CENTRALIZED AUTOMATIC REPORTING ON TRUNKS/ REMOTE AUTOMATIC MEASURING OF PERFORMANCE AND REPORTING ON TRUNKS (CAROT/RAMPART) GENERAL ADMINISTRATION

Contents

(continued)

Contents, continued	SUBJECT	PAGE

GENERAL

Purpose

This practice provides the following standard operational guidelines for GTE's CAROT/RAMPART trunk testing program:

• Administration.
• Operation.
• Maintenance.

System Description

A CAROT/RAMPART system:

• Performs end-to-end routine or demand transmission and operational tests on trunks.

• Consists of a minicomputer-based controller which performs mechanized administrative and control functions.

The minicomputer-based controller has the capability to:

• Cause seizure of trunks by the Remote Office Test Line (ROTL).

• Cause test equipment (e.g., responders and test lines) to be connected to each end of the trunks seized.

• Cause the test equipment to perform measurements on trunks.

• Receive and store results of measurements.

• Report trouble indications and compile statistics on the test schedule and trunk performance.

NOTE: For a more detailed description refer to:

   • "NOTES ON THE BOC INTRA-LATA NETWORKS" Section 8.

   OR

   • AT&T Practice 190-103-110.

Acronyms and Definitions

ACRONYM OR TERM	MEANING
A/D/A	Analog/Digital/Analog
AML	Actual Measured Loss
ANSI	American National Standards Institute
AR	Audible Ring
AST	Automatic Scheduled Testing
BAL	Balance
Balance Test	Includes tests concerning echo return loss (ERL) and singing return loss (SRL). Measurements are stated in "dBm". ERL — Average of return loss over the echo band (500 to 2500 Hz). SRL — Lower of two (2) average return loss measurements in the low and high singing bands, 200 to 500 Hz and 2500 to 3000 Hz respectively.
BSP	Bell System Practice
BZSL	Sleeve failure following Busy
C-Message Noise	Measurement of the amount of unwanted sound on a trunk within the frequency of 300 to 3000 Hz. Measurements are stated in "dBrnc".
C-Notched Noise	Test measurement of noise by the far-end sending a 1004 Hz tone at -16dBm to the near-end. Measurements are stated in "dBrnc".

(continued)

Acronyms and Definitions, continued

ACRONYM OR TERM	MEANING
CAROT	Centralized Automatic Reporting On Trunks
CAROT/RAMPART SYSTEM	System consisting of a: • Controller. • Dial Network. • ROTL. • Trunk under test. • Responder. • Test line.
CLO	Circuit Layout Orders
CLR	Circuit Layout Record
CO	Central Office
COMPS	Central Office Maintenance Planning System
CONTROLLER	Made up of: • Test ports. • End user remote ports. • Test and data processors.
CRCC	Carrier Restoration Control Center
CXR	Carrier
D/A	Digital/Analog
dBm	Decibel measurement specifying the amount of power in decibels above (or minus dB below) a level of one milliwatt.

(continued)

Acronyms and
Definitions,
continued

ACRONYM OR TERM	MEANING
dBrnC	Decibels above Reference Noise of 1000 Hertz at -90dBm, but adjusted for C-Message circuits with a C network.
DID	Direct Inward Dial
DLP	Decoded Level Point
DMS-200	Northern Telecom Tandem Switching Machine
DT-FIU	Digital Trunk Facility Interface Unit
DTU	Digital Trunk Unit
DTUF	Digital Trunk Unit Frame
EAS	Extended Area Service
ELP	Encoded Level Point
EML	Expected Measured Loss
EO	End Office
ERL	Echo Return Loss
FCC	Federal Communication Commission
FEBY	Far-end test line Busy
FGB	Feature Group "B"

(continued)

Acronyms and
Definitions,
continued

ACRONYM OR TERM	MEANING
FGC	Feature Group "C"
FGD	Feature Group "D"
Gain-Slope	Consists of three (3) frequency measurements (404 Hz, 1004 Hz, 2804 Hz) of the voice frequency (VF) band, which represents a response curve of the trunk line. Measurements are stated in "dBm".
GTOC	General Telephone Operating Company
H&D	High and Dry
HIT	Unexpected change in supervision (during trunk seizure)
Hz	Hertz (Frequency)
ICL	Inserted Connection Loss
I/O	Interoffice Trunking
IXC	Interexchange Carrier
LEC	Local Exchange Carrier
Loss	A defined measurement (1004 Hz loss test) of power lost from one end trunk to another end trunk. Measurements are stated in "dBm".
MDF	Main Distributing Frame

(continued)

