

MULTIFREQUENCY OUTGOING SENDERS SD-26051-01 AND SD-25580-01
TESTS
USING SENDER TEST SET SD-25674-01 (J24756A)
NO. 5 CROSSBAR OFFICES

1. GENERAL

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1.01 This section describes a method of testing nonwire-spring-relay type and wire-spring-relay type multifrequency outgoing senders using the master test control circuit SD-25800-01, the sender test set circuit SD-25674-01, and the sender test circuit SD-25675-01.

1.02 The reasons for reissuing this section are listed below. Revision arrows are used to emphasize the more significant changes. Equipment Test Lists are affected.

(a) To add Test AI.

(b) To add paragraph 5.25.

1.03 The tests covered are:

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A. Regular Call: This test checks that the sender records information from a marker and outputs interoffice calls on an AMA or non-AMA basis. The transmitting of information to the transverter is checked on AMA class calls. This test also checks sender functions on CCSA tandem AMA calls.

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B. Abandoned Call—AMA: This test checks that the sender waits until the initial AMA entry has been made before releasing.

11

C. Abandoned Call—Non-AMA: This test checks that the sender releases at any stage of a call.

12

D. Transverter Trouble Release—Noncoin Zone—AMA: This test checks that the RO relay operates, the trunk is set to overflow, and the sender releases when the transverter fails on both first and second trial on a detail-billed call.

13

E. Transverter Trouble Release Coin Zone—AMA: This test checks that the sender, when arranged to function with coin zone trunks and junctors, allows a coin zone call to complete on a trouble release from the transverter.

14

F. Delay Pulsing of Last Digit—AMA: This test checks that the sender delays sending the last digit until AMA functions are completed.

14

G. No-Digit Call—AMA: This test checks that the sender releases without pulsing on a no-pulse AMA call. It also checks that the sender, after timeout, does not release on an abandoned intraoffice call until the transverter releases. An interoffice office trunk is used when making this test.

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H. Reversed Trunk Test: This test checks that the sender sets the trunk to overflow and that the sender releases when supervision is reversed to off-hook after the start-pulse signal.

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I. Trunk Test—Open Trunk: This test checks that the sender detects an open trunk during trunk test and after timeout, sets the trunk to overflow.	17	when the multifrequency current supply is transferred during pulsing.	24
J. Timing Features—Noncoin Zone: This test checks that the sender releases and sets the trunk to overflow in 12 to 24 seconds if it cannot complete its functions. It also checks that the sender times out and sets the trunk to overflow if the transverter has not completed its functions within 7 to 12 seconds.	18	O. Intersender Timing—Wire-Spring Relay Type and Nonwire-Spring-Relay Type Arranged for Intersender Timing: This test checks that the sender sets the trunk to overflow and the sender releases if the start pulse is not returned within 4 to 8 seconds after sender seizure and the marker finds all senders in the sender group busy.	25
K. Timing Features—Coin Zone: This test checks that the sender, when arranged to function with coin zone trunks and junctors, will time out within 24 to 48 seconds if the operator fails to answer. It also checks that timing is canceled while the operator is connected, and the sender releases and sets the trunk to overflow in 12 to 24 seconds after the operator disconnects if it cannot complete its functions.	19	P. ANI—Automatically Identified Call: This test checks that when the calling number has been successfully ascertained by the ANI transverter or AMA transverters arranged for ANI, the sender transmits a KP signal, a 0 or 3 information digit, the calling number, and the ST signal.	26
L. Cancel-Timed Release and Alarm: The following features are checked: (1) With the associated CTR key operated, the sender will not release when it times out and will operate the stuck sender alarm. (2) If the call is abandoned at this time, the sender will not release. (3) If the alarm sending circuit is provided and the alarms are transferred, the sender cancel timed release feature is disabled. (4) Option YC features to stop sender progress at trouble point are tested when provided.	21	Q. ANI—Automatically Identified Call Failure: This test checks that when the ANI transverter or AMA transverters arranged for ANI fails on both first and second trial, the sender transmits a KP signal and a 2 or 5 information digit.	28
M. Marker Reorder: This test checks that the sender sets the trunk to overflow and the sender releases when the marker calls for reorder.	23	R. ANI—Operator Identified Call: This test checks that when the sender handles a call from a multiparty customer in which automatic identification of the calling number is not possible, the sender transmits a KP signal and a 1 or 4 information digit.	29
N. Multifrequency Current Supply Trouble Release: This test checks that the sender sets the trunk to overflow and the sender then releases		R.1 ANI—Identification Failure After Sender Time-Out: This test checks that the sender outpulses an identification failure information digit if sender time-out occurs before the transverter connection is established.	30
		S. Timing Features—ANI: This test checks that the sender releases and sets the trunk to overflow if the ANI transverter has not completed its functions in 7 to 12 seconds. It also checks that the sender releases and sets	

