NO. 3 ESS
OPERATIONAL TESTING
VOLUME
INTEGRATED

CONTENTS

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1. GENERAL INFORMATION

1.1 Purpose

1.11 The basic purpose of this section is to verify the office capability, during a minimum 24-hour test interval, to process an integrated volume call load within allowable error limits. Certain regularly scheduled events within this test interval are permitted to occur while other events may be inhibited.

1.12 The real 24-hour test interval is divided into 2 12-hour portions. The purpose of this is to exercise each system controller (SYC), 0 and 1, over a time interval which includes significant office events. Office time is manually altered to start the test and to force the midnight maintenance routines to occur once in each 12-hour interval.

1.13 The integrated volume test is designated as 500 calls per hour per network frame.

1.2 Sequence - This section should follow the successful completion of Handbook 269, Section 660.31; No. 3 ESS Operational Testing, Volume, Maintenance. Refer to Handbook 269, Section 1; No. 3 ESS Test Planning for an overall sequence of No. 3 ESS testing.

1.3 Test Prerequisites

1.31 All previous testing requirements, as listed in Section 1 of this handbook, should have been successfully completed.

1.32 All equipment should be in service and all other installation, test and maintenance activity should be suspended during the actual test interval.

1.4 References

1.41 General - Refer to Sections 1 and 500 of this handbook for reference to general documentation which may be useful in conducting the testing procedures of this section.

1.42 Specific - REfer to Sections 660, 660.01, 660.31, and 660.35, of this handbook for refererence to specific information whcih may be useful or required in conducting the testing procedures of this section.

2. WORKSHEETS, RECORDS, AND REQUIREMENTS

2.1 Worksheets

2.11 The worksheets prepared for Sections 660, 660.31, and 660.35 of this handbook should normally be sufficient for purposes of this section.

2.2 Records

2.21 The testing results of this section shall be recorded on Forms SD-97-1313 and SD-97-1315. For detailed information on filling out test records, refer to Section 6B, Handbook 3.

2.22 Form SD-97-1313, Test Trouble Record, is used to record TTY trouble printouts during the test interval.

2.23 Form 269.660.31-1, Volume Test Summary Record (refer to Exhibit 1 of Section 660.31 of this handbook) is used to record the call completion rate during the test interval.

2.24 These records and all associated TTY printouts will be saved as part of the office records.

2.3 Requirements

This section's testing is intended to satisfy (in part) BSP 820-650-180, Performance Requirements, No. 3 ESS, General Equipment Requirements, Electronic Switching Systems.

3. TEST EQUIPMENT

3.1 Test Sets Required

Amt.	ITE Code	Title	Part of
1	5649	Computerized Volume Test Set	---
or			
*	5956	* SCOATS - (See Section 660.01)	
1	5390-CC6	Control Board	ITE-5649
8	5390-CC7	Line Circuit	ITE-5649
set	5664	Computerized Volume Test Set Program Tapes	ITE-5649
1	5489	33 ASR TTY	ITE-5649

* 1 for each 4 network frames

** SCOATS - Speed Call Originating and Terminating Test Set)

3.2 Possible Troubleshooting Test Equipment

ITE Code	Title
4511	Whistler Test Set
4525B	Tone Buzzer Test Set
4631	Test Receiver Set
4659	Volt-Ohm-Milliammeter
4669	Tektronix 135 Amplifier and P6020 Current Probe
4732	Clip-on DC Milliammeterd
5237B	Oscilloscope Tektronix #465
PK-3H301	Network Troubleshooting Manual

4. TEST PREPARATION

4.1 General

4.11 The basic objective of this test section is to verify that the office call handling error rate is within specified limits. 24 hours of BHC is required to obtain this verification.

4.12 The office is loaded with intraoffice and interoffice calls for a "combined" 500 calls per hour per network frame. The test is conducted over an actual 24-hour (or greater) period in which it is required to observe various major events in two 12-hour periods.. Thus, specified generic program events are observed while (at the same time) data is obtained.

4.13 Adjust the volume test set to initiate 500 calls per hour per network frame.

4.14 Turn on the volume test set one line at a time.

4.15 The following outline presents a general guide for integrated volume testing.

a. Determine the intraoffice test calling rate. Verify that available test lines can support this calling rate.

b. Determine the interoffice test calling rate. Select that trunk group (or groups) configuration to be used to support integrated volume testing. (NOTE: This configuration should have already been singled out and tested as a "configuration" in Sections 660.31 and 660.35 of this handbook.) Verify that additional test lines (over that required for intraoffice calls) are available and ready to support interoffice calling.

c. Verify that available service circuits are capable of supporting the integrated calling rate.

d. Verify volume test set connections at the CDF.

e. Verify that those CDF trunk-to-trunk test interconnections required for the integrated test are available and proper.

f. Determine and insert new or modified line and trunk translations into the computerized volume test set and/or office translations.

NOTE: All originating lines of the SCOATS must be defined as 1-digit speed calling lines.