Acronyms and Definitions, continued

ACRONYM OR TERM	MEANING
MF	Multifrequency
MS	Management Summary
NEF	Near-end Failure
NEBY	Near-end Busy
NOAS	No Answer Supervision
NSFE	Far-end Noise measurement
NSNE	Near-end Noise measurement
NSSC	Network Services Support Center
P/AR	Peak-to-Average Ratio
PCM	Pulse Code Modulation
PERR	Priming Error
PKTO	105 test line Parking circuit Time-Out
Q1	Trunks successfully tested but exceed maintenance limits (Should be repaired within 24 hours)
Q2	Trunks successfully tested but exceed immediate-action limits (Remove from service and repair immediately)

(continued)

Acronyms and
Definitions,
continued

ACRONYM OR TERM	MEANING
QMEP	Quality Measurement Evaluation Plan, used to measure CAROT/RAMPART routine testing performance. Expressed in % Trunk Tests Meeting Performance Objectives
QSIC	Quad Span Interface Card
RAMPART	Remote Automatic Measuring of Performance And Reporting on Trunks
RDT	Routine and Demand Test
RERR	ROTL signalling format Error
RO	Reorder from far-end
ROTL	Remote Office Test Line
ROTNOT	Routine Testing, Trunks Not Scheduled for a specified ROTL office
ROTSCH	Routine Testing, Trunks Scheduled for specified ROTL office
RSU	Remote Switch Unit
SCED	Routine Test Scheduling Program
SDN	Switched Digital Network
SPC	Stored Program Control
SPHT	Supervisory Hit detected

(continued)

GENERAL, continued

Acronyms and Definitions, continued

ACRONYM OR TERM	MEANING
SRL	Singing Return Loss
SSWAP	Switching Services Work Allocation Procedure
SUPV	Supervision
TCT	Toll Connecting Trunk
TDL	Temporary Daily List
TGSCH	Routine Testing, All trunks scheduled for a specified Trunk Group
TLOSCH	Routine Testing, All trunks scheduled for a specified Test Line office
TLP	Transmission Level Point
TPT	Test Progress Tone (ROTL calls only)
VA	Voice or Voice Announcement
VF	Voice Frequency
VNL	Via Net Loss
VNLF	Via Net Loss Factor
WEPL	Weighted Echo Path Loss

RESPONSIBILITIES

Network Services Support Center	The CAROT/RAMPART Centers are located in the Network Services Support Center (NSSC) which are responsible for: • Operating and maintaining the controller(s). • Maintaining the CAROT/RAMPART database. • Scheduling routine trunk testing. • Generating daily and monthly performance reports. • Providing overall CAROT/RAMPART system analysis. • Providing technical assistance on ROTL/Responder maintenance.
Switching Services Operations Center/ Carrier Restoration Control Center	The Switching Services Operations Center/Carrier Restoration Control Center (SSOC/CRCC) is responsible for: • Receiving daily and monthly performance reports. • Analyzing exception reports. • Dispatching on Q1, Q2, High & Dry, and trouble patterns. • Providing next level of support to the Central Office (CO). • Ensuring trunk testing performance objectives are met, i.e., QMEP.
Central Office	Central Office maintenance personnel provide: • Maintenance and alignment on trunks. • Maintenance on ROTL/Responder equipment. • Routine maintenance on test line equipment. • Demand tests on new, changed, or failed trunks. AND • Ensure that all eligible trunks are in the CAROT/RAMPART database.
Trunk Administration	Trunk Administration is responsible for: • Designing circuits. • Issuing Circuit Layout Orders (CLO's). • Providing all pertinent transmission information on circuits.
Maintenance Administration	Maintenance Administration is responsible for: • Providing staff support for CAROT/RAMPART operations. • Issuing practices, policies, and procedures. • Overseeing budget and staffing requirements. • Evaluating training requirements. • Providing vendor liaison.

Controller | The following formulae are used as performance indicators for management:

FORMULA

TEST PORTS = TP = 1-((TPs DOWN * MINUTES DOWN) /
(TOTAL TPs * AVAILABLE MINUTES))

REMOTE PORTS = RP = 1-((RPs DOWN * MINUTES DOWN) /
(TOTAL RPs * AVAILABLE MINUTES))

DATA/TEST CPUs = CP - 1-((CPs DOWN * MINUTES DOWN) /
(CPs * AVAILABLE MINUTES))

Controller Availability = ((TP+RP+CP)/3)*100

Controller Availability Objective is 99.4% to 100%.

NOTE: • CAROT controller update/backup time is NOT to:

— Exceed one hour per business day.
— Be included in the above calculation.

• Preventive Maintenance (PMS) planned or unplanned ARE to be included in the calculation.

Trunk | Trunk Performance is an indication of how well the network is meeting the customer needs from a transmission and/or access perspective.