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the trunk to overflow if it has not outputted the calling number in 14 to 22 seconds after the ANI transverter releases.	31	signal on coin, noncoin, PPCS, or prefix 1, when calls are routed over a common trunk group to a TSPS No. 1.	38
T. Zero Operator Call Routed to a Traffic Service Position Which Requires Automatically Identified Calling Number: This test checks that the sender, on a class basis, sends the calling number forward without having first sent the called number.	32	AB. Intersender Timing—Automatic Intercept System: This test checks trunk guard timing and cancellation of intersender timing on calls to AIS.	38
U. Zero Operator Call Routed to a Traffic Service Position Which Requires Operator Identified Calling Number: This test checks that the sender, on a class basis, sends an operator identification signal without having first sent the called number.	33	AC. IDDD-LAMA Call: This test checks that the sender records information from the marker, outputs gateway information, recycles, and then outputs the remaining digits on a LAMA basis. The transmitting of information to the transverter is also checked.	39
V. Special Start Signal (ANI) Via Crossbar Tandem TSP: This test checks that the sender transmits a special start signal on a PPCS coin call to distinguish it from a station paid call where both calls are routed to tandem over a common trunk group.	33	AD. IDDD-LAMA Gateway Timing: This test checks the ability of the sender to time for receipt of on-hook and off-hook signaling from the gateway office and return overflow tone when the signals are not received within an allotted time.	39
W. Sender Busy: This test checks that the sender appears busy when it is in use or when it is made busy at the associated MB ₂ jack.	34	AE. Abandoned Call—IDDD-LAMA: This test checks that the sender waits until the initial entry (AMA) has been made before releasing on IDDD-LAMA calls.	40
X. Comparative Frequency Test: This test makes an appraisal of an oscillator frequency by using a nearby oscillator of the same frequency as a beat frequency oscillator.	35	AF. IDDD-TSPS Call: This test checks that the sender receives information from the marker, outputs KP, prefix 1, the called number, and a special start signal. The sender then recycles and after ANI functions are completed, outputs KP, an information digit, the calling number, and a start signal. This test also checks the special start signals for station-to-station and PPCS calls.	40
Y. Oscillator Output Voltage: This test checks that each oscillator output voltage is within prescribed limits.	35	AG. Directory Assistance Charging: This test checks the ability of the sender to record the called number structure and called number class for directory assistance calls.	41
Z. Frequency Test: This test checks that the frequency of each oscillator is within prescribed limits.	36	AH. 211 Code Routed to a Traffic Service Position as a Zero	
AA. Special Start Signal (ANI) to TSPS No. 1: This test checks that the sender transmits a special start			

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Operator Call: This test checks that where the dialing plan requires dialing 211 to reach a long distance operator at a TSP, the call will route as a zero operator call. 42

AI. ♦Digit 8 Access Call to Enhanced Private Switched Communications Systems (EPSCS) No. 1 ESS: This test checks that the sender on a class basis, sends the calling number forward without sending the called number.♦ 43

1.04 Tests X, Y, and Z are to be performed on wire-spring-relay type senders equipped with a frequency generator.

1.05 Test X will normally be used for a comparative frequency test. When the results of this test are not within the limits specified or when a precise measurement of frequency is required, Test Z should be performed.

1.06 If the oscillator output voltage or frequency is not within the limits specified in the tests, the required corrective measures are given in the circuit notes of SD-26051-01.

1.07 Tests G, J, K, and W should be made as rapidly as possible since other senders are made busy during these tests.

1.08 For Tests A through V, AA through AG, Test Charts are provided for listing specific priming information as required for each test. These charts should be filled out from local records in accordance with instructions provided in Part 5, Preparation of Test Chart.

1.09 Tests K and L require verification at sender under test.

1.10 Local instructions should be followed for recording and reporting plant register operations for registers associated with sender SS leads.

1.11 Lettered Steps: A letter a, b, c, etc, added to a step number in Parts 3 and 4 of this section indicates an action which may or may not be required depending on local conditions.

The condition under which a lettered step or a series of lettered steps should be made is given in the ACTION column, and all steps governed by the same condition are designated by the same letter within a test. Where a condition does not apply, all steps designated by that letter should be omitted.

1.12 The manner of selecting some circuits and test conditions at the master test frame (MTF) and its associated circuits varies depending on the apparatus options furnished with these circuits. Therefore, where variable means of selection are provided, precise instructions for the selection of circuits and test conditions are not given. Precise instructions for the use of these variable means are given in Section 218-106-301.

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

2. APPARATUS

All Tests

2.01 322A (make-busy) plugs as required.

2.02 MTF Jack, lamp, and key circuit, SD-25672-01.

Tests A Through Y, AA Through ♦AI♦

2.03 Master test control circuit, SD-25800-01.

2.04 Sender test set, J24756A (SD-25674-01).

2.05 Sender test circuit, SD-25675-01.

2.06 Two testing cords, 20-conductor cord, 6 feet long, equipped with one KS-13875 plug and one KS-13895 plug (W20C cord) (for patching test set to test circuit).

Tests C, J, K, L

2.07 Patching cord, P3F cord, 4 feet long, equipped with one 309 plug and one 310 plug (3P12A cord) (for digit control).

Tests D, G Through O, S, AB, AD

2.08 52-type head telephone set or equivalent.

Tests G, I, J, K, L, O, S, AB, AD, R.1

2.09 KS-3008 stopwatch or equivalent.

Tests K, L, O, S, W, X, Y, Z, AB

2.10 Blocking and insulating tools as required. Use tools and apply as covered in Section 069-020-801.

Test N

2.11 Testing cord, 893 cord, 6 feet long, equipped with two 360A tools (1W13B cord) and two KS-6278 connecting clips (for connecting ground).

Test W

2.12 67C test set, or equivalent, equipped with one KS-6278 connecting clip and one 518C tool (for checking the presence or absence of ground).

Test X

2.13 67C test set or equivalent, equipped with two 624B tools (for making test connections to terminals arranged for solderless wrapped connections).

Test Y

2.14 Electron tube voltmeter, voltohmyst, RCA WV-98A senior or equivalent (for measuring oscillator output voltage).

2.15 Load resistor, 19LM or equivalent, 275 ohms ± 1 percent.

Tests Y, Z

2.16 Two testing cords, 893 cord, 6 feet long, equipped with two 360A tools (1W13B cord), one 624B tool, and one KS-6278 connecting clip.

2.17 Load resistor, 19SE or equivalent, 1100 ohms ± 1 percent.

Note: Refer to paragraphs 1.11, 1.12, and 1.13.

STEP**ACTION****VERIFICATION**

1 Patch sender test set SDT1 jack to SDT1 jack at either MTF or outgoing sender frame.

Test Z

2.18 Frequency meter, Berkley EPUT or Hewlett-Packard 521C with 10-second gates.

2.19 Testing cord, Pomona Electronics MG-C-BNC-36 cable assembly, 3 feet long, equipped with one UG-88C coaxial connector and two alligator clips (red clip connected to cable center conductor, black clip connected to shield) (for use with Berkley EPUT meter).

