SWITCHED SERVICE NETWORKS

ELECTRONIC TANDEM NETWORK (ETN)

SERVICE MAINTENANCE

NOTICE

1. GENERAL

1.01 This section defines the Network Routing Guide and maintenance features and specifies the preservice (installation) and maintenance (trouble and routine) test descriptions, procedures, and requirements for the Electronic Tandem Network (ETN).

1.02 Whenever this section is reissued, the reason(s) for reissue will be given in this paragraph.

1.03 The objectives of the tests and procedures covered in this section are to ensure that calls will be properly completed and that satisfactory voice and/or data transmission will be achieved. These tests, switchboard to switchboard (overall or end-to-end), are part of the network test plan for ETN.

1.04 To perform ETN tests, attention must be given to ensure that the following items have been completed:

   (a) Testboard-to-testboard transmission tests

   (b) Drop test at both ends

   (c) All cross connects and necessary plug-in equipment installation at tandem location.

2. RESPONSIBILITIES

2.01 The responsibilities of the various offices associated with ETNs are covered in section 309-400-001. For the purpose of this section, the office designated as the Plant Control Office (PCO) is responsible for the scheduling and performance of circuit order and annual routine maintenance tests. Other work centers are responsible for trouble testing as required.

2.02 The PCO will also do the following:

   (a) Delegate the performance of tests to another office (eg, subcontrol office on central office to central office trunks) when necessary.

   (b) Maintain a permanent record of circuit order and routine maintenance test results. Trouble reports and associated test results will be documented on trouble logs or Special Service System (SSS) trouble tickets as appropriate.

   (c) Assume full end-to-end testing responsibilities of a circuit comprised entirely of telephone company (TELCO) facilities and equipment.

2.03 When a circuit includes customer-provided facilities or terminates in customer-provided equipment (CPE), the TELCOs are responsible for testing to the TELCO/CPE interface only. The TELCO is not responsible for testing CPE. When a circuit includes other common carriers (OCCs), refer to Section 471-200-001.

3. ETN IMPLEMENTATION

A. Service Considerations

3.01 The high visibility of ETN circuit status, as well as the customer records for out-of-service credit, requires strict adherence to procedures for releases, response to automatic detected trouble, and ticketing of trouble reports.

3.02 Customers rely heavily on their communication service in the operation of their business. For this reason, it is important that:

   (a) Service dates be met

   (b) Outage time be kept to a minimum

   (c) Status of circuits be known at all times

   (d) Circuit maintenance be of the highest quality

   (e) Network operation be as designed and expectations of the customer be met.

3.03 Initial circuit order tests must be of the highest quality and should be started in time to allow for clearing of any problems or troubles that may be encountered before cutover. The same applies to rearrangements, changes, additions, and deletions which are covered in the ETN Plan for Coordination.

3.04 Circuit releases for maintenance activities will usually be obtained by the PCO. In any event, the PCO must be informed of all releases and plant activities on circuits for which it is designated control.

B. Circuit Order Tests

3.05 Circuit order tests must be performed before a circuit is placed in service. If the requirements are not met, the circuit must not be turned up without the concurrence of the appropriate engineering forces.

3.06 Circuits that must be installed using equipment or facilities other than those specified by the circuit layout record (CLR) should be turned up for service only after engineering approval has been received. In these cases, the CLR should be corrected locally and a new corrected CLR must be issued by the engineering forces as soon as possible.

3.07 Circuit order tests are to be performed on initial installation and whenever any subsequent changes or rearrangements are made that might affect the operation or transmission characteristics of the circuit. Circuit order tests often prove to be valuable tools during trouble locating procedures. For this reason, the circuit order test results should be recorded and filed with the CLR or at some other readily accessible location for reference.

4. ETN VERIFICATION TESTS

4.01 A brief summary of each of the network tests, the organizations involved, the documentation required, and the means of verification is given in the following paragraphs. For DIMENSION Feature Package 8 (FP8) PBXs, references to test methods are also provided with each description. A summary of this information is provided in Table A.

A. Hardware Acceptance Tests

4.02 The ETN test activity begins with the installation and acceptance testing of the hardware for the Customer Administration Center System (CACS) and the station message detail record (SMDR) tape unit, as well as the FP8. The organization which installs these units also performs the associated standard tests. These tests ensure that the units are fully operational and that the PBX features are working properly. The CACS hardware is used during the CACS test and in the call-through. The SMDR tape unit is also used during the call-through. In the case of DIMENSION FP8 tandems, the PBX is used during the remaining tests and the call-through.

B. Transmission/Maintenance Tests

4.03 There are two sets of tests designed for transmission: testboard-to-testboard and switchboard-to-switchboard (end-to-end). The testboard-to-testboard tests measure the transmission levels between offices for all circuits. These tests are verified during the switchboard-to-switchboard tests. The switchboard tests measure the transmission levels from trunk to trunk between tandems, from tandem to main PBXs, and from trunk to serving office for off-net circuits. The standard switchboard tests are augmented on each circuit with a station-to-station measurement which verifies pad switching as well as the transmission levels and signaling compatibility.

4.04 Switchboard-to-switchboard tests (end to end tests) check the facilities from each tandem to all other main PBX/CTXs or tandems which are directly connected to it. These tests are performed after the cross connects are made and the testboard and drop tests completed. A standard sequence for transmission/maintenance tests and section references is listed below for DIMENSION FP8 tandems.

(1) 1000 Hz Loss—Section 311-300-500

(2) Frequency Response—Section 311-300-500

(3) Message Circuit Noise—Section 311-300-500

(4) Balance (Echo Return Loss and Singing Point)—Sections 311-350-100 and 311-350-500

(5) Pulsing—Sections 333-126-500 and 311-300-500.

4.05 Form ETN-1 (Fig. 1) for recording FP8 test results are completed with the actual measurements obtained. The PCO is responsible for assuring and documenting these tests, although the measurements are performed at the tandem location by other work center personnel.

