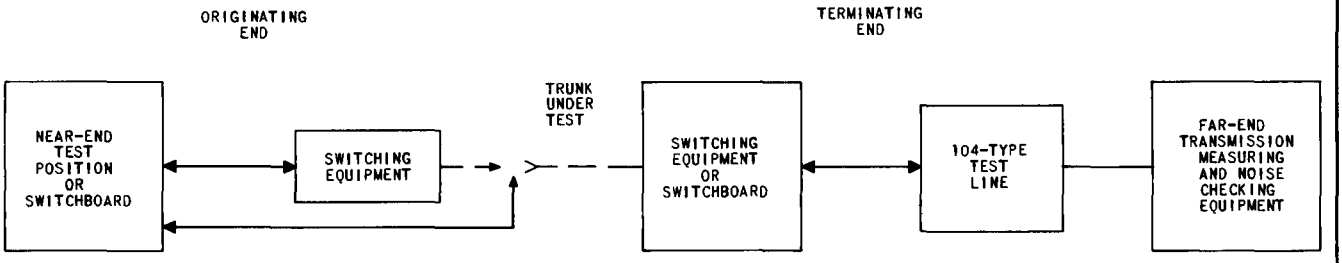

Fig. 1 — Typical Manual Transmission Measurement Setup

Manual tests may be made from a testboard, a switchboard, a manual outgoing trunk test frame, a master test frame or other manual transmission testing arrangements at the originating office. A connection to the trunk to be tested is made through the office switching equipment, or from the trunk appearance at a testboard test frame or switchboard.

The access code is 104 if an intertoll trunk is being tested and a 3-, 4-, or 7-digit number if a toll connecting trunk is being tested, including CAMA or local trunks. Access to the test lines terminated on No. 1- and No. 3-type toll switchboards is obtained by signaling the operator (when required) and requesting connection to the 104-type test line. The loss of the trunk can then be measured in each direction of transmission and a noise check made at the far-end without assistance at the far-end of the trunk.

104-type test lines serving intertoll trunks must provide both test progress tone (TPT) and dc flash signals for an interim period until all automatic test frames which can test to them are modified to recognize TPT. In this interim period, the durations and interruption rates of the tone and dc flash signals are altered to provide compatibility with single-frequency signaling systems.

104-type test lines serving other than intertoll trunks and those appearing at switchboards are equipped with TPT only. This change in signaling conforms to the desired use of tone in the DDD network, making it possible to use the far-end transmission measuring and noise checking equipment to test trunks where the return of off-hook supervision to the originating end is blocked.

The test line signaling methods and test progress tone (2225-Hz) signals applicable to particular far-end equipments are shown in Table A.

TABLE A

TEST LINE SIGNALING METHOD AND TEST PROGRESS TONE (2225 Hz) SIGNALS

TEST CONDITION	SIGNALING METHOD	
	DC FLASH PLUS TPT	TPT ONLY
Test line in parking status waiting to be served	ON-HK and TPT applied	OFF-HK and TPT applied (OFF-HK is maintained from seizure of test line to release of test line.)
Connected to transmission measuring and noise checking equipment	OFF-HK and TPT removed	TPT removed
TEST CONDITION	**SIGNALING METHOD**	
Repeat	1.0 sec ON-HK wink and TPT	0.5 sec TPT
Reorder	Flashing ON-HK and TPT at 30 ipm	TPT at 120 ipm
Add 10	1.0 sec ON-HK wink and TPT	0.5 sec TPT
Noise does not exceed 41 dBrnc	Steady ON-HK and TPT applied	Steady OFF-HK and TPT applied
Noise exceeds 41 dBrnc	Flashing ON-HK and TPT at 30 ipm	Steady OFF-HK and TPT at 120 ipm

Note: Figure 1 shows the general arrangement for making tests from a manual test position.

STEP	PROCEDURE	REMARKS
		Note: The transmission measuring set to be used in making the test should be calibrated against the milliwatt supply arrangements provided at the test position. Calibrating instructions are provided in the sections relating to the particular type of transmission measuring set being used.
1	When the 1000-Hz test power is obtained from a 2A sending panel, the 1000-Hz machine must be up to full speed before the connection to the 1000-Hz supply is made.	This can be assured by inserting a 600- or 900-ohm plug (as appropriate) into any other milliwatt sending jack at some other location. Make sure, however, that the jack selected is served by the ***same*** machine. This is unnecessary if the milliwatt source is obtained from a 71-type (transistorized) generator.
2	Select the trunk to be tested, make a busy test, seize the trunk, and pulse forward or signal on the trunk. (Refer to section describing the operating procedures at the particular test position being used).	***Intertoll Trunks*** — Code 104 is pulsed forward to gain access to the far-end test lines. ***Toll Connecting, CAMA and Local Trunks*** — 3-, 4-, or 7-digits are pulsed forward to gain access to the far-end test lines. ***Switchboard-ended Trunks*** — Signal the operator (when required) and request connection to the 104-type test line.
3	Monitor on the trunk via the monitoring circuit provided at the test position.	Wait for parking circuit at the far-end to connect the trunk to the 104-type equipment. The following supervision and/or TPT signals should be observed.