2.20 Testing cord, Hewlett-Packard 11001A cable assembly, 45 inches long, equipped with one UG-88C coaxial connector and one dual banana plug (plug nearest knurled section connected to cable center conductor) (for use with Hewlett-Packard 521C cord).

2.21 Two No. 60 Mueller clips for use with Hewlett-Packard 11001A cable assembly.

3. PREPARATION

3.01 When sender class requires off-hook to on-hook start signal, operate and restore REV key of sender test set.

3.02 If digit verification is required, patch the SDT jack to sender MB_jack and operate the DC key (Digit Control). This causes the sender test circuit to block the first digit outputted. Subsequent digits are outputted by operating and releasing the ST key. This operation must be completed before sender timeout.

3.03 The first momentary lighting of the D lamp indicates the KP signal and the second momentary lighting indicates the ST signal.

3.04 All tests except G, I, M through O, and W through Z refer to paragraphs 3.02 and 3.03.

3. PREPARATION (Cont)

Tests A Through V, AA Through AII

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STEP	ACTION	VERIFICATION
2	Patch sender test set SDT2 jack to SDT2 jack at either MTF or outgoing sender frame.	
3	At MTF— Restore all keys and switches.	
4	Momentarily operate RL key.	All lamps extinguished.
5	Select SDT class of test.	
6	Select sender to be tested.	
7	Select marker.	
8	Select route advance to direct call to selected outgoing route.	
9	Release (push-in) CTR_ key.	
	Note: When the stuck sender trunk identifier circuit (SSTI) is in use in an office, the SSI and ACTR keys should be in the OFF position when testing senders.	
10a	If signal receiving circuit of an MF incoming register is used by sender test circuit— Insert make-busy plug into IRMB_ jack of incoming register associated with sender test circuit.	

Tests D, E, G Through O, S, AB, AD

11	Patch head telephone set to sender test set REC jack.	
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Tests C, J, K, L

12	Patch SDT jack to sender MB_ jack for digit control.	
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4. METHOD

STEP	ACTION	VERIFICATION
A. Regular Call		
AMA Calls and DDD AMA or CAMA Calls		
11	Operate keys and set switches in accordance with Test Chart Test 1.	

STEP	ACTION	VERIFICATION
12b	If 2-way trunk is used for selected outgoing route— At distant office— Have trunk removed from service.	
13c	If check of transverter leads is not required— At sender test set— Momentarily operate ST key (refer to paragraph 3.01).	TTC, A lamps lighted. D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for each digit outpulsed. D lamp momentarily lighted.
14c	Momentarily operate RL key.	All lamps extinguished.
15d	If trouble record is required to check transverter leads— At MTF— Operate REC key.	
16d	At sender test set— Momentarily operate ST key (refer to paragraph 3.01).	TTC, A lamps lighted. D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for each digit outpulsed. D lamp momentarily lighted. Two trouble records taken. FR_, CN_, S_, FT_ FU_ VG_, HG_, VF_ OBS or NOB, RNT0, 1, or 2, RN_, CP_, MB_, and LST, L5D, 4DG, or 5DG designations perforated on each trouble record. MKR, TP or RP, A_ through K_ for area code, office code, numerals of called number, a 7 (1 out of 5) for digit following the last digit of called number designations perforated on first trouble record. TV, 2L or 4L, TPT or RPT, and A_ through K_ for area code, office code, numerals of called number (when test call is an observed 2-line entry, or a 4- or 5-line entry call) designations perforated on second trouble record.
17d	Momentarily operate RL key.	All lamps extinguished.
18d	At MTF— Restore REC key.	
19b	If 2-way trunk is used for selected outgoing route— At distant office— Have trunk restored to service.	
20	Repeat Steps 11 through 19b, as required for Tests 2 through 45.	

STEP	ACTION	VERIFICATION
Non-AMA Calls and 2-Way or Intertoll Trunk Calls		
21	Operate keys and set switches in accordance with Test Chart Test 46.	
22b	If 2-way trunk is used for selected outgoing route— At distant office— Have trunk removed from service.	
23	At sender test set— Momentarily operate ST key (refer to paragraph 3.01).	TTC, A lamps lighted. D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for each digit outpulsed. D lamp momentarily lighted.
24	Momentarily operate RL key.	All lamps extinguished.
25b	If 2-way trunk is used for selected outgoing route— At distant office— Have trunk restored to service.	
26	Repeat Steps 21 through 25b, as required for Tests 47 through 66.	
Coin Zone Trunk Calls		
27	Operate keys and set switches in accordance with Test Chart Test 67.	
28c	If check of transverter leads is not required— At sender test set— Momentarily operate ST key.	
29c	Operate OPA key.	
30c	Restore OPA key (refer to paragraph 3.01).	A lamp lighted. If local zone call is selected— TTC lamp lighted. D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for each digit outpulsed. D lamp momentarily lighted.
31c	Momentarily operate RL key.	All lamps extinguished.
32d	If trouble record is required to check transverter leads— At MTF— Operate REC key.	

STEP	ACTION	VERIFICATION
33d	At sender test set— Momentarily operate ST key.	
34d	Operate OPA key.	
35d	Restore OPA key (refer to paragraph 3.01).	A lamp lighted. D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for each digit outputted. D lamp momentarily lighted. Two trouble records taken. FR_, CN_, S_, FT_ FU_, VG_, HG_, VF_, OBS or NOB, RNT0, 1, or 2, RN_, CP_ MB_, and LST, L5D, 4DG or 5DG designations perforated on each trouble record. MKR, TP or RP, A_ through G_ for office code, numerals of called number, a 7 (1 out of 5) for digit following last digit of called number designations perforated on first trouble record. TV, 2L or 4L, TPT or RPT, and A_ through G_ for office code, numerals of called number (when test call is an observed 2-line entry or, a 4- or 5-line entry call) designations perforated on second trouble record.
36d	Momentarily operate RL key.	All lamps extinguished.
37d	At MTF— Restore REC key.	
38	Repeat Steps 27 through 37d, as required for Tests 68 and 69.	