4.06 The switchboard tests for each circuit in a group are considered complete after a station-to-station call and level measurements have been made. A call in both directions verifies continuity and provides a subjective check of the quality of transmission of each circuit. A measurement is made to verify the previous transmission test levels as well as to demonstrate that the switched pads are switching properly. In the case of FP8,

TABLE A

ETN TESTS

TESTS	PREREQUISITES	RESPONSIBLE ORGANIZATION	METHOD OF TESTING	DOCUMENTATION REQUIRED
Hardware Acceptance (PBX, SMDR, CACS)	Installation Complete	WECo or PBX craft	Section 554-111-300 (DIMENSION) 554-010-122 (SMDR) 554-010-140 (CACS)	See Method of Testing
Testboard-to-Testboard	All circuits installed	PCO (SSC/STC)	Standard procedures	Measurements obtained on forms.
Switchboard-to-Switchboard (Transmission)	PBX installed TB-TB drop tests cross-connects complete	PCO (SSC/STC)	Tested by PBX craft from trunk side. Levels given in Cut-over Guide	Measurements obtained to complete form.
Switchpad (Overall)	SWB-SWB complete on circuit	PCO (SSC/STC)	Measure levels from line-side through loop-around test trunk	Measurement on same form as switchboard results
Trunk Group	SWB-SWB complete on one circuit	PCO (SSC/STC)	List of calls to be placed between PBXs	Checklist included with switchboard results
PBX Acceptance	Installation complete. Final reuse tape installed	PBX craft	Check station features and trans-lations	COD initialed. Section 554-111-302 Section 554-111-303
Network Trans-lations Routing Guide/ COD comparison	Final reuse tape installed	Business Services	Cross-check of routing and ACA	COD initialed. ACA Forms 3 & 4 completed for sample routes. Forms will be sent to PBX craft for verifi-cation.
COD/Machine translation compairson	RG/COD complete	PBX craft	Check translations via MAAP panel	Form 3 & 4 from Bus. Svcs completed. Re-turned to Cutover Chairman
CACS	1. Installation complete 2. RMATS ports installed	PBX craft	Check connection to switches	Printout sent to Cutover Chairman
Network Ini-tialization	Performed prior to call-through and cutover	PBX craft Business Services	Synchronize all clocks, activate ACA, SMDR, and CACS. Initialize	Checklist initialed. Returned to Cutover Chairman
Call-through	All other tests completed	NCO, PCO, PBX craft, Business Services	Call analysis via SMDR tape and data matrix	Call-through Analysis Matrix

the test can be made by placing calls through the loop-around test line in the distant DIMENSION PBX and taking measurements on the tones received. The PBX craft person performs this test and records the results of the measurements. Form ETN-1 (Fig. 1) is used to record end-to-end trunk tests for FP8.

4.07 For off-net groups, comparable transmission tests are performed per existing sections between the tandem PBX and the Serving Test Center (STC) or serving office at the far end. A call to verify continuity, depending on the type of facility, may be made in only one direction.

4.08 For each on-net group, after one circuit has been tested, a set of calls is placed to verify signaling compatibility as well as to test certain aspects of automatic alternate routing (AAR) (eg, programmed pause, overflow to off-net, and calls to a satellite PBX, a station, or an attendant). See form ETN-2 (Fig. 2) for FP8.

C. Translations

4.09 The transmission tests are augmented by a series of calls designed to verify certain features. These calls are made on a trunk group basis and test the translations that may permit a call to complete off-net through a tandem or PBX. The ability to call an extension, an attendant, or a satellite PBX is also verified by these tests. For FP8, station features and station translations are tested and verified during PBX acceptance testing. The remaining translations for automatic circuit assurance (ACA) and AAR/ARS (automatic route selection) are tested and verified by two mechanisms. Forms 3 and 4 (Fig. 3 and 4) are used for recording the test results.

4.10 The first mechanism for verification involves a detailed comparison between the routing guide (see Appendix 1) and the customer order document (COD). This is done by the Business Services organization. The second, used to determine that the COD matches the actual PBX software as shown via the maintenance and administration panel (MAAP), is made only on a sample of the translations.

D. Data Acquisition

4.11 Data acquisition via the SMDR unit is tested during the hardware acceptance tests and verified during call-through. The CACS data

acquisition capabilities are tested during the CACS test and initialization. The purpose of the test is to ensure that the data collection mechanisms are set up correctly and to perform minor data validity checks. This test is verified through the use of the CACS during the call-through.

5. AUTOMATIC CIRCUIT ASSURANCE (ACA)

5.01 The ACA feature, available with DIMENSION FP8, assists the customer in identifying possible trunk malfunctions. The FP8 PBX monitors and keeps track of holding times associated with calls on each circuit (ie, tie, foreign exchange [FX], Wide Area Telecommunications Service [WATS], and central office [CO] trunks). When circuits exhibit unusual holding-time characteristics (very short or very long holding times), a call is initiated to the PBX attendant identifying the potential short or long holding-time circuit. ACA for No.1/1A ESS is not presently provided.

5.02 While one long holding time will alert the attendant, short holding times are accumulated. When a predetermined number of short holding-time conditions have occurred (usually 24), the attendant will be alerted. The attendant console will display the trunk group and trunk number that has the holding-time problem.

5.03 When alerted by ACA, the attendant will verify the condition of the suspect circuit by using the Trunk Verification by Station (TVS) feature, which is available with DIMENSION FP8. This is done by dialing the trunk test access number, trunk group number, and trunk number displayed on the console. If a defective trunk is found and if it is a 1-way outgoing trunk, the customer can put it in a maintenance busy condition. The customer must then notify the PCO of the trunk in trouble.

5.04 Another form of circuit assurance in the DIMENSION FP8 is detection of circuits which cannot be seized. Each trunk circuit pack has different voltage levels during call progress. If the DIMENSION PBX does not see an expected voltage or if a circuit times out, call processing will cease and the suspect trunk is placed in a quarantine state. The DIMENSION PBX then tests the circuit every 20 milliseconds; and if the circuit is still suspect after fifteen minutes, a minor alarm will be generated in the DIMENSION PBX alarm panel and the attendant console. The customer

should advise the Repair Service Bureau (RSB) of the alarm. The RSB may enlist the aid of the Remote Maintenance Administration and Traffic System (RMATS), if available, or dispatch repair forces to locate the problem using the MAAP. Although the trouble may clear itself and the circuit may be automatically restored to service, the alarm must be cleared manually.

6. REMOTE MAINTENANCE STATION (RMS)

6.01 If using DIMENSION FP8 tandems, a station is extended to the PCO to facilitate network maintenance and is called an RMS. The RMS provides the same basic function as the TVS features. The difference between TVS for the customer and RMS for the PCO is the capability with RMS to busy out both 1-way outgoing trunks and the outgoing portion of 2-way trunks. The TVS feature allows a busy to be placed only on 1-way outgoing trunks.

6.02 When RMS is used to busy out the outgoing portion of a 2-way trunk, the distant end must be made busy also. Failure to busy out the distant end will result in "high and dry" problems on the incoming portion of that trunk.

6.03 The RMS feature provides the following:

(a) Permits the PCO to dial and determine whether individually selected trunks terminating on the PBX are working (ie, the trunk can be selected and checked to see if it meets transmission objectives).

(b) Provides an override option when the trunk under test is busy (1-way incoming trunks may be checked with RMS only when they are in the busy condition).

(c) Provides a trunk maintenance busy routine when trouble is verified on a given trunk.