GTE CAROT objectives and definitions are:

OBJECTIVE	DEFINITION
Percent Trunks Tested	Percentage of scheduled trunks on which transmission tests were actually performed.
Percent Not Tried	Percentage of scheduled trunks not accessed due to test equipment malfunctions i.e., ROTL and/or Responder self-check failures, trunks in aborted groups (2 VA's, 4 H&D's, etc.).

(continued)

**Trunk,
continued**

OBJECTIVE	DEFINITION
Percent Busy	Percentage of scheduled trunks not accessed due to trunk exhibiting a permanent busy condition. CAROT will attempt to access each scheduled trunk up to four times throughout the night's test cycle, if necessary.
Percent High & Dry	Percentage of scheduled trunks that the far end test line could not be accessed due to a "no ring" condition.
Percent Other	Percentage of scheduled trunks which encountered an incorrect response on the far end test line e.g., voice announcement, ring no answer, reorder, far end test line busy, ROTL errors, and priming errors.
Percent Q1	Percentage of transmission tests performed which exceeded the assigned maintenance limits. Indication that a circuit is degrading, but shouldn't be noticeable by the customer. However, it requires alignment before degrading to a Q2 condition.
Percent Q2	Percentage of transmission tests performed which exceeded the assigned limits and are noticeable by the customer. This circuit should be removed from service immediately and not be turned up until properly aligned.
QMEP	Measurement of percent trunk tests meeting performance objectives. The numerator includes Q1s, Q2s, High & Dry, and Other categories. The denominator is total scheduled test completed plus attempted.

(continued)

Trunk,
continued

Listed below are the GTE CAROT objectives. The QMEP formula shows which registers in the CAROT database are used in obtaining the QMEP objective.

MEASUREMENT	OBJECTIVE
Percent Trunks Tested	95.00%
Percent Not Tried	2.00%
Percent Busy	1.00%
Percent High & Dry	0.50%
Percent Other	1.50%
Percent Q1	0.50%
Percent Q2	0.25%
QMEP	98.70%

QMEP = (1-(MGQ1 + MGQ2 + MBQ1 + MBQ2 + MSQ1L + MSQ1CM +MSQ1CN + MSQ2L + MSQ2CM + MSQ2CN + MSH&D + MSOTHER) / (MTTLOS + MTTCMES + MTTCN + MGTEST + MBTEST + MSH&D + MSOTHER))*100 [NO DISCOUNTS]

NOTE: Trunk Performance Reports should be available on a Central Office, District, Division, SSOC, Unit, Area, IXC, or GTE basis.

Reports   The following are examples of minimum monthly summary CAROT performance reports:

CAROT — TRUNK PERFORMANCE

MONTHLY REPORT SUMMARY

DECEMBER 1989

GTE TELOPS OBJECTIVE	95.00	0.50	0.25	2.00	0.50	1.00	1.50	98.70	98.70

AREA NAME	% TESTED	% Q1	% Q2	% NTRY	% H&D	% BUSY	% OTH	% QMEP	YTD QMEP
AREA TOTAL	96.93	0.30	0.33	0.64	0.05	1.40	0.98	98.98	99.29

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OPERATING
UNIT NAME (first)

SSOC	% TESTED	% Q1	% Q2	% NTRY	% H&D	% BUSY	% OTH	% QMEP	YTD QMEP
EASTERN	95.60	0.60	0.35	1.50	0.40	1.20	1.40	97.98	99.10
NORTHERN	93.07	2.26	2.95	4.14	0.05	1.59	1.15	93.56	96.54
SOUTHERN	97.25	0.14	0.02	1.06	0.03	1.23	0.43	99.65	99.40
WESTERN	98.32	0.04	0.01	0.42	0.02	0.67	0.57	99.69	99.68
UNIT TOTAL	97.65	0.04	0.02	1.00	0.02	0.82	0.51	99.71	99.65

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OPERATING
UNIT NAME (last)

SSOC	% TESTED	% Q1	% Q2	% NTRY	% H&D	% BUSY	% OTH	% QMEP	YTD QMEP
BEST BAY	95.14	0.09	0.01	2.89	0.05	1.29	0.63	99.64	99.53
WIDE OPEN	97.34	0.08	0.00	0.99	0.03	0.95	0.69	99.64	99.46
LOOKOUT	97.25	0.11	0.01	1.40	0.03	1.23	0.43	99.65	99.40
UNIT TOTAL	96.90	0.11	0.01	1.82	0.07	1.12	0.09	99.51	99.43

*** END -OF -REPORT ***

Reports,
continued

— — — CAROT EQUIPMENT PROBLEM HISTORY REPORT — — —

ROTL'S DOWN

OFFICE	CONDITION	DATE DOWN	DATE UP	STATUS	NOTE
CLLIstZZZZZ	Self-chk Fail.	mm/dd/yy	mm/dd/yy	UP	

TESTLINES DOWN

OFFICE	CONDITION	DATE DOWN	DATE UP	STATUS	NOTE
CLLIstZZZZ	RO on 01/01/89	01/02/89		DWN	1

TRUNK(S) OR TRUNK GROUP NOT TESTED

OFFICES	CONDITION	DATE DOWN	DATE UP	STATUS	QTY	NOTE
CLLIstZZZZ- CLLIstZZZZ	H&D ON 01/01/89	01/02/89	01/01/89	UP	(21)	

Note: 1. Local maintenance investigating problem.