Tandem Trunk Calls—Non AMA

39	Operate keys and set switches in accordance with Test Chart Test 70.	
40b	If 2-way trunk is used for selected outgoing route— At distant office— Have trunk removed from service.	
41	At sender test set— Momentarily operate ST key (refer to paragraph 3.01).	TTC, A lamps lighted. D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for each digit outputted. D lamp momentarily lighted.
42	Momentarily operate RL key.	All lamps extinguished.

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STEP	ACTION	VERIFICATION
43b	If 2-way trunk is used for selected outgoing route— At distant office— Have trunk restored to service.	
44	Repeat Steps 39 through 43b, as required for Test 71.	
CCSA Tandem Trunk Calls—AMA		
45	Operate keys and set switches in accordance with Test Chart Test 72.	
46b	If 2-way trunk is used for selected outgoing route— At distant office— Have trunk removed from service.	
47c	If check of transverter leads is not required— At sender test set— Momentarily operate ST key (refer to paragraph 3.01).	TTC, A lamps lighted. D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for each digit outpulsed. D lamp momentarily lighted.
48c	Momentarily operate RL key.	All lamps extinguished.
49d	If trouble record is required to check transverter leads— At MTF— Operate REC key.	
50d	At sender test set— Momentarily operate ST key (refer to paragraph 3.01).	TTC, A lamps lighted. D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for each digit outpulsed. D lamp momentarily lighted. Two trouble records taken. FR_, CN_, S_, FT_, FU_, VG_, HG_, VF_, OBS or NOB, RNT0, 1, or 2, RN_, CP_, MB_, and LST, L5D, 4DG or 5DG designations perforated on each trouble record. MKR, TP or RP, A_ through G_ for office code, numerals of called number, a 7 (1 out of 5) for digit following last digit of called number designations perforated on first trouble record. TV, 2L or 4L, TPT or RPT, and A_ through G_ for office code, numerals of called numbers (when test call is an observed 2-line or a 4- or 5-line entry call) designations perforated on second trouble record.

STEP	ACTION	VERIFICATION
51d	Momentarily operate RL key.	All lamps extinguished.
52d	At MTF— Restore REC key.	
53b	If 2-way trunk is used for selected outgoing route— At distant office— Have trunk restored to service.	
54	Repeat Steps 45 through 53b, as required for Test 73.	
Trunks To TSPS No. 1 Calls		
55	Operate keys and set switches in accordance with Test Chart Test 74.	
56	At sender test set— Momentarily operate ST key (refer to paragraph 3.01).	TTC, A lamps lighted. D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for each digit outpulsed. D lamp momentarily lighted.
57	Momentarily operate RL key.	All lamps extinguished.
58	Repeat Steps 55 through 57, as required for Test 75.	
All Calls		
59	At MTF— Restore all keys and switches and remove all patching cords not required in next test.	
B. Abandoned Call—AMA		
11	Operate keys and set switches in accordance with Test Chart Test 76.	
12b	If 2-way trunk is used for selected outgoing route— At distant office— Have trunk removed from service.	
13c	If noncoin zone trunk is selected— At sender test set— Momentarily operate ST key (refer to paragraph 3.01).	TTC, A, C, lamps lighted. D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for all except last digit.
14d	If sender is arranged for coin zone trunks or junctors, and a coin zone trunk or junctor is	TTC, C lamps lighted.

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STEP	ACTION	VERIFICATION
	selected— At sender test set— Momentarily operate ST key.	
15d	Operate OPA key.	
16d	Restore OPA key (refer to paragraph 3.01).	A lamp lighted. D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for all except last digit.
17	Operate DISC key.	TTC, C, A lamps remain lighted.
18	Momentarily operate RT key.	TTC, C, A lamps extinguished.
19	Momentarily operate RL key.	All lamps extinguished.
20	Restore DISC, RT keys.	
21b	If 2-way trunk is used for selected outgoing route— At distant office— Have trunk restored to service.	
22	At MTF— Restore all keys and switches and remove all patching cords not required in next test.	

C. Abandoned Call—Non-AMA

13	Operate keys and set switches in accordance with Test Chart Test 77.	
14b	If 2-way trunk is used for selected outgoing route— At distant office— Have trunk removed from service.	
15c	If noncoin zone trunk is selected— At sender test set— Momentarily operate ST key (refer to paragraph 3.01).	TTC, A lamps lighted. D lamp momentarily lighted. One 0 to 9 lamp lighted for first digit outpulsed.
16d	If sender is arranged for coin zone trunk or junctors, and a coin zone trunk or junctor is selected— At sender test set— Momentarily operate ST key.	TTC lamp lighted.
17d	Operate OPA key.	

STEP	ACTION	VERIFICATION
18d	Operate DC key (refer to paragraph 3.01).	A lamp lighted. D lamp momentarily lighted. One 0 to 9 lamp lighted for first digit outpulsed.
19	Operate DISC key.	TTC, A lamps extinguished.
20	Momentarily operate RL key.	All lamps extinguished.
21	Restore DISC key.	
22b	If 2-way trunk is used for selected outgoing route— At distant office— Have trunk restored to service.	
23	At MTF— Restore all keys and switches and remove all patching cords not required in next test.	

D. Transverter Trouble Release—Noncoin Zone—AMA

12	Operate keys and set switches in accordance with Test Chart Test 78.	
13b	If 2-way trunk is used for selected outgoing route— At distant office— Have trunk removed from service.	
14	At sender test set— Momentarily operate ST key (refer to paragraph 3.01).	Detail-billing route TTC lamp lighted. A lamp momentarily lighted. Overflow tone heard. Bulk-billing route TTC, A lamps lighted. One 0 to 9 lamp momentarily lighted for each digit outpulsed.
15	Momentarily operate RL key.	All lamps extinguished.
16	At MTF— Restore SDT2 key.	
17	Operate TOF key.	
18	At sender test set— Momentarily operate ST key.	TTC lamp lighted. A lamp momentarily lighted. Overflow tone heard.
19	Momentarily operate RL key.	All lamps extinguished.