6.04 With this feature, all trunks terminated at the PBX can be tested. This includes CO, FX, WATS, direct inward dialing (DID), tie, and release-link trunks (RLTs) for centralized attendant service. Special trunks, such as recorded dictation, code call, and paging cannot be accessed with this feature.

6.05 With the RMS, both busy and idle trunks can be tested. When a trunk under test is idle, a normal test call placed over that trunk will provide adequate verification. When a trunk circuit selected for testing is busy, a per trunk group option to override the busy call is provided. This override option directs an executive override tone (2 to 4 seconds of steady tone) to both parties on the active call and then establishes a 3-way connection (bridge-on). The bridge-on option is not provided on RLTs or trunk-to-trunk connections.

6.06 DID and other 1-way incoming type trunks (other than incoming RLTs) can be accessed with the RMS only when the trunk is busy. Incoming trunks *cannot* be selectively seized and tested when idle.

TRUNK TESTING FROM THE RMS

6.07 Three access codes are provided with the RMS. One access code is provided for trunk testing, one for making a trunk maintenance busy, and one for making a trunk maintenance unbusy. When the selected trunk is made maintenance busy, any calls in progress are terminated.

A. Trunk Testing Through the DIMENSION FP8 PBX

6.08 Chart 1 shows procedures for trunk testing within a local PBX.

CHART 1

TRUNK TESTING THROUGH THE DIMENSION FP8 PBX

STEP	PROCEDURE
1	Initiate a test call by establishing an off-hook condition at the RMS.
	Note: PBX dial tone should be heard.

CHART 1 (Contd)

STEP	PROCEDURE
2	Dial the trunk test access code.
	Note: Second dial tone should be heard.
3	Dial the desired trunk group access code followed by the trunk number to be tested.
4	Determine that call has not been intercepted.
	Note: Intercept tone will be heard if an invalid code is dialed during call process.
5	Listen for one of the following responses.

(a) CO dial tone (Outgoing trunk under test is not busy.)

Note: Tester can now dial a test number through RMS, establish a connection, and evaluate the quality of transmission. (It may be necessary to dial a valid single digit traveling class mark (TCM) after the test number if the call progresses through another DIMENSION FP8 PBX).

(b) Conversation (Trunk under test is busy; RMS bridged to trunk after a 2 to 4 second warning tone to both parties on active call.) The testers should identify themselves and indicate that a trouble test is in progress.

Note: If unable to evaluate the quality of transmission, further testing should be delayed until circuit is idle and positive transmission tests are performed.

(c) Centralized attendant services (CAS) attendant (Trunk under test is an idle RLT.)

Note: Use RMS to evaluate quality of transmission with CAS attendant.

(d) Busy tone

Note: Busy tone is returned for one of the following reasons:

Trunk under test has bridge-on restriction

Trunk under test in process of call setup

Trunk under test on 3-way call

RLT under test is busy

Call on trunk under test is data restricted

Call on trunk under test is trunk-to-trunk call.

(e) Continuous recall (stutter) dial tone (Trunk under test is maintenance-busy.)

B. Maintenance Busy/Unbusy Routine

6.09 The maintenance busy or maintenance unbusy routine is an option of the RMS. When a 2-way trunk or 1-way outgoing trunk under test results in an incomplete connection or poor transmission, the outgoing portion can be made maintenance busy and unavailable for service. The maintenance unbusy routing is used to make a defective trunk available after repairs have been made. Chart 2 shows the procedure required for placing a trunk on maintenance busy or for removing it.

CHART 2

**TRUNK TEST FOR MAINTENANCE BUSY/UNBUSY
ROUTINE**

STEP	PROCEDURE
1	Initiate a test call by establishing an off-hook condition at the RMS.
	Note: PBX dial tone should be heard.
2	Dial the maintenance busy or unbusy code.
	Note: Second dial tone should be heard.
3	Dial the desired trunk group access code followed by the trunk number to be tested.
4	Determine that call has not been intercepted.
	Note: Intercept tone will be returned if an invalid code is dialed or the trunk is not of the type that can be put on maintenance busy.
5	Determine that trunk is on or off maintenance busy.
	Note: Three bursts of confirmation tone are returned to the RMS to verify that the trunk is on or off maintenance busy.

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7. PBX TEST TONES AND LOOP-AROUNDS

7.01 Test tones and loop-arounds are provided with the DIMENSION FP8 PBX. Both test tone and loop-around numbers are assigned separate station numbers associated with the DIMENSION FP8 PBX.

7.02 Test tones and loop-arounds use two different ports in the test line equipment. The loop-around can only be dialed while the test tone call is going through its cycle. Two different circuits must be used to obtain a loop-around (see Fig. 5). After the test tone number has been dialed on circuit "0", the loop-around number is dialed on circuit "1", connecting both circuits "0" and "1" in a loop-around mode. Since only one call at a time can be placed by the RMS, the call on "0" circuit must be held up by artificial means in order for the RMS to dial the loop-around number.

7.03 The use of the loop-around feature enables the RMS to make the near to far-end transmission measurement by applying tone to "1" circuit and subtracting the far to near reading from the loop-around measurement.

7.04 The following occurs when port "0" is called:

(a) Answers automatically in 0.67 seconds

(b) Quiet termination for 300 milliseconds

(c) 1004 Hz at 0 dBm for 9 seconds (tone coupled thru port "0" to time division bus)

(d) Quiet for 1 second

(e) 404 Hz at 0 dBm for 9 seconds

(f) Quiet for 1 second

(g) 2804 Hz at 0 dBm for 9 seconds

(h) Quiet for 33 seconds

(i) Disconnects automatically (port "0" goes on-hook).

7.05 The following occurs when port "1" is called:

(a) Answers automatically in 0.67 seconds

(b) Quiet termination for 30 seconds (port "1" terminated in 600Ω input impedance of the amplifier)

(c) Disconnects automatically (port "1" goes on-hook).

7.06 The following occurs when port "0" is called first and then Port "1:"

(a) Port "0" (which is generating the tone sequence) immediately terminates generation of tones and remains off-hook.

(b) Port "1" answers in 0.67 seconds.

(c) Port "1" is linked to port "0" via 0 dB amplifier (one way) for 90 seconds.

(d) Port "1" disconnects.

(e) Port "0" continues off-hook and quiet for 30 seconds before hanging up.

7.07 The ability of an RMS to dial the RMS at the far end of a tie trunk enables the testers to make transmission and noise measurements without using the test tone and loop-around features. When using this method however, the testers must allow for the excess level deviations of the RMS test circuitry at each end of the connection.