Glossary: Can be used to explain acronyms or abbreviations.

*** END - OF - REPORT ***

Report
Distribution

Trunk Performance and Problem History Reports are distributed to:

- Managers — Network Services.
- Division Managers.
- Managers — Maintenance Administration.

NOTE: Reports need to be issued by the 10th calendar day of the current month for the previous month's data.

General   This section provides definitions and tables for use in encoding the
CAROT/RAMPART database for trunk transmission testing. The Test limit
Parameter of TP record is used in the CAROT database for input of the Q1
(maintenance limits) and Q2 (immediate action limits) parameters. A sample of the
TP record is shown below:

CAROT PARAMETER RECORD
9/2/89

	TEST LIMITS																																											
	LOSS 1004 HZ			C-MESSAGE		GAIN/SLOPE 404 HZ				GAIN/SLOPE 2804 HZ				C-NOTCHED		BALANCE							
				NOISE		LESS LOSS	LESS LOSS	MORE LOSS	MORE LOSS	LESS LOSS	LESS LOSS	MORE LOSS	MORE LOSS	NOISE		ERL NEAR	ERL NEAR	ERL FAR	ERL FAR	SRL NEAR	SRL NEAR	SRL FAR	SRL FAR
	DCL	Q1	Q2	Q1	Q2	Q1	Q2	Q1	Q2	Q1	Q2	Q1	Q2	Q1	Q2	Q1	Q2	Q1	Q2	Q1	Q2	Q1	Q2
1|2|3	4|5	6|7	8|9	10|11	12|13	14|15	16|17	18|19	20|21	22|23	24|25	26|27	28|29	30|31	32|33	34|35	36|37	38|39	40|41	42|43	44|45	46|47	48|49
/|T|P																							

Designed Circuit Loss

Table A   Table B,C   Table D,E   Table F   Table G

Use the following information and Tables A through G in determining the Q1 or Q2
parameters for transmission testing of:

- Loss.
- C-Message.
- Gainslope.
- C-Notch.
- Balance type.

These Tables were:

- Developed by using the American National Standards Institute (ANSI)
  document.

- Approved by Transmission Engineering.

Loss
Deviation
(Table A)

A Loss Deviation test is a definition measurement of the amount of power lost from one end of a trunk to the other. CAROT/RAMPART makes 1004 Hz loss test.

When loss is being tested:

- A one milliwatt 1004 Hz at O dBm test tone is sent over the trunk from the:

  — Far-end to the near-end.

    THEN

  — Near-end to the far-end.

NOTE: If the far-end is equipped with only a 102 type testline, the loss measurement will be only in one direction, i.e., Far-end to near-end.

- The amount of power lost in each tone is measured at the end which is receiving it.

- Loss criteria is set in accordance to facility design in terms of Estimated Measured Loss (EML).

- Loss deviation from EML are rated as "Q1" or "Q2" where Q1 is the maintenance limit and should be repaired within 24 hours and Q2 is the immediate action limit and must be removed from service and repaired immediately.

- Loss measurements are stated as "dBm".

EML Loss Deviation
10/5/89

TABLE A

		Intra LATA								Feature Group-D					Feature Group-C				
		EO-EO 2wire		EO-EO 4wire		EO-AT 2wire		EO-AT 4wire	AT-AT 4wire	EO-POT 2wire		EO-POT 4wire		AT-POT 4wire	EO-POT 2wire		EO-POT 4wire		AT-POT 4wire
			*		*		*													
TIER-1	Q1	.7	1.2	.7	1.2	.7	1.2	.7	.7	.7	1.2	.7	1.2	.7	.7	1.2	.7	1.2	.7
	Q2	2.0	2.0	2.0	2.0	2.0	2.0	1.5	1.5	2.0	2.0	2.0	2.0	1.5	2.0	2.0	2.0	2.0	2.0
TIER-2	Q1	.7	1.2	.7	1.2	.7	1.2	.7	.7	.7	1.2	.7	1.2	.7	.7	1.2	.7	.7	.7
	Q2	2.5	2.5	2.5	2.5	2.5	2.5	2.0	2.0	2.5	2.5	2.5	2.5	2.0	2.5	2.5	2.5	2.5	2.5

* Trunks on Cable without gain.