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STEP	ACTION	VERIFICATION
20	At MTF— Restore TOF key.	
21b	If 2-way trunk is used for selected outgoing route— At distant office— Have trunk restored to service.	
22	At MTF— Restore all keys and switches and remove all patching cords not required in text test.	
E. Transverter Trouble Release—Coin Zone—AMA		
12	Operate keys and set switches in accordance with Test Chart Test 79.	
13	At sender test set— Momentarily operate ST key.	TTC lamp lighted.
14	Operate OPA key.	
15	Restore OPA key (refer to 3.01).	A lamp lighted. One 0 to 9 lamp momentarily lighted for each digit outpulsed.
16	Momentarily operate RL key.	All lamps extinguished.
17	At MTF— Restore all keys and switches and remove all patching cords not required in next test.	
F. Delay Pulsing of Last Digit—AMA		
11	Operate keys and set switches in accordance with Test Chart Test 80.	
12b	If 2-way trunk is used for selected outgoing route— At distant office— Have trunk removed from service.	
13c	If noncoin zone trunk is selected— At sender test set— Momentarily operate ST key (refer to paragraph 3.01).	TTC, A, C lamps lighted. One 0 to 9 lamp momentarily lighted for all except last digit.
14d	If sender is arranged for coin zone trunks or junctors, and a coin zone trunk or junctor is selected— At sender test set— Momentarily operate ST key.	TTC, C lamps lighted.

STEP	ACTION	VERIFICATION
15d	Operate OPA key.	
16d	Restore OPA key (refer to paragraph 3.01).	A lamp lighted. One 0 to 9 lamp momentarily lighted for all except last digit.
17	Momentarily operate RT key.	One 0 to 9 lamp lighted for last digit. C lamp extinguished. D lamp lighted.
18	Momentarily operate RL key.	All lamps extinguished.
19b	If 2-way trunk is used for selected outgoing route— At distant office— Have trunk removed from service.	
20	At MTF— Restore all keys and switches and remove all patching cords not required in next test.	

G. No-Digit Call—AMA

12	Operate keys and set switches in accordance with Test Chart Test 81.	
13b	If 2-way trunk is used for selected outgoing route— At distant office— Have trunk removed from service.	
14	At MTF— Insert make-busy plugs into MB_ jacks of all senders that use same transverter-connector as sender being tested (refer to paragraph 1.07).	
15	At sender test set— Momentarily operate ST key; <i>start timing</i> .	TTC, C lamps lighted. 0 to 9 lamp not lighted. In 7 to 11 seconds— At MTF— TO_ lamp lighted At sender test set— Overflow tone <i>not</i> heard.
		Note: Immediately after verification of this step, proceed to next step in order to prevent transverter timeout.
16	Momentarily operate RT key.	At MTF— TO_ lamp extinguished.

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STEP	ACTION	VERIFICATION
		At sender test set— C lamp extinguished.
17	Momentarily operate RL key.	All lamps extinguished.
18b	If 2-way trunk is used for selected outgoing route— At distant office— Have trunk restored to service.	
19	Repeat Steps 12 through 18b, as required for Test 82.	
20	At MTF— Remove make-busy plugs from MB_ jacks of all senders.	
21	Restore all keys and switches and remove all patching cords not required in next test.	
H. Reversed Trunk Test		
12	Operate keys and set switches in accordance with Test Chart Test 83.	
13b	If 2-way trunk is used for selected outgoing route— At distant office— Have trunk removed from service.	
14c	In noncoin zone trunk is selected— At sender test set— Momentarily operate ST key.	TTC, A lamps lighted.
15d	If sender is arranged for coin zone trunks or junctors, and a coin zone trunk or junctor is selected— At sender test set— Momentarily operate ST key.	TTC lamp lighted.
16d	Operate OPA key.	
17d	Restore OPA key.	A lamp lighted.
18	Momentarily restore REV key.	0 to 9 lamp momentarily lighted. A lamp extinguished. Overflow tone heard.
19	Momentarily operate RL key.	All lamps extinguished.
20	Restore REV key.	

STEP	ACTION	VERIFICATION
21b	If 2-way trunk is used for selected outgoing route— At distant office— Have trunk restored to service.	
22	Repeat Steps 12 through 21b, as required for Test 84.	
23	At MTF— Restore all keys and switches and remove all patching cords not required in next test.	
I. Trunk Test—Open Trunk		
12	Operate keys and set switches in accordance with Test Chart Test 85.	
13	At sender test set— Momentarily operate ST key; <i>start timing</i> (refer to 3.01).	Marker on light traffic TTC lamp lighted. In 2.5 to 4.5 seconds— Overflow tone heard. Trouble record taken. TGT, sender, and trunk number designations perforated.
		Note: If trouble record is not taken in 2.5 to 4.5 seconds, make sure marker is on light traffic by making it busy. Repeat test.
14	Momentarily operate RL key.	All lamps extinguished. Overflow tone silenced.
15	At MTF— Operate HTR key.	
16	At sender test set— Momentarily operate ST key; <i>start timing</i> .	Marker on heavy traffic TTC lamp lighted. In 14 to 32 seconds— At MTF— TO_ lamp momentarily lighted. At sender test set— Overflow tone heard.
17	Momentarily operate RL key.	All lamps extinguished.
18	At MTF— Restore HTR key.	
19	Repeat Steps 12 through 18, as required for Test 86.	