8. NETWORK ACCEPTANCE TESTS

8.01 The COD must be compared and verified with the routing guide and verified with the project memo for all features. All tests must be documented by the PCO (Fig. 1 through 4). Copies of the documentation forms should be sent to the National Cutover Chairman. The general tests are shown in Charts 3 through 9.

CHART 3

SWITCHBOARD-TO-SWITCHBOARD TESTS

STEP	PROCEDURE
1	Use LC-11 test jacks on DIMENSION PBXs for transmission measurements. *Note:* Trunk to station loss must be allowed to equal 2.3 dB on DIMENSION PBXs and the requirement on the circuit order layout record for other type PBXs.
2	After transmission lineup tests from LC-11 jacks, dial up a test call from a station at the tandem switch to a station at the distant location.

CHART 3 (Contd)

STEP	PROCEDURE

Note: After call is established, again check transmission (1010 Hz) to assure proper overall loss and switch pad operation.

3   Place a test call from the distant end to the test station at the tandem switch.

Note 1: Pulsing tests from the DIMENSION PBX to subtending dial pulse locations are required.

Note 2: The MAAP may be used to temporarily convert the signaling mode for tests at the DIMENSION PBX.

4   Use RMS to dial distant station (RNX-XXXX).

5   Use TVS to dial distant attendant (RNX-0111).

6   Place call from distant location to tandem attendant (RNX-0111).

7   If a satellite or tributary PBX is involved, place a test call (station to station) in both directions from the tandem to the satellite/tributary.

8   If off-net calling is provided through a subtending PBX, place an off-net call from the tandem through that PBX.

Note 1: Steps 4 through 8 required on a trunk group basis only.

Note 2: See Fig. 1 and 2 for sample test forms.

CHART 4

SMDR TESTS

STEP	PROCEDURE

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1   Verify SMDR operation by using a printer and special circuit pack LC375. This provides a hard copy of an SMDR printout for pre-cutover testing.

Note 1: The SMDR must be accepted prior to turnover with the tape printout.

Note 2: On call-through tests, the first half of the test will use the printer and the second half of the test will use the regular SMDR magnetic tape.

Note 3: Separate SMDR tapes should be ordered for call-through tests.

CHART 5

CACS NETWORK TESTS

STEP	PROCEDURE
1	Initialize CACS to customer-provided parameters. This includes verification of: (a) Polling frequency (b) Threshold values.
2	Test CACS connection capability to each tandem.

CHART 6

AUTOMATIC CIRCUIT ASSURANCE

STEP	PROCEDURE
1	Initialize ACA and verify: (a) Trunks equipped (b) ACA thresholds for each trunk group. *Note 1:* Check COD for factory settings *Note 2:* See Fig. 3 for sample test form for ACA.

CHART 7

CALLS TO PBXs AND OTHER TANDEMS (AAR)

STEP	PROCEDURE
1	Verify RNX-XXXX call (completed with switchboard-to-switchboard tests).
2	Verify operator (RNX-0111) call (completed on switchboard-to-switchboard tests).
3	Verify direct access calls via TVS and RMS (completed on switchboard-to-switchboard tests).

CHART 7 (Contd)

STEP	PROCEDURE
4	For overflow (on/off net): (a) Verify RNX (on-net) to listed directory number (off-net) translations. (b) Verify off-net translations to operator.
5	Verify main satellite/tributary calls (completed on switchboard-to-switchboard tests).
6	Verify incoming calls (completed on switchboard-to-switchboard tests). *Note:* See Fig. 2 and 4 for sample test form.

CHART 8

AUTHORIZATION CODES/FACILITY RESTRICTION LEVELS (FRLs)

STEP	PROCEDURE
1	Obtain a test authorization code with the highest FRL for TELCO testing and maintenance. *Note:* This is a separate authorization code than that used for call-through tests.
2	Verify FRLs by comparing the routing guide with the COD by Business Services prior to turnover.

CHART 9

AUTOMATIC ROUTE SELECTION (ARS)

STEP	PROCEDURE
1	Verify off-net calls via main PBXs (completed on switchboard-to-switchboard tests).
2	Verify all head-end and tail-end hop-off patterns.
3	Check sample sequences for all head-end and tail-end hop-off patterns via MAAP.

CHART 9 (Contd)

STEP	PROCEDURE

Note: See Fig. 4 for sample form.

9. QUEUEING

CHART 10

TEST REQUIREMENTS FOR NETWORK QUEUEING

STEP	PROCEDURE

A. Local Test at Each Tandem

1   Test proper queueing on tandem switcher originating call.

(a) Tandem users queue in nonpriority queue (when provided).

(b) Users receive proper tones.

(c) Queues time out as required.

(d) Calls overflow on time out as required (if applicable).

(e) Traffic registers assigned and pegged properly.

(f) Message detail created properly.

Note 1: Trunk calls can be tested later.

Note 2: See Fig. 6 for test procedure.

B. Network Tests

2   Test queueing on calls from subtending switches.

(a) Subtending users queue in priority queue (when provided)

(b) Users receive proper tones.

(c) Queues time out as required.

(d) Calls overflow on time-out as required (if applicable).

CHART 10 (Contd)

STEP	PROCEDURE

(e) Traffic registers assigned and pegged properly.

(f) Message detail created properly.

(g) Service protection is operational. (See Fig. 7 for test procedures.)

3   Test network queueing with access tie trunk queues (when provided). (See Fig. 8 for test procedures.)

(a) Test queue at original tandem.

(b) Test access tie trunk queue.

4   Test network queueing in mixed DIMENSION/ESS ETN on DIMENSION/ESS groups. (See Fig. 9 for test procedures.)

(a) Verify that call-in-queue at DIMENSION PBX seizes trunk after call at ESS releases.

(b) Verify that call-in-queue at ESS seizes trunk after call at DIMENSION releases.

5   Test CACS controls and data by suspending or reinstating a queue and network queue. (See Fig. 10 for test procedures.)

(a) Check individual tandem queueing.

(b) Check network queueing.

(c) Verify that CACS data reflects queueing.

Note: CACS data reflects queues and queue seizures.

6   Test Customer Administration Panel/Customer Administration Terminal (CAP/CAT) controls and data by suspending or reinstating a queue. (See Fig. 11 for test procedures.)

Note: CAP/CAT reads data on queues.

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10. ETN DATA TRANSMISSION

A. Data Considerations

10.1   Voiceband analog data transmission on ETN is supported under two service provisioning options. The availability of these two new conditioning offerings provide a simplified data transmission plan for ETN. This plan provides basic (no conditioning) and enhanced (new tie trunk conditioning) data service.