TIER-1   DIGITAL, CABLE, DIGITAL + CABLE
(64kbits/s 8-bit encoding; D2, D3, D4, D5 channels on wire, radio, or fiber media)

TIER-2   MULTIFACILITIES COMBINATION AND OTHER FACILITIES
(32kbits/s 7-bit encoding; D1 channels; Frequency Division Multiplex to DS-1
trans-multiplexers; compandored and non-compandored analog carrier facilities or
combined with TIER-1 facilities)

C-Message
Noise

A C-Message Noise test is made to measure the amount of unwanted noise on a trunk within the frequency of 300 to 3000 Hz.

When noise is being tested, test gear (105 testline) is attached to the trunk to measure the amount of unwanted noise on the trunk when it is idle. The noise levels also have threshold criteria of "Q1" and "Q2" in accordance with facility design parameters. C-Message measurements are stated as "dBrnc". Measurements that are greater than the established parameters will be flagged as Q1 or Q2 accordingly.

C-MESSAGE NOISE
9/1/89

TABLE B

TIER - 1		Intra LATA			Feature Group - D		Feature Group - C	
FACILITY TYPE		EO—EO	EO—AT	AT—AT	EO—POT	AT—POT	EO—POT	AT—POT
DIGITAL (ANY LENGTH)	Q1	28	26	26	28	26	30	28
	Q2	30	28	28	30	28	32	30
CABLE < 15 MILES	Q1	28	26	26	28	26	30	28
	Q2	30	28	28	30	28	32	30
DIGITAL+ <15 MI CABLE	Q1	28	26	26	28	26	30	28
	Q2	30	28	28	30	28	32	30
CABLE > 15 MILES	Q1	31	29	29	31	29	33	31
	Q2	33	31	31	33	31	35	33
DIGITAL+ >15 MI CABLE	Q1	31	29	29	31	29	33	31
	Q2	33	31	31	33	31	35	33

TIER-1   DIGITAL, CABLE, DIGITAL + CABLE
(64kbit/s 8-bit encoding; D2,D3,D4,D5 channels on wire radio or fiber media)
Digital End Office Using digital loss pads add 1 db to Q1 for the terminating direction.

TABLE C

TIER - 2		Intra LATA			Feature Group - D		Feature Group - C	
FACILITY MILES		EO—EO	EO—AT	AT—AT	EO—POT	AT—POT	EO—POT	AT—POT
0 — 50	Q1	31	30	30	31	30	32	31
	Q2	34	33	33	34	33	35	34
51 — 100	Q1	33	32	32	33	32	34	33
	Q2	36	35	35	36	35	37	36
101 — 200	Q1	35	34	34	35	34	36	35
	Q2	38	37	37	38	37	39	38
201 — 400	Q1	38	37	37	38	37	39	38
	Q2	41	40	40	41	40	42	41
) — 400	Q1	40	39	39	40	39	41	40
	Q2	43	42	42	43	42	44	44

TIER-2   MULTIFACILITIES COMBINATION AND OTHER FACILITES
(32-kbit/s 7-bit encoding; D1 channels; Frequency Division Multiplex to
DS-1 trans-multiplexers; compandored and non-compandored analog carrier
facilities or combined with TIER-1 facilities)

C-Notched
Noise

C-Notched Noise tests are made by the far-end sending to the near-end a 1004Hz tone at -16dBm. The near-end responder filters out that frequency and measures the noise. Gives important information on carrier facility trunks.

Transmission noise measurement is as follows:

TRANSMISSION TYPE	MEASUREMENT
Voice	The noise heard during the quiet intervals of speech is most important and this is what the standard message circuit noise measurement evaluates.
Data	The noise on the channel during active transmission and the corresponding signal to noise ratio is what is most important.

In systems using compandors or quantizers, the noise increases during active transmission. To measure this noise:

- A -16dBm tone is transmitted from the far-end of the channel under test and then filtered out ahead of the noise.

- The filter used to remove the tone is a narrow notch filter centered at the frequency of the tone, hence, the name C-Notched noise. Also referred to as noise with tone.

(continued)

C-Notched
Noise,
continued

C-Notched measurements are stated in "dBrnc". Measurements that are greater than the established parameters will be flagged as Q1 or Q2 accordingly.

C-NOTCHED
9/28/89

TABLE F

Signal/Noise Ratio								
		Intra LATA			Feature Group-D		Feature Group-C	
FACILITY		EO—EO	EO—AT	AT—AT	EO—POT	AT—POT	EO—POT	AT—POT
TIER 1	Q1	33	35	35	33	35	31	33
	Q2	32	34	34	32	34	30	32
TIER 2	Q1	31	33	33	31	33	29	31
	Q2	27	29	29	27	29	25	27

Use Formula below to derive CAROT C-notched parameter.