STEP	ACTION	VERIFICATION
20	At MTF— Restore all keys and switches and remove all patching cords not required in next test.	
J. Timing Features—Noncoin Zone		
13	Operate keys and set switches in accordance with Test Chart Test 87.	
14	At sender test set— Momentarily operate St key; <i>start timing</i> (refer to paragraph 3.01).	TTC, A lamps lighted. One 0 to 9 lamp lighted for first digit outpulsed. In 14 to 22 seconds— At MTF— TO_ lamp momentarily lighted. At sender test set— Overflow tone heard. A lamp extinguished.
15	Momentarily operate RL key.	All lamps extinguished.
16	At MTF— Insert make-busy plugs into MB_ jacks of all senders that use same transverter-connector as sender under test (refer to paragraph 1.07).	
17	Operate SDT3 key.	
18	At sender test set— Momentarily operate ST key; <i>start timing</i> (refer to paragraph 3.01).	TTC, A, C lamps lighted. One 0 to 9 lamp lighted for first digit outpulsed. In 7 to 11 seconds— At MTF— TO_ lamp lighted. At sender test set— A lamp extinguished. Overflow tone heard.
19	Momentarily operate RT key.	C lamp extinguished.
20	Momentarily operate RL key.	All lamps extinguished.
21	At MTF— Restore SDT3 key.	
22	Remove make-busy plugs from MB_ jacks of all senders.	
23	Repeat Steps 13 through 15, as required for Test 88.	

STEP	ACTION	VERIFICATION
24	At MTF— Restore all keys and switches and remove all patching cords not required in next test.	
K. Timing Features—Coin Zone		
13	Operate keys and set switches in accordance with Test Chart Test 89.	
14b	If 2-way trunk is used for selected outgoing route— At distant office— Have trunk removed from service.	
15	At outgoing sender group release circuit— Block operated R_ relay of sender group containing sender under test (refer to paragraph 1.07).	
16	At sender test set— Momentarily operate ST key; <i>start timing</i> .	TTC lamp lighted. In 25 to 48 seconds— Overflow tone heard.
17	Momentarily operate RL key.	All lamps extinguished. Overflow tone silenced.
18	At outgoing sender group release circuit— Remove blocking tool from R_ relay.	
19	At sender test set— Momentarily operate ST key; <i>start timing</i> .	TTC lamp lighted. In 25 to 48 seconds— At MTF— TO_ lamp lighted.
Note: If the marker encounters an all-senders-busy condition at this time, the sender will release.		
20	At sender test set— Momentarily operate RL key.	All lamps extinguished.
21	Momentarily operate ST key; <i>start timing</i> . Note: Perform next step immediately after operation of the ST key.	TTC lamp lighted.
22	Operate OPA key.	In 25 to 48 seconds after ST key operated— At MTF— TO_ lamp <i>not</i> lighted.
23	At sender test set— Operate DC key.	

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STEP	ACTION	VERIFICATION
24	Restore OPA key; <i>start timing</i> (refer to paragraph 3.01).	A lamp lighted for first digit outputted. In 12 to 24 seconds— At MTF— TO_ lamp momentarily lighted. At sender test set— Overflow tone heard. A lamp extinguished.
25	Momentarily operate RL key.	All lamps extinguished.
26	At MTF— Insert make-busy plugs into MB_ jacks of all senders that use same transverter-connector as sender under test (refer to paragraph 1.07).	
27	Restore SDT1 key.	
28	Operate SDT3 key.	
29	At sender test set— Momentarily operate ST key.	TTC, C lamps lighted.
30	Operate OPA key.	
31	Operate DC key.	
32	Restore OPA key; <i>start timing</i> (refer to paragraph 3.01).	One 0 to 9 lamp lighted for first digit outputted. In 7 to 12 seconds— At sender test set— TM relay momentarily operated. In 12 to 24 seconds— At sender test set— A lamp extinguished. Overflow tone heard. At sender under test— TM relay momentarily operated.
33	At sender test set— Momentarily operate RL key.	All lamps extinguished. Overflow tone silenced.
34	At MTF— Restore SDT3 key.	
35	Remove make-busy plug from MB_ jack of all senders.	
36b	If 2-way trunk is used for selected outgoing route— At distant office— Have trunk restored to service.	

STEP	ACTION	VERIFICATION
37	Repeat Steps 13 through 25 and 36b as required for Test 90.	
38	At MTF— Restore all keys and switches and remove all patching cords not required in next test.	
L. Cancel-Timed Release and Alarm		
13	Operate keys and set switches in accordance with Test Chart Test 91.	
14	Operate (pull out) CTR_ key of sender under test.	
15b	If stop sender progress feature (YC option) is provided— At sender under test— Block nonoperated second steering relay that would normally operate dependent on code used in test.	
16b	At sender test set— Momentarily operate ST key; start timing .	TTC, A lamps lighted. One 0 to 9 lamp lighted for first digit outputted. In 14 to 22 seconds— At MTF— TO_ lamp lighted. At sender frame— TRL, PG1 relays operated.
17b	At sender under test— Remove blocking tool from steering relay.	TRL, PG1 relays remain operated.
18b	At MTF— Restore (push-in) CTR_ key.	TO_ lamp extinguished. At sender under test— TRL, PG1 relays released.
19b	At sender test set— Momentarily operate RL key.	All lamps extinguished.
20b	At MTF— Operate (pull-out) CTR_ key.	
21c	If noncoin zone trunk is selected— At sender test set— Operate DC key.	
22c	Momentarily operate ST key; start timing (refer to paragraph 3.01).	TTC, A lamps lighted. One 0 to 9 lamp lighted for first digit outputted. In 14 to 22 seconds—

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STEP	ACTION	VERIFICATION
		At MTF— TO_ lamp lighted. At sender test set— Overflow tone heard.
23d	If sender is arranged for coin zone trunks or junctors, and a coin zone trunk or junctor is selected— At sender test set— Momentarily operate ST key.	TTC lamp lighted.
24d	Operate OPA key.	
25d	Operate DC key; start timing (refer to paragraph 3.01).	A lamp lighted. One 0 to 9 lamp lighted for first digit outpulsed. Overflow tone heard. In 12 to 24 seconds— At MTF— TO_ lamp lighted.
26	At MTF— Remove cord from sender MB_ jack; start timing.	In 10 to 15 seconds— R-S-TOA lamp lighted. Major alarm sounds.
		<p>Note: If R-S-TOA lamp is lighted in less than 10 seconds, it may be necessary to repeat test as another circuit may have seized the common alarm circuit.</p>
27	Insert cord into sender MB_ jack.	R-S-TOA lamp extinguished. Major alarm silenced. At sender test set— Overflow tone still heard.
28	Momentarily operate DISC key.	Overflow tone silenced.
29	At MTF— Restore (push-in) CTR_ key.	TO_ lamp extinguished.
30	At sender test set— Momentarily operate RL key.	All lamps extinguished.
31	At MTF— Remove cord from sender MB_ jack.	
32e	If alarm sending circuit is provided— Operate (pull-out) CTR_ key of sender under test.	
33e	Operate transfer key to DB position (if provided), or to TR position.	