10.2   Basic data service is supported (permitted and maintained) for higher data speeds (to the extent specified in Section 851-300-100) between on-premises stations of PBX/CTX tandem switches and main PBXs/CTXs. With no conditioning, data at speeds of 300 b/s or less will be supported over

connections with five or fewer tie trunks in tandem, 2400 b/s for two trunks in tandem, and 4800 b/s for one trunk.

10.3 Enhanced data service provides two new conditioning options, C7 and C8. These options will allow support for higher speed data transmission over more complex connections of tandem tie trunks. The C7 and C8 conditioning limits are:

ATTENUATION DISTORTION (Relative to 1000 Hz) (400 to 2800 Hz)	ENVELOPE DELAY DISTORTION (1000 to 2600 Hz)
Variation (dB)	Variation (μsec)
C7 -1, 4.5	550
C8 -1, 3.0	125

See Sections 314-410-300 and 314-410-500 for test procedures.

10.4 Tie trunks for an ETN configuration are installed following standard tie trunk designs and cannot be expected to support data beyond the basic level without special treatment. Enhanced data service on connections with up to three tandem tie trunks, for data speeds up to 4800 b/s, is available when conditioning is applied. Data support is defined in the following paragraphs with the appropriate conditioning requirements.

B. Data Support

10.5 High speed data transmission support should not be offered and C7 and C8 conditioning should not be applied when the following facility conditions are encountered in a trunk:

   (a) O, ON, or N1 carrier is present

   (b) More than one T1/D1A, B facility is present

   (c) More than five carrier facilities (any type) are present.

10.6 All trunks between data locations, with the exception of those listed in paragraph 10.2 above, must be conditioned or special routing must be provided to access a conditioned subgroup for data calls.

10.7 Data support for data speeds greater than 300 b/s is defined for tandem connections of C7- or C8-conditioned tie trunks in ETN and other tie trunk configurations as follows:

   (a) Up to 2400 b/s—Three tie trunks, any combination of C7 or C8 conditioning

   (b) Up to 4800 b/s—Two tie trunks, C7 conditioning; three tie trunks, at least one C8 conditioning and two C7 conditioning.

10.8 The C8 conditioning may be applied on any one of the three tandem tie trunk groups, although the intertandem trunks will normally be preferred in ETN configurations. Separate voice and data trunk groups can be established between two electronic tandem switching (ETS) locations using special RNX codes to select the data trunks. In this case, only the data trunk group rquires conditioning. The data RNX precludes the possibility of alternate routing. This procedure reduces the required number of trunks to be C8 conditioned. Wihout special routing, the entire voice circuit group would require conditioning.

10.9 Data transmission support on ETN and other tie trunk configurations is based on providing a grade of service (GOS) comparable to the Message Telecommunications System (MTS) network. Data GOS is defined as the percent of dialed connections meeting error rate limits for Bell System provided data sets or transmission parameter limits for CPE data sets. Data support consists of a GOS of at least 85 percent of dialed connections meeting the error rate or transmission criteria.

10.10 Error rate limits for determining data GOS with Bell System provided data sets are a bit error rate of 10^{-5} or better for asynchronous data sets and a 1000-bit block error rate of 10^{-2} or better for synchronous data sets.

10.11 The determination of GOS for higher speed data support, using CPE data sets, is based on the end-to-end requirements in Table B. The end-to-end limits apply over the number of tandem connections supported for the given data speed and conditioning purchased, eg, with C7 conditioning only, the end-to-end limits for 2400 b/s apply over three trunks and the limits for 4800 b/s apply over only two trunks.

TABLE B

PARAMETER REQUIREMENTS FOR SUPPORTED DATA TRANSMISSION

(END-TO-END)

PARAMETER/UNITS	>300, ≤2400 BPS	>2400, ≤ 4800 BPS
EDD (μsec) (1004 to 2604 Hz)	≤1500	≤1100
Slope (dB) (404, 2804 Hz)	≤14	≤14
R2* (dB)	≥27	≥27
R3* (dB)	≥32	≥32
Signal/Noise † (dB)	≥ 24	≥ 24
Phase Jitter (Deg [20 to 300 Hz])	≤10	≤10
P/AR ‡	>50	>10
Impulse Noise/counts in 15 min — 6 dB below Received 1004 Hz tone	≤15	≤15

* R2 and R3 are 2nd and 3rd order intermodulation distortion, respectively.

† C-Notch noise at least 24 dB below received 1004 Hz holding tone level.

‡ Not required if EDD and slope are measured.

C. Data Service Arrangement

10.12 Data service arrangements which propose the use of off-premises PBX station lines are not recommended. However, data will be supported on an off-premises station (OPS) as specified for enhanced service if the OPS line is C7 conditioned and if it is counted as a trunk toward the maximum number of trunks allowed in a data connection.

10.13 When facilities and/or switches provided by OCCs or customers are utilized in an overall arrangement that include ETS switches, no statement of data support can be made over connections involving the OCC or CPE facilities or switches. Data transmission is not recommended or supported and no error rate can be specified when the MTS network is accessed via an ETN configuration (ie, an off-net connection).

11. REFERENCES

11.01 The following sections contain additional information.

SECTION	TITLE
309-001-011	Switched Services Network—ETL
309-400-000	ETN—General Description
309-400-001	ETN—Procedures and Responsibilities
309-400-002	CACS/CAP/CAT
309-400-004	ETN—Trouble Reporting
309-400-005	ETN—Network Analysis
309-400-007	ETN—Network Identification
311-100-500	Circuit Order and Trunk Order Transmission Tests
311-100-501	1000 Hz and Noise Measurements
311-300-500	PBX—Tests and Adjustment
471-2YY-ZZZ	Other Common Carrier (OCC)

SECTION	TITLE	SECTION	TITLE
554-010-122	SMDR—Maintenance and Test	554-191-208	SMDR—Feature Document
554-111-110	DIMENSION—Maintenance and System Administrative	554-191-3ZZ	DIMENSION—Troubles and Special Orders
554-111-300	DIMENSION—Installation and Test	660-225-1ZZ	Special Service System
554-111-3ZZ	DIMENSION—Feature Translation	795-402-100	Common Language Service Codes

End to End ETN Trunk Tests

Circuit _____ Customer _____

Location(A) (Tandem) _____ Distant End (Z) _____

   RNX(A) _____ Trunk Group DAC(Z) _____

Authorization Code _____ Station(Z) # of Digits Outpulsed _____

1. Switchboard to Switchboard Tests
   A. Transmission Test
      1) Net Loss EML _____
         BSP 311-300-500 (Table L)

Loss Readings
(For Dimensions allow 2.3 dB trunk to station loss)

	A→→Z	Z→→A

      2) Frequency Response
         BSP 311-300-500
            (Table M)

	A→→Z	Z→→A
1004N	_____	_____
404N	_____	_____
2804N	_____	_____

      3) Message Circuit Noise
            Required _____
         BSP 311-300-500
            (Table N)