TIER-1 DIGITAL, CABLE, DIGIT + CABLE
   (64-kbit/s 8-bit encoding; D2,D3,D4,D5 channels on wire, radio or fiber media)
   Digital End Office using digital loss pads add 2 db for degradation factor
   for terminating direction. CABLE is cable of any length.

TIER-2 MULTI-FACILITIES COMBINATION AND OTHER FACILITIES
   (32-kbit/s 7-bit encoding; D1 channels; Frequency Division Multiplexers to
   DS-1 trans-multiplexers; compandored and non-compandored analog carrier
   facilities, or if combined with TIER-1 facilities)
   Digital End Office using digital loss pads add 1 db for degradation factor
   for terminating direction.

$$90 - \underline{\hspace{1.5cm}} - \underline{\hspace{1.5cm}} - \underline{\hspace{1.5cm}} + \underline{\hspace{1.5cm}} = \underline{\hspace{1.5cm}} \text{ dbrnC0}$$

| -16 CAROT | Trunk | Signal/Noise | Degradation | CAROT |
| Test Signal | EML | Ratio | Factor | Parameter |

TESTING PARAMETERS, continued

Gainslope   Three frequency measurements are called gainslope. Gainslope is an overall view of the trunk-voice frequency (VF) band. Measurement of three frequencies of the audible band of a telephone line (404Hz, 1004Hz, 2804Hz) represents a response curve of the trunk line.

The loss on a channel is measured at three different frequencies:

- 404Hz.
- 1004Hz.
- 2804Hz.

The loss at 1004Hz is subtracted from the loss at 2804Hz and that at 404Hz. These differential losses are referred to as the slope at 2804Hz and at 404Hz. These two slopes are a measure of the frequency response of the channel under consideration. Higher loss at 2804Hz or 404Hz in comparison to loss 1004Hz results in positive slope value. Gainslope measurements are stated in "dBm".

$$\text{GAIN/SLOPE}$$
10/3/89

TABLE D

TIER-1		Intra LATA					Feature Group-D			Feature Group-C					
		ED-ED 2_{wire}	ED-ED 4_{wire}	ED-AT 2_{wire}	ED-AT 4_{wire}	AT-AT 4_{wire}	ED-POT 2_{wire}	ED-POT 4_{wire}	AT-POT 4_{wire}	ED-POT 2_{wire}	ED-POT 4_{wire}	AT-POT 4_{wire}	ED-AT 2_{wire}^{**}	ED-AT 4_{wire}^{**}	Notes
Less Loss	Q1	1.0	1.0	0.5	0.5	0.5	1.0	1.0	0.5	1.0	1.0	1.0	1.5	1.5	1
	Q2	1.5	1.5	1.0	1.0	1.0	1.5	1.5	1.0	1.5	1.5	1.5	2.0	2.0	2
More Loss	Q1	2.0	2.0	1.5	1.5	1.5	2.0	2.0	1.5	2.0	2.0	2.0	3.0	3.0	3
	Q2	2.5	2.5	2.0	2.0	2.0	2.5	2.5	2.0	2.5	2.5	2.5	3.5	3.5	4

TIER-1 DIGITAL, CABLE < 1 MI, DIGITAL + CABLE < 1 MI
(64-kbit/s 8-bit encoding; D2, D3, D4, D5 channels on wire, radio, or fiber media)
** Non Equal Access Offices; Equal Access Offices use Intra Lata parameters.

TABLE E

TIER-2		Intra LATA					Feature Group-D			Feature Group-C					
		ED-ED 2_{wire}	ED-ED 4_{wire}	ED-AT 2_{wire} *	ED-AT 4_{wire} *	AT-AT 4_{wire} *	ED-POT 2_{wire}	ED-POT 4_{wire} *	AT-POT 4_{wire} *	ED-POT 2_{wire}	ED-POT 4_{wire} *	AT-POT 4_{wire} *	ED-AT 2_{wire}^{**}	ED-AT 4_{wire}^{**}	Notes
Less Loss	Q1	1.5	1.5	1.0 0.5	1.0 0.5	1.0 0.5	1.5	1.5 1.0	1.0 0.5	1.5	1.5 1.0	1.5 1.0	1.5 1.0	1.5 1.0	1
	Q2	2.0	2.0	1.5 1.0	1.5 1.0	1.5 1.0	2.0	2.0 1.0	1.5 1.0	2.0	2.0 1.0	2.0 1.0	2.0 1.0	2.0 1.0	2
More Loss	Q1	5.0	3.5	2.5 2.5	2.5 2.5	2.5 2.5	5.0	3.5 2.5	2.5 2.5	5.0	3.5 2.5	3.5 2.5	6.0 2.5	5.0 2.5	3
	Q2	5.5	4.0	3.0 3.0	3.0 3.0	3.0 3.0	5.5	4.0 3.5	3.0 3.0	5.5	4.0 3.5	4.0 3.5	6.5 3.5	5.5 3.5	4