STEP	ACTION	VERIFICATION
	<i>Note:</i> All alarms will be transferred while key is operated.	
34f	If alarm sending circuit is provided and a noncoin zone trunk is selected— At sender test set— Momentarily operate ST key; <i>start timing</i> .	TTC lamp lighted. In 12 to 24 seconds— Overflow tone heard. At MTF— TO_ lamp <i>not</i> lighted.
35g	If alarm sending circuit is provided and sender is arranged for coin zone trunks or junctors and a coin zone trunk or junctor is selected— At sender test set— Momentarily operate ST key.	TTC lamp lighted.
36g	Operate OPA key.	
37g	Operate DC key; <i>start timing</i> (refer to paragraph 3.01).	In 12 to 24 seconds— Overflow tone heard. At MTF— TO_ lamp <i>not</i> lighted.
38e	If alarm sending circuit is provided— At sender test set— Momentarily operate DISC key.	Overflow tone silenced.
39e	At MTF— Operate transfer key to NTR.	
40e	Momentarily operate RS key.	
41e	At sender test set— Momentarily operate RL key.	All lamps extinguished.
42	Repeat Steps 13 through 41e, as required for Test 92.	
43	At MTF— Restore all keys and switches and remove all patching cords not required in next test.	

M. Marker Reorder

12	Operate keys and set switches in accordance with Test Chart Test 93.	
13b	If 2-way trunk is used for selected outgoing route— At distant office— Have trunk removed from service.	

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STEP	ACTION	VERIFICATION
14c	If noncoin zone trunk is selected— At sender test set— Momentarily operate ST key.	TTC lamp lighted. A lamp lighted for 2-way trunks only. Overflow tone heard.
15d	If sender is arranged for coin zone trunks or junctors, and a coin zone trunk or junctor is selected— At sender test set— Momentarily operate ST key.	TTC lamp lighted. Overflow tone heard.
16	Momentarily operate RL key.	All lamps extinguished.
17b	If 2-way trunk is used for selected outgoing route— At distant office— Have trunk restored to service.	
18	Repeat Steps 12 through 17b, as required for Test 94.	
19	At MTF— Restore all keys and switches and remove all patching cords not required in next test.	

N. Multifrequency Current Supply Trouble Release

12	Operate keys and set switches in accordance with Test Chart Test 95.	
13	At MTF— Insert make-busy plug into MB_jack of sender under test.	
14	At multifrequency current supply bay— Operate 1-4, 2-5, or 3-6 keys associated with sender under test.	
15b	If nonwire-spring-relay type senders are provided— At sender under test— Connect ground to terminal 22 of C terminal strip of sender being tested.	
16c	If wire-spring-relay type senders are provided— At sender under test— Connect ground to terminal 15 of C terminal strip of sender under test.	
17d	In noncoin trunk is selected— At sender test set— Momentarily operate ST key (refer to paragraph 3.01).	TTC, A lamps lighted. Overflow tone heard.

STEP	ACTION	VERIFICATION
18e	If sender is arranged for coin zone trunks or junctors, and a coin zone trunk or junctor is selected— At sender test set— Momentarily operate ST key.	TTC lamp lighted.
19e	Operate OPA key.	
20e	Restore OPA key (refer to paragraph 3.01).	A lamp lighted. Overflow tone heard.
21	Momentarily operate RL key.	All lamps extinguished.
22	At multifrequency supply bay— Restore 1-4, 2-5, or 3-6 keys.	
23	At sender under test— Remove testing cord from terminal strip.	
24	At MTF— Remove make-busy plug from MB_ jack associated with sender under test.	
25	Repeat Steps 12 through 24, as required for Test 96.	
26	At MTF— Restore all keys and switches and remove all patching cords not required in next test.	
O. Intersender Timing—Wire-Spring-Relay Type and Nonwire-Spring-Relay Type Arranged for Intersender Timing		
12	Operate keys and set switches in accordance with Test Chart Test 97.	
13	At MTF— Insert make-busy plug into MB_ jack of sender under test.	
14	At sender under test— Block nonoperated SP relay.	
15	At outgoing sender group release circuit— Block operated R_ relay of sender group containing sender under test.	
16b	If noncoin zone trunk is selected— At sender test set— Momentarily operate ST key; start timing.	TTC, A lamps lighted. Within 4 to 8 seconds— Overflow tone heard. A lamp extinguished.

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STEP	ACTION	VERIFICATION
17c	If sender is arranged for coin zone trunks or junctors, and a coin zone trunk or junctor is selected— At sender test set— Momentarily operate ST key; <i>start timing</i> .	TTC lamp lighted. Within 4 to 8 seconds— Overflow tone <i>not</i> heard.
18c	Operate OPA key.	
19c	Restore OPA key; <i>start timing</i> .	A lamp lighted. Within 4 to 8 seconds— Overflow tone heard.
20	Momentarily operate RL key.	All lamps extinguished.
21	At outgoing sender group release circuit— Remove blocking tool from R_ relay.	
22	At sender under test— Remove blocking tool from SP relay.	
23	At MTF— Remove make-busy plug from MB_ jack associated with sender under test.	
24	Repeat Step 12 through 23, as required for Test 98.	
25	At MTF— Restore all keys and switches and remove all patching cords not required in next test.	
P. ANI—Automatically Identified Call		
11	Operate keys and set switches in accordance with Test Chart Test 99.	
12b	If 2-way trunk is used for selected outgoing route— At distant office— Have trunk removed from service.	
13c	If trouble record is required to check transverter leads— Operate REC key.	
14c	At sender test set— Momentarily operate ST key (refer to paragraph 3.01).	TTC, A lamps lighted. D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for each digit of called number outpulsed. D lamp momentarily lighted. Two trouble records taken. FT_ FU_ VG_ HG_ VF_ (calling line