    _____   _____

      4) ERL and S.P.
         BSP 311-350-100
            311-350-500 Terminating
            851-300-100
                       Through

		Required	Actual
Terminating	ERL	_____	_____
	SP	_____	_____
Through	ERL	_____	_____
	SP	_____	_____

      5) Pulsing
         BSP 311-300-500   Max 12PPS
            333-126-500   Min 12PPS
                           Max 8PPS
                           Min 8PPS

	Actual	(A→→Z)	(Z→→A)
Max 12PPS		_____	_____
Min 12PPS		_____	_____
Max 8PPS		_____	_____
Min 8PPS		_____	_____

   B. Switchpad Test
      Tandem Sta →→ Distant Sta (Overall loss and SW Pad Verification)
         Use TVS Test Station
         AML (1004H)

A→→Z	Z→→A
_____	_____

      (Dial test code + dial access code + TK # + station #).
      Note: If distant end is equipped, test tones may be used for this test.

   C. Operations Test Call
      Distant END →→ tandem test station
      (Network access code + RNX + tandem test station number) (+ Auth code if required).

            Call Completed OK _____

                                    Signature _____
                                    Date _____

Copy to National Cutover Chair

   Date _____

Fig. 1—Sample ETN Test Form 1

ETN-2
12/8/78

TRUNK GROUP TESTS

Customer _____

Tandem Location (A) _____

     RNX(A) _____

TEST AUTHORIZATION CODE _____

Trk Grp # _____

Distant Location (Z) _____

DAC(Z) _____

RNX Z: _____

Attentant RNX(Z) _____

1. Use TEST STATION to dial Distant Station
   8 + RNX + STATION
      Call Completed and SMDR Verified _____

2. Use test station to dial Distant Attendant
   8 + RNX + 0111
      Test Completed OK _____

3. If Satellite or Tributary is involved.
      Test Call A →→ Sat/Trib Station   Tributary RNX _____
        Dial 8 + RNX + Sat/Trib Sta XXXX
        Call Completed and SMDR Verified _____

4. If "Off Net" calling is provided via a subtending PBX.
      (a) Call an OFF Net number through the subtending PBX   Test NR _____
          Call Completed and SMDR Verified _____

5. AAR Verification of "ON Network" to "OFF Network" translations.
      (Call from Tandem Station to distant station).

   Note: Busy out all "on net" primary and alternate routes that could be accessed.

     (a) Call Distant Station (8+RNX+XXXX)
        1. If distant end had DID, the call should complete to the station via DDD.

        2. If distant end doesn't have DID the call should complete to the distant attendant on the LDN.

       Call Completed and SMDR Verified _____

     (b) Call Distant Attendant (8+RNX+0111) if DID. Attendant
        1. The call should complete to the distant attendant.

       Call Completed and SMDR Verified _____

                                        Signature _____

                                        Date _____

Note: On all of the above tests an authorization code may
      be required.

Form Forwarded To National Cutover Chair:

Date: _____

Fig. 2—Sample ETN Test Form 2

CUSTOMER_____

TANDEM LOCATION_____

AUTOMATIC CIRCUIT ASSURANCE TEST

(ACA TEST)

Business Service personnel should complete all sections labeled "Bus Svce" using the Routing Guide (sections "Group Attributes" and "Misc. Information") and the COD.

The field personnel verify the above results by performing the MAAP procedures given, and complete the rest of the form with the results as shown on the MAAP. A copy of the completed form should be sent to:

Cutover Chairman

_____

_____

Note: The Cutover Chairman should be notified on any discrepancies of results. He will coordinate their resolution with Business Services.

1. ACA enable: _____   (Bus Svce)

                                 _____   (MAAP 285, field 4)

                              (0 = off, 1 = on)

2. Console referred to and whether activated or not.

                      Console #   _____   (Bus Svce)

                                        _____   (MAAP 286, field 3)

                      Active   _____   (MAAP 286, field 1)

                      On/Off   _____   (MAAP 286, field 2)

Completed by (Bus Svce)_____   Date_____

Verified by (field personnel)_____   Date_____

Fig. 3—Sample ETN Test Form 3 (Sheet 1 of 2)

ETN-3b

Page_____ of _____

CUSTOMER_____

TANDEM LOCATION_____

ACA TEST
(continued)

3. Trunk group and thresholds assigned

DAC (BUS SVCE)	TRUNK GROUP # (BUS SVCE)	SHORT CALL (BUS SVCE)	THRESHOLD (MAAP 120)	LONG CALL (BUS SVCE)	LIMIT (MAAP 12)
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

Completed by (Bus Svce)_____   Date _____

Verified by (field personnel)_____   Date _____

Note: The Cutover Chairman should be notified on any discrepancies of results. He will coordinate their resolution with Business Services.

Fig. 3—Sample ETN Test Form 3 (Sheet 2 of 2)

Customer: _____

Tandem Location: _____

<u>AAR/ARS Routing Tests</u>

Business Service personnel should complete all items labelled "Bus Svce" using the Routing Guide and the COD.

The field personnel verify the above results by performing the MAAP procedures given and completing the rest of the form with the results as shown on the MAAP.
A copy of the completed forms should be sent to: Cutover Chairman

_____

_____

<u>NOTE</u>: The Cutover Chairman should be notified of any discrepancies on this form. It is his responsibility to resolve them via coordination with Business Services.

A. <u>AAR</u>

    1. A list of network RNX's and the AAR pattern they route to.

Routing Guide (Bus Svce — RNX Code Patterns)		(MAAP 320, word 4)
<u>RNX (Location Code)</u>	<u>Pattern #</u>	<u>Pattern #</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Completed by (Bus Svce): _____ Date:_____

Verified by (field personnel): _____ Date:_____

Fig. 4—Sample ETN Test Form 4(Sheet 1 of 5)

Customer: _____

Tandem Location: _____

AAR/ARS Routing Tests
(continued)

A. AAR (continued)

2. The trunk group number and other information for each of the preferences in the routing patterns listed in part A.1. above.