NOTE: A 500 type telephone set bridged across the SCOATS test lines may be used to "set up speed calling".

g. Set up to control (conduct or not conduct as required) automatic diagnostic testing.

h. Conduct test run. Record and analyze traffic measurement printouts. Determine if problems are present. Maintain records during the 24-hour test interval. Continuously evaluate system performance against the performance requirements. If the error rate is excessive (above allowable error rates) it is suggested that the cause of the error is isolated and corrected and that the test be restarted.

i. Determine that the test successfully passed performance requirements.

4.2 Fill Out Worksheets

4.21 Those worksheets, prepared during previous load application and volume testing, should be helpful in planning and preparing for integrated volume testing.

4.22 Test Line Worksheets, prepared during Sections 660.31 and 660.35 should be analyzed to verify that the originating and terminating test lines are adequate for integrated volume testing. (Modification may have to be made to these test lines to satisfy integrated volume test requirements.)

NOTE: Refer to Section 660.31 of this handbook for additional information on test line worksheets.

4.23 Worksheets prepared for Sections 660.31 and 660.35 should contain that trunk testing information required for integrated volume testing. This trunk test configuration should be adequate for integrated volume testing.

NOTE: Refer to Sections 660 and 660.31 of this handbook for additional information on test trunk worksheets.

4.24 Form 269.660.31-1, Volume Test Summary Record, used to record information during the maintenance volume test may also be used to record information during the integrated volume test. Information is printed out periodically on the maintenance TTY and should be transcribed on to this form. Analysis of this information (soon after it is received) should indicate if troubles are being encountered.

4.3 Maximum Applied Integrated Volume

The maximum applied integrated volume may be identical to the simulated traffic generated for the maintenance volume test. Section 660.31 of this handbook, "Maximim Applied Maintenance Volume", may be referred to for additional information on this subject.

4.4 Test Line Requirements

The integrated volume test line requirements may be supported by those test lines used during maintenance volume testing. Section 660.31 of this handbook may be referred to for additional information on this subject.

4.5 Trunk Circuit Requirements

The integrated volume trunk circuit requirements may be supported by those trunk circuits used during maintenance volume testing. Section 660.31 of this handbook may be referred to for additional information on this subject.

4.6 System Test Configuration

The integrated volume system test configuration should be similar to that system test configuration used during maintenance volume testing. Section 660.31 of this handbook may be referred to for additional information on this subject.

4.7 Automatic Diagnostic Testing

4.71 Automatic diagnostic testing on the Ringing and Tone plant may cause lost calls:

4.72 Diagnostics are not allowed on those trunk circuits designated as TEST.

4.73 Failures, which can be attributed to diagnostics of the circuit listed in paragraph 4.71 may be discounted.

4.74 Prevent Line Circuits Test (ALIT) from executing by unseating the FB525 pack at 06-29 or the FB669 pack at 06-33 in the PTU of the Test Frame. Inhibit Network Fabric tests by typing in:

INH:MSF 8! (Generic 3E3)

or INH:MSF 9! (Generic SØ2)

5. TEST PROCEDURES

5.1 General

5.11 The off-line CU must always run in the standby and update mode (except during scheduled diagnostics or when manually induced procedures force the CU out of such state). The off-line CU may be manually taken out of standby for purposes of running diagnostics or for troubleshooting purposes.

5.12 System failures encountered during test may be neutralized during the test interval. "Neutralized" in this sense means that the malfunctions causing such errors may be either corrected or eliminated from the system. Hardware faults are permitted under the following circumstances:

a. They cannot interfere or preempt other system test performance requirements (such as time requirement in SYC0 and SYC1, error rate or lost calls).

b. All hardware (other than SYC) may be placed OOS or otherwise relieved of call processing responsibilities. Such equipment does not have to be repaired during test nor subjected to subsequent call processing loads provided associated operational test procedures or diagnostics are available and used to reverify the circuit. It must, of course, be repaired and retested in accordance with available and pertinent handbook sections, before turnover to the telephone company.

5.13 Set or verify system clock to such time as automatic diagnostics will not be conducted until ready to do so (refer to paragraph 5.6 of this section).

NOTE: All other test activity should be curtailed during the integrated volume test.

5.2 Start Volume Test Set

When using the ITE-5956, refer to Section 660.01 for setup instructions, etc. Start the test set.

5.3 Forced System Time Updates

5.31 Set system machine time and date with the following TTY input message:

SET:CLK:TIME (hh, mm, ss), day (mo, dd, yy)!

NOTES: 1. The system time should be set to some convenient time before printed out. The D schedule be triggers the automatic diagnostic test sequence. Check the Traffic Work Schedule, ESS Form 3400 to ascertain that exact "system-time" when the D schedule is to appear. If the D schedule time has not been previously manually selected, it should be set to (02 30 00) using recent change messages.