TIER-2 MULTI-FACILITIES COMBINATION AND OTHER FACILITIES
(32-kbit/s 7-bit encoding; D1 channels; Frequency Division Multiplexers to DS-1 trans-multiplexers; compandored and non compandored analog carrier facilities or if combined with TIER-1 facilities.
* When POT is an interface with SF signaling, more stringent parameters are required between the Exchange Carrier and POT. + Use more stringent parameters if SF signaling is used.
** Non Equal Access Offices; Equal Access Offices use Intra LATA parameters.

CAROT "TP" Record character postions:
Notes: 404 hz   2804 hz
1 =   14,15   22,23
2 =   16,17   24,25
3 =   18,19   26,27
4 =   20,21   28,29

Balance

Balance testing includes the following low and high frequency tests:

- Echo return loss.
- Singing return loss.

Echo can occur at:

- Any 4- to 2-wire junction.

  OR

- 2-wire impedance irregularity.

The amount of echo return is a function of the mismatch between the impedance at those points. Balance procedures are used to control the mismatch as a fundamental means of controlling echo. Impedance mismatch at different levels of the switching hierarchy is controlled through balance procedures.

The predominant echo normally occurs at the 4- to 2-wire junction (hybrid) closest to the subscriber loop. Any additional echoes would further degrade talker and listener echo.

Balance is controlled to meet objectives for ERL and SRL. ERL is the average of return loss over the echo band (500 to 2500Hz). SRL is the lower of two average return loss measurements in the low and high singing bands, respectively (200 to 500Hz and 2500 to 3000Hz).

Balance measurements are stated in "dBm". Measurements that are smaller than the established parameters will be flagged as Q1 or Q2 accordingly.

Balance
9/1/89

TABLE G

		EO—AT		EO—POT	
		ERL	SRL	ERL	SRL
Tier 1 & 2	Q1	18	10	18	10
	Q2	13	6	13	6

CAROT balance testing is concerned only with the Echo Return Loss (ERL) and Singing Return Loss (SRL) for offices where a 2-4 wire hybrid resides on the trunk. Balance measurements are made by the ROTL at the 4-wire office whereas the 2-wire office ROTL provides the termination. Analog End Offices with 4-wire trunks most likely to have the hybrid on its trunks and should be balance tested where as Digital End Offices does not have a hybid on its trunks and need not be balance tested. Digital Offices with Access Tandem responsibilities should be enabled to balance test trunks to Analog End Offices.

The parameters for End Offices (EO) originating trunks tested from the EO are entered in the Echo-FAR and SRL-FAR character positions of the CAROT "TP" record. Parameters for the Access Tandem Office for terminating trunks tested from the AT are entered in the Echo-NEAR and SRL-NEAR character postions in the CAROT "TP" record.

| Routine | Routine testing is normally performed daily between 1800 hours and 0500 hours. However, this interval may fluctuate due to: |

- Controller capacity.
- Number of test cycles scheduled.
- Customized ROTL start-up time for certain central offices.

NOTE: The CAROT controller should not exceed 100,000 trunks in the database.

Routine testing includes the following types of testing:

- Loss.
- C-Message.
- C-Notch.
- Gainslope.
- Balance.

Frequency

Minimum testing requirements are:

FACILITY TYPE	LOSS	C-MESS	C-NOTCH	G/S	BALANCE
DIGITAL Pure	M	M	M	Q	X
DIGIT A/D/A	W	W	W	M	OPT
ANALOG	W	W	W	M	OPT
CABLE Rptrd	W	W	W	M	OPT
CABLE Non Rptrd	M	M	M	M	X

W=Weekly,   M=Monthly,   Q=Quarterly,   X=Not Required,   OPT=Optional

Trunk types requiring routine testing include:

- Interoffice.
- EAS.
- Toll.
- IXC (FGB, FGC, FGD).
- DID.

Demand   Demand testing:

- Should normally be conducted from 0800 hours to 1700 hours.

- Is activated by the end-user.

- Restricted times are noted in the "sign on message" so users will know when not to schedule demand testing.

- Results will be transmitted to the end-user's terminal that requested the test or to another specified terminal if desired.

- Can be requested on an individual trunk, trunk group, or facility basis.

NOTE: • No Routine or Demand testing can be conducted during the CAROT update period.

- Remote users can not access the system during the UPDATE cycle.

- The "sign-on message" should contain the time that UPDATE is scheduled.