Routing Guide
Bus Svce — ARS Routing Patterns)   (MAAP 320, word 1)

Pattern #	Preference	DAC/Trunk Group #	FRL	Warning Tone	Offnet	Trunk Group #	FRL	Warning Tone	Offnet
_____	1	_____	__	_____	_____	_____	__	_____	_____
	2	_____	__	_____	_____	_____	__	_____	_____
	3	_____	__	_____	_____	_____	__	_____	_____
	4	_____	__	_____	_____	_____	__	_____	_____
_____	1	_____	__	_____	_____	_____	__	_____	_____
	2	_____	__	_____	_____	_____	__	_____	_____
	3	_____	__	_____	_____	_____	__	_____	_____
	4	_____	__	_____	_____	_____	__	_____	_____
_____	1	_____	__	_____	_____	_____	__	_____	_____
	2	_____	__	_____	_____	_____	__	_____	_____
	3	_____	__	_____	_____	_____	__	_____	_____
	4	_____	__	_____	_____	_____	__	_____	_____
_____	1	_____	__	_____	_____	_____	__	_____	_____
	2	_____	__	_____	_____	_____	__	_____	_____
	3	_____	__	_____	_____	_____	__	_____	_____
	4	_____	__	_____	_____	_____	__	_____	_____

Completed by (Bus Svce): _____   Date: _____

Verified by (field personnel): _____   Date: _____

Fig. 4—Sample ETN Test Form 4 (Sheet 2 of 5)

ETN-4c

Page____ of____

Customer:_____

Tandem Location:_____

AAR/ARS Routing Tests
(continued)

B. ARS

1. A list of routing patterns (for three plans) for 3-digit translated foreign NPAs.

Routing Guide
(Bus Svce — FNPA 3-D Service Codes)   (MAAP 311, word 2)

NPA	Plan 1 Pattern #	Plan 2 Pattern #	Plan 3 Pattern #	Plan 1 Pattern #	Plan 2 Pattern #	Plan 3 Pattern #
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

2. List of office codes (NNXs) and corresponding patterns for the home NPA.

Routing Guide
(Bus Svce — HNPA NNX List)   (MAAP 311, word 1)

NNX (Office Code)	Pattern #	Pattern #
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Completed by (Bus Svce): _____ Date:_____

Verified by (field personnel):_____ Date:_____

Fig. 4—Sample ETN Test Form 4 (Sheet 3 of 5)

ETN-4d
Page____ of __

Customer: _____

Tandem Location: _____

<u>AAR/ARS Routing Tests</u>
(continued)

B. <u>ARS</u> (continued)

3. List of routing patterns for 6-digit translated foreign NPAs.

Routing Guide
(Bus Svce — FNPA 6-D NNX Translation List)   (MAAP 311, word 3)

<u>NPA</u>	<u>NNX (Office Code)</u>	<u>Pattern #</u>	<u>Pattern #</u>
____	_____	____	____
____	_____	____	____
____	_____	____	____
____	_____	____	____
____	_____	____	____
____	_____	____	____
____	_____	____	____
____	_____	____	____
____	_____	____	____
____	_____	____	____
____	_____	____	____
____	_____	____	____
____	_____	____	____
____	_____	____	____
____	_____	____	____
____	_____	____	____
____	_____	____	____
____	_____	____	____
____	_____	____	____

Completed by (Bus Svce): _____   Date: _____

Verified by (field personnel): _____   Date: _____

Fig. 4—Sample ETN Test Form 4 (Sheet 4 of 5)

Customer: _____

Tandem Location: _____

AAR/ARS Routing Tests
(continued)

B. ARS (continued)

4. The trunk group number, FRL, warning tone for each of the preferences (for each plan) for the ARS patterns listed in A.1, 2, 3 above.

Routing Guide
(Bus Svce — ARS Routing Patterns)   (MAAP 310, word 1)

Plan	Pattern #	Preference	DAC/Trunk Group #	FRL	Warning Tone	Trunk Group #	FRL	Warning Tone
___	___	___	___/___	___	___	___	___	___
___	___	___	___/___	___	___	___	___	___
___	___	___	___/___	___	___	___	___	___
___	___	___	___/___	___	___	___	___	___
___	___	___	___/___	___	___	___	___	___
___	___	___	___/___	___	___	___	___	___
___	___	___	___/___	___	___	___	___	___
___	___	___	___/___	___	___	___	___	___
___	___	___	___/___	___	___	___	___	___
___	___	___	___/___	___	___	___	___	___
___	___	___	___/___	___	___	___	___	___
___	___	___	___/___	___	___	___	___	___
___	___	___	___/___	___	___	___	___	___
___	___	___	___/___	___	___	___	___	___
___	___	___	___/___	___	___	___	___	___

Completed by (Bus Svce) _____ Date _____

Verified by (field personnel) _____ Date _____

Fig. 4—Sample ETN Test Form 4 (Sheet 5 of 5)

NOTE:
  PORTS 2 & 3 ARE MADE TO LOOK PERMANENTLY
  ON-HOOK BY ON-BOARD CIRCUITRY.
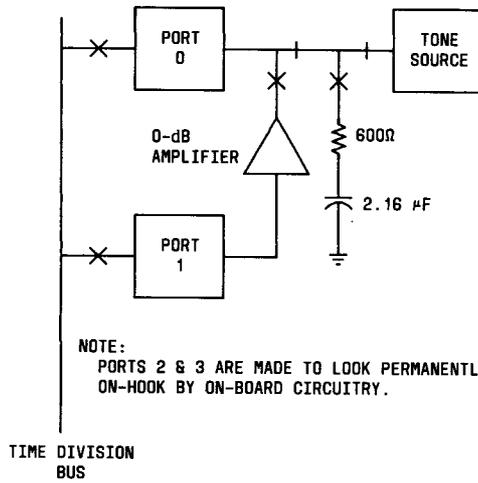
TIME DIVISION
  BUS

Fig. 5—DIMENSION Test Tones and Loop-Around Test

1. BUSY OUT ALL TRUNKS ON GROUP TO BE TESTED AND ALL ALTERNATE ROUTES (IF APPLICABLE).

2. INITIATE A CALL. NOTE TONES AS CALL QUEUES.

3. USE RMATS OR MAAP TO MONITOR PEG COUNTS ON NONPRIORITY QUEUE.

   (a) NOTE IF CALL CAUSES PEG INCREMENT.

   (b) NOTE ALL TRAFFIC REGISTER CONTENTS ON NO. 1/1A.

   (c) USE CAT TO MONITOR NONPRIORITY QUEUE AS ABOVE.

   (d) MONITOR PRIORITY QUEUE (WHEN PROVIDED).

4. OPEN FIRST ALTERNATE ROUTE; MONITOR TRAFFIC REGISTERS FOR THAT ROUTE (ONLY APPLICABLE TO ARS OR DDD OVERFLOW).

5. CALL IS ALLOWED TO TIME OUT.

6. TERMINATE CALL AFTER TIME-OUT, AND NOTE TERMINATION TIME AND ANY TONES.

7. MONITOR MESSAGE DETAIL RECORD CONFIRMING THAT CALL QUEUED FOR X SECONDS ALLOWED FOR TIME-OUT AND COMPLETED OVER ALTERNATE ROUTE WITH UPGRADED FRL (IF APPLICABLE) OR WENT TO REORDER.