2. The system is forced through the automatic diagnostic tests; first on one SYC and then again on the alternate SYC.

3. PU exercises failing to complete does not terminate the integrated volume test provided the exercise was not accomplished by a major alarm

printout. Simply manually restart the PU exercises via appropriate TTY input requests. It should be noted that if, while running that portion of PU exercises from the offline CU (CU temporarily removed from normal) the PU exercises are aborted for same non-major alarm producing reason, the CU will be left out of normal. If this situation occurs, the CU should first be restored to normal and then restart the PU exercises. This situation does not terminate the test. You are required to successfully complete the PU exercises twice (once with each CU active).

5.32 After the hourly printout (12 hours after test starts) has finished, or later if the testing on the first half of the system has been prolonged for some reason, the date and time should be changed to force the system to run the early morning diagnostics on the alternate system.

The "next day" is that "system" date set into the machine. Certain diagnostics are run on odd or even circuits depending upon if the day of the month is odd or even. Note that the SYCs should have switched during the early morning diagnostics.

5.33 Set machine time and date with the following TTY input message:

SET:CLK:TIM (hh, mm, ss), day* (mo, dd, gg)!

* The next day from that entered in paragraph 5.31 of this section.

NOTE: This returns the system to the automatic diagnostic period and forces tests on the alternate SYC and again on the peripherals.

5.4 Volume Test Set Observations

5.41 The volume test set counts should be observed for any indications of trouble conditions. Correlation with office trouble indication could be helpful in trouble isolation.

5.42 Enter the computerized volume test set totals on Form 269.660.33-1, Volume Test Summary Records.

5.5 Office Under Test Observations

5.51 Generally, when the office is performing at or near the designated test requirements, most clues or indication of problems will come via the office TTY. System malfunction indicatons via sounder alarms and lamps should be few or none. It is, therefore, suggested that close scrutiny of the TTY be made at periodic intervals to detect "non-normal" printouts. Every "non-normal" printout should be accounted for or to its impact upon test requirements.

5.52 An evaluation must be made as to the cause of every trouble printout. If the trouble printout is the result of an equipment malfunction and it is not a major alarm printout, the equipment should be removed from service in order to prevent its further use and more trouble printouts (if not already automatically accomplished by the system). The equipment must be repaired and ATP before turnover to the telephone company.

5.53 Those Registers Volume Test Set should be observed for indication of lost calls.

5.6 Excessive Trouble Indications

If the observed "error rate" exceeds the "allowed error rate", it is suggested that the test be terminated. All previous data is void. The test may be continued on a trouble-locating basis in an attempt to isolate the fault or faults.

5.7 End Test

At the conclusion of each 12-hour test run, the total test results should be reviewed and it should be determined if the results are within the performance requirements.

6. TEST REQUIREMENTS

6.1 General

Section 660 of this handbook lists general load application and volume test requirements which apply to this section (and all other load application and volume test sections). These requirements are in addition to or supplement those listed in paragraph 6.2 of this section.

6.2 Additional Integrated Volume Test Requirements

6.21 Time Requirements

6.211 The basic time interval for the integrated volume test is 24 hours. The test interval can never be less than 24 hours but may be greater than 24 hours depending upon the number and types of problems encountered, their difficulty of repair and general operating procedures.

6.212 The 24-hour interval selected as meeting the integrated volume performance requirements must be continuous and contiguous.

6.213 Each system side (SYC0 and SYC1) must be active at least 12 hours of the test interval.

6.22 Volume Requirements

The total office traffic cannot drop lower than approximately 500 calls per hour per network frame.

6.23 Error Rate Requirements

6.231 There can be no more than 1 in 10,000 calls failing to complete (or lost calls).

NOTE: This requirement is based on failure to terminate due to system errors. Failure due to malfunctioning test equipment and human error may be discounted.

6.232 No more than 5 system troubles per 10,000 calls are allowed. A system trouble may be indicated by a maintenance or diagnostic TTY printout, by any adverse or unexpected system reaction, system alarms. It should be noted that a single system trouble can cause multiple trouble indications but should be counted as only one system trouble.

6.24 Alarms

6.241 No major alarms are permitted.

NOTE: Major alarms caused by the improper or inadequate allotment or use of office facilities in support of or during test (such as trunk service circuits, etc.) may be discounted.

6.242 Minor alarms associated with system troubles are allowed.

6.25 Lost Call Impact on Test Requirements

Those lost calls which can be positively attributed to improper operator procedures or improper computerized volume test set operation may be subtracted from total lost calls to arrive at the number of lost calls used to determine success or failure of a test interval. This, of course, assumes that the other provisions of associated test requirements are not preempted.

6.26 MRFs (Maintenance Reset Functions)

No MRFs are permitted.

6.27 PU exercises must have been successfully completed twice, once on (or using) SYC0 and once again on (or using) SYC1. Final SYC exercises on SYC0 and SYC1 must be All-Tests-Pass (ATP).

No arrows shown due to extensive changes.

Manager, Development Engineering and Installation - 2/2B, 3, 4, and 5 ESS

2-8-80

Reason for Reissue:
Extensive changes.