INTEREXCHANGE CARRIER (IXC) TESTING

Types   IXC routine testing will be conducted on all IXC trunk terminated connections. This includes Feature Group "B" (FGB), Feature Group "C" (FGC), and Feature Group "D" (FGD) trunks. Unless otherwise specified in local tariffs normal Automatic Scheduled Testing (AST) includes:

- Loss.
- C-Message Noise.
- C-Notch Noise.
- Gainslope.
- Balance. *

    *   Not required if the LEC equipment isn't capable of performing the test.

Provision testing or acceptance testing on new circuits can be accomplished via CAROT/RAMPART using the demand test mode. Acceptance testing must be completed on or before the circuit due date. The testing schedule must be coordinated with the IXC.

The use of CAROT/RAMPART testing is predicated on the IXC providing access to a 105 type test line.

Frequency

IXC trunks:

- Must be routinely tested on a monthly basis.
- Will be tested and aligned prior to turn-up for service.

NOTE: IXC request for more frequent testing or special testing will result in billing the IXC for services.

Results
Reporting

If Automatic Scheduled Testing (AST) is used to test the switched access service, GTE will provide the IXC with monthly test reports indicating the:

- Number of trunks tested.
- Test results.

NOTE: Reference FCC No. 1 Tariff for all requirements dealing with an IXC.

ANALOG/DIGITAL

Analog
Testing

Analog testing requirements include:

- Loss.
- C-Message.
- C-Notch.
- Gainslope.
- Balance (4- to 2-wire).

Guidelines for analog testing are:

- Analog circuits require more maintenance than digital.

- If any leg of the circuit is analog, then the entire circuit will be considered analog.

- Analog circuits may be physical cable (non-repeatered or equipped with VF repeaters), digital span line with digital-to-analog converter.

- Trunks included are:

  - I/O.
  - EAS.
  - Toll.
  - IXC.
  - DID.
  - Intermachine trunks.

- Frequency of testing is based on facility type.

- Analog offices with 50 or more CAROT/RAMPART testable trunks should be equipped with a ROTL/Responder.

- A 105 test line should be installed in every central office.

Digital Testing	CAROT/RAMPART testing:

Digital Testing

CAROT/RAMPART testing:

- Reports a very small amount of transmission related problems on digital facilities between two digital switches.

- Identifies switch related problems not detected by other monitoring systems.

Digital facilities will continue to be tested via CAROT/RAMPART until information as stated below is detected and a report supplied on a real-time basis from other full-time performance monitoring systems. The report must:

- Provide a detailed analysis of syndromes detected during monitoring.

- Give sufficient information to allow a trouble ticket to be generated and dispatched.

When utilizing a system that monitors using thresholds, the thresholds must be set to one to ensure real-time performance.

CAROT/RAMPART testing of digital facilities will:

- Locate switch irregularties.
- Indicate bipolar violations in Digital Trunk-Facility Interface Unit (DT-FIU).
- Provide measurement on interface to T1 CXR.
- Provide C-Notch measurement on interface to T1 CXR.
- Reflect impluse noise from spikes in the facility.
- Detect Sleepy Span Syndromes via Reorder condition.
- Identify incorrect digital pad settings.
- Detect harmonic distortion between GTD-5 and DMS-200.
- Detect failing QSIC card in DTUF.

Digital testing includes:

- Loss.
- C-Message.
- C-Notch.
- Gainslope.

Frequency of testing:

- Monthly for:

    — Loss.
    — C-Message.
    — C-Notch.

- Quarterly for Gainslope.

(continued)

QUALITY ASSURANCE

Controller Database

Software audit utility programs are available to check accuracy of Controller Database. These programs are:

PROGRAM	DESCRIPTION	FREQUENCY OF RUNNING
VRDIT	Checks database addresses, links, and accessibility of all records.	Twice a week.
UTFIX	Checks all utility file links and repairs any broken links found.	Twice a month.
INDEX	Checks last routine test attempt since a given date.	Once a month.
PEREC	Monitors and maintains file sizes.	Once a week.

NOTE: More detailed information is available in AT&T Practice 190-103-211 (2 CAROT 4 Controller — Data Base Administration).

Circuit Orders

Check pending circuit orders at least weekly to detect overdue orders. This pertains to:

- Adds.
- Changes.
- Deletes.

QUALITY ASSURANCE, continued
_____

Central
Office

Verify CAROT/RAMPART testable trunks as follows:

- CO displays all trunk groups.

- Compare display with actual circuit orders.

- Ensure all CAROT/RAMPART testable trunks can be accessed by controller via Demand Test Feature.

- Pursue and correct all discrepancies.

- Alignment of test equipment:

  — ROTL.
  — Responder.
  — Test lines (105, 102).
  — Minimum frequency once per year.

NOTE: Include the above routines in the local Central Office Maintenance Planning System (COMPS) or Switching Services Work Allocation Procedure (SSWAP) database.