8. REPEAT STEPS 1 THROUGH 7 FOR EACH FRL AND DOCUMENT TEST RESULTS.

Fig. 6—Recommended Procedures for Local Test at Each Tandem in Support of Network Queueing Installations

1. BUSY OUT ALL TRUNKS ON GROUP TO BE TESTED AND ALL ALTERNATE ROUTES (IF APPLICABLE).

2. USE TEST ACCESS TO SIMULATE CALL FROM MAIN/SATELLITE/TRIBUTARY ON ACCESS TIE TRUNK.

3. USE RMATS OR MAAP TO MONITOR PEG COUNTS ON NONPRIORITY QUEUE (WHEN PROVIDED).

    (a) NOTE IF CALL CAUSES PEG INCREMENT.

    (b) NOTE ALL TRAFFIC REGISTER CONTENTS ON NO. 1/1A.

    (c) USE CAT TO MONITOR NONPRIORITY QUEUE AS ABOVE.

    (d) MONITOR PRIORITY QUEUE (WHEN PROVIDED).

4. OPEN FIRST ALTERNATE ROUTE; MONITOR TRAFFIC REGISTERS FOR THAT ROUTE (ONLY APPLICABLE TO ARS OR DDD OVERFLOW).

5. CALL IS ALLOWED TO TIME OUT.

6. TERMINATE CALL AFTER TIME-OUT, AND NOTE TERMINATION TIME AND ANY TONES.

7. MONITOR MESSAGE DETAIL RECORD CONFIRMING THAT CALL QUEUED FOR X SECONDS ALLOWED FOR TIME-OUT AND COMPLETED OVER ALTERNATE ROUTE WITH UPGRADED FRL (IF APPLICABLE) OR WENT TO REORDER.

8. REPEAT STEPS 1 THROUGH 7 FOR EACH FRL AND DOCUMENT TEST RESULTS.

Fig. 7—Recommended Procedures for Network Queueing Test

1. BUSY OUT ALL TRUNKS ON GROUP TO BE TESTED AND ALL ALTERNATE ROUTES (IF APPLICABLE).

2. AT DISTANT TANDEM, BUSY OUT ALL TRUNKS IN ACCESS TIE TRUNK GROUP WITH QUEUES INSTALLED.

3. INITIATE TANDEM CALL TO PBX (SERVED BY DISTANT TANDEM) ON ACCESS TIE TRUNK GROUP IN STEP 2.

4. OPEN TRUNK IN DIRECT ROUTE-ON. CALL SHOULD COMPLETE TO DISTANT TANDEM AND QUEUE.

5. AT DISTANT TANDEM, OPEN TRUNK IN ACCESS TIE TRUNK GROUP. CALL SHOULD COMPLETE.

6. MONITOR MESSAGE DETAIL RECORD AT ORIGINATING TANDEM FOR PROPER DATA AND NOTE.

7. AT DISTANT TANDEM, MONITOR MESSAGE DETAIL RECORD AT TERMINATING TANDEM FOR PROPER DATA AND NOTE.

8. REPEAT STEPS 1 THROUGH 7 FOR EACH COMBINATION OF INTERMACHINE TRUNK QUEUES AND ACCESS TIE TRUNK QUEUES.

Fig. 8—Recommended Procedures for Network Queueing Test With Access Tie Trunk Queues

1. BUSY OUT ALL BUT ONE TRUNK IN "DIMENSION"/ESS TRUNK GROUP AND ALL
    ALTERNATE ROUTES AT EACH OF THE TANDEMS.

2. INITIATE TWO CALLS FROM ESS TANDEM TO "DIMENSION" TANDEM.

3. INITIATE TWO CALLS FROM "DIMENSION" TANDEM TO ESS TANDEM.

4. VERIFY THAT FIRST ESS CALL IS RELEASED -- "DIMENSION" CALL SHOULD
    SEIZE TRUNK.

5. HOLD "DIMENSION" CALL FOR 1 MINUTE -- THEN RELEASE -- ESS CALL
    SHOULD SEIZE TRUNK.

6. HOLD ESS CALL FOR 1 MINUTE -- THEN RELEASE.

7. MONITOR MESSAGE DETAIL DATA TO DETERMINE IF TRUNK GROUP IS
    PROPERLY SHARED.

Fig. 9—Recommended Procedures for Testing Network Queueing a Mixed DIMENSION/ESS ETN Configuration

1. BUSY OUT ALL TRUNK GROUPS AT A TANDEM.

2. INITIATE TEST CALLS TO VERIFY THAT QUEUES AT TANDEM ARE ACTIVE. ASSUME TANDEM AND NETWORK TESTS HAVE BEEN COMPLETED.

3. USE CACS TERMINAL TO SUSPEND EACH QUEUE AT TANDEM.

4. INITIATE CALLS TO TEST QUEUE SUSPENSION.

5. USE CACS TERMINAL TO REINSTATE EACH QUEUE AT TANDEM.

6. INITIATE CALLS TO TEST THAT QUEUES ARE ACTIVE.

7. REPEAT STEPS 1 THROUGH 6 FOR EACH TANDEM.

8. WITH ALL TRUNKS BUSY, USE CACS TERMINAL TO SUSPEND QUEUES ON A NETWORK BASIS.

9. INITIATE CALLS TO TEST QUEUES SUSPENSION.

10. USE CACS TERMINAL TO REINSTATE QUEUES ON NETWORK BASIS.

11. INITIATE CALLS TO TEST IF QUEUES ARE ACTIVE.

12. PUT ALL TRUNKS BACK INTO SERVICE.

13. DURING TESTING, MONITOR CACS TRAFFIC DATA REPORTS TO ENSURE QUEUES AND QUEUE SIZES ARE PROPERLY REFLECTED IN CACS MASK.

Fig. 10—Recommended Procedures for Testing CACS Network Queueing Installations

1. BUSY OUT ALL TRUNKS GROUPS TO BE TESTED FOR QUEUEING.

2. INITIATE CALLS TO ENSURE QUEUES ARE ACTIVE.

3. USE CAP TO CANCEL QUEUEING (NO. 1/1A TANDEMS USE CAT).

4. INITIATE CALLS TO TEST QUEUE SUSPENSION.

5. USE CAP/CAT TO REINSTATE QUEUE.

6. INITIATE CALLS TO ENSURE QUEUE IS ACTIVE.

7. DURING TESTS, USE CAP/CAT TO READ TRAFFIC REGISTERS.

8. REPEAT STEPS 1 THROUGH 6 FOR EACH QUEUE AT EACH TANDEM.

Fig. 11—Recommended Procedures for Testing CAP/CAT Network Queueing Installations

NOTES