TEST LINE SIGNALING METHODS — PARKING STATUS AND CONNECT SIGNALS

TEST LINE CONDITION	SIGNALING METHOD	
	DC FLASH PLUS TPT	TPT ONLY
Test line in parking status waiting to be served.	ON-HK and TPT applied	OFF-HK and TPT applied (OFF-HK is maintained from seizure of test line to release of test line.) See Note.
Connected to transmission measuring and noise checking equipment.	OFF-HK and TPT removed	TPT removed

Note: When connection to 104-type test line is made at switchboards, the OFF-HK signal is indicated on the switchboard cord circuit and TPT is applied to the trunk under test until connection to the transmission measuring equipment is made. The OFF-HK signal is not transmitted to the originating end.

STEP	PROCEDURE	REMARKS
4	Upon receiving the connect signal(s), promptly send 1000-Hz test tone for 3 to 8 seconds.	During this time the far-end equipment measures the loss, adjusts an attenuator, and checks the measurement.
5	Disconnect the 1000-Hz tone and monitor the trunk.	Observe for the presence of repeat or reorder signal(s) as follows:

TEST LINE SIGNALING METHODS — REPEAT AND REORDER SIGNALS

TEST CONDITION	SIGNALING METHOD	
	DC FLASH PLUS TPT	TPT ONLY
Repeat	1.0 sec ON-HK wink and TPT	0.5 sec TPT
Reorder	Flashing ON-HK and TPT at 30 ipm	TPT at 120 ipm

		When a repeat condition is received, it indicates that the far-end equipment was unable to complete the attenuator adjustment and check the measurement. Steps 4 and 5 must be repeated. When a reorder condition is received, one of the following has occurred and Steps 2 through 5 must be repeated. (a) The 1000-Hz tone was not connected within 8 seconds after the connect signal(s) was received. (b) The 1000-Hz test tone was applied for less than 3 seconds or longer than 8 seconds. (c) The loss (near-to-far) exceeded 19.9 dB. (d) The received test power at the far-end was greater than 0 dBm. (e) The received test power at the far-end varied more than ± 0.5 dB during the measurement.
6	If no repeat or reorder condition is indicated, promptly connect the trunk to the transmission measuring system or set.	
7	Measure the first 10-second transmission of 1000-Hz test tone from the far-end equipment.	Record the TMS meter reading (far-to-near loss).

STEP	PROCEDURE	REMARKS
8	Monitor the trunk.	Observe for the presence of an ***add 10*** signal as follows:

TEST LINE SIGNALING METHODS — ADD 10 SIGNALS

TEST CONDITION	SIGNALING METHOD	
	DC FLASH PLUS TPT	TPT ONLY
Add 10	1.0 sec ON-HK wink and TPT	0.5 sec TPT

		If an ***add 10*** signal is received, it indicates that 10 dB must be added to the next 1000-Hz tone transmission from the far-end equipment.
9	After a 2-second pause, the far-end equipment will again send a 10-second interval of 1000-Hz test tone reduced by the amount of the near-to-far loss measured in Step 7.	If an ***add 10*** signal was not received in Step 8, the measurement will be equal to the sum of the near-to-far and the far-to-near losses of the trunk. If an ***add 10*** was received in Step 8, add 10 dB loss to the measurement. Record the reading (or corrected reading if 10 dB was added).
10	Remove connection to the transmission measuring system or set. Leave trunk connection up for approximately 5 seconds while the far-end equipment makes a noise check.	Noise checks made at the far-end are indicated as follows:

TEST LINE SIGNALING METHODS — NOISE CHECKS

TEST CONDITION	SIGNALING METHOD	
	DC FLASH PLUS TPT	TPT ONLY
Noise does not exceed 41 dBrnc	Steady ON-HK and TPT applied	Steady OFF-HK and TPT applied
Noise exceeds 41 dBrnc	Flashing ON-HK and TPT at 30 ipm	Steady OFF-HK and TPT at 120 ipm

11	Release the trunk connection.	***On Switchboard-ended Trunks*** — Signal the operator and request that the connection be removed from the 104-type test line.
12	Subtract the reading in Step 7 from that of Step 9 (corrected as required) to obtain the near-to-far loss of the trunk.	