STEP	ACTION	VERIFICATION
		location), NOB designations perforated on each trouble record. MKR, TP or RP, designations perforated on first trouble record. TV, TPT or RPT, A_ through G_ (calling number), a 7 (1 out of 5) for digit following last digit of calling number designations perforated on second trouble record.
15c	Operate REV key.	D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for 0 information digit and each digit of calling number outpulsed. D lamp momentarily lighted.
16c	Momentarily operate RL key.	All lamps extinguished.
17c	Restore REV key.	
18c	At MTF— Restore REC key.	
19d	If check of transverter leads is not required— At sender test set— Momentarily operate ST key (refer to paragraph 3.01).	TTC, A lamps lighted. D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for each digit of called number outpulsed. D lamp momentarily lighted.
20d	Operate REV key.	D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for 0 information digit and each digit of calling number outpulsed. D lamp momentarily lighted.
21d	Momentarily operate RL key.	All lamps extinguished.
22d	Restore REV key.	
23d	At MTF— Operate OBS key.	
24d	At sender test set— Momentarily operate ST key (refer to paragraph 3.01).	TTC, A lamps lighted. D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for each digit of called number outpulsed. D lamp momentarily lighted.
25d	Operate REV key.	D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for information digit 3 and each digit of calling number outpulsed. D lamp momentarily lighted.

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STEP	ACTION	VERIFICATION
26d	Momentarily operate RL key.	All lamps extinguished.
27d	Restore REV key.	
28d	At MTF— Restore OBS key.	
29b	If 2-way trunk is used for selected outgoing route— At distant office— Have trunk restored to service.	
30	Repeat Steps 11 through 29b, as required for Tests 100 through 123.	
31	At MTF— Restore all keys and switches and remove all patching cords not required in next test.	
Q. ANI—Automatically Identified Call Failure		
11	Operate keys and set switches in accordance with Test Chart Test 124.	
12b	If 2-way trunk is used for selected outgoing route— At distant office— Have trunk removed from service.	
13	At sender test set— Momentarily operate ST key (refer to paragraph 3.01).	TTC, A lamps lighted. D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for each digit of called number outpulsed. D lamp momentarily lighted.
14	Operate REV key.	D lamp momentarily lighted. Information digit 2 outpulsed.
15	Momentarily operate RL key.	All lamps extinguished.
16	Restore REV key.	
17	At MTF— Operate OBS key.	
18	At sender test set— Momentarily operate ST key (refer to paragraph 3.01).	TTC, A lamps lighted. D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for each digit of called number outpulsed. D lamp momentarily lighted.

STEP	ACTION	VERIFICATION
19	Operate REV key.	D lamp momentarily lighted. Information digit 5 outputted.
20	Momentarily operate RL key.	All lamps extinguished.
21	Restore REV key.	
22	At MTF— Restore OBS key.	
23b	If 2-way trunk is used for selected outgoing route— At distant office— Have trunk restored to service.	
24	At MTF— Restore all keys and switches and remove all patching cords not required in next test.	
R. ANI—Operator Identified Call		
11	Operate keys and set switches in accordance with Test Chart Test 125.	
12b	If 2-way trunk is used for selected outgoing route— At distant office— Have trunk removed from service.	
13	At sender test set— Momentarily operate ST key (refer to paragraph 3.01).	TTC, A lamps lighted. D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for each digit of called number outputted. D lamp momentarily lighted.
14	Operate REV key.	D lamp momentarily lighted. Information digit 1 outputted.
15	Momentarily operate RL key.	All lamps extinguished.
16	Restore REV key.	
17	At MTF— Operate OBS key.	
18	At sender test set— Momentarily operate ST key (refer to paragraph 3.01).	TTC, A lamps lighted. D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for each digit of called number outputted. D lamp momentarily lighted.

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STEP	ACTION	VERIFICATION
19	Operate REV key.	D lamp momentarily lighted. Information digit 4 outputted.
20	Momentarily operate RL key.	All lamps extinguished.
21	Restore REV key.	
22	At MTF— Restore OBS key.	
23b	If 2-way trunk is used for selected outgoing route— At distant office— Have trunk restored to service.	
24	At MTF— Restore all keys and switches and remove all patching cords not required in next test.	
R.1 ANI—Identification Failure After Sender Time-Out		
11	Operate keys and set switches in accordance with Test Chart Test 126.	
12b	If 2-way trunk is used for selected outgoing route— At distant office— Have trunk removed from service.	
13c	If sender is nonwire-spring-relay type— At sender under test— Insulate contacts 3-4T and 5-6B of STT relay.	
14d	If sender is wire-spring-relay type— At sender under test— Insulate contacts 1M and 10M of STT relay.	
15	At sender test set— Momentarily operate ST key (refer to paragraph 3.01).	TTC, A lamps lighted. D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for each digit of called number outputted. D lamp momentarily lighted.
16	Operate REV key; <i>start timing</i> .	Within 6.3 to 12 seconds— 2 lamp lighted for information digit (nonobserved identification failure) outputted. D lamp momentarily lighted.
17	Momentarily operate RL key.	All lamps extinguished.
18	Restore REV key.	

STEP	ACTION	VERIFICATION
19	At MTF— Operate OBS key.	
20	At sender test set— Momentarily operate ST key (refer to paragraph 3.01).	TTC, A lamps lighted. D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for each digit of called number outpulsed. D lamp momentarily lighted.
21	Operate REV key; <i>start timing</i> .	Within 6.3 to 12 seconds— 5 lamp lighted for information digit (observed identification failure) outpulsed. D lamp momentarily lighted.
22	Momentarily operate RL key.	All lamps extinguished.
23	Restore REV key.	
24	At MTF— Restore OBS key.	
25	At sender under test— Remove insulators from STT relay.	
26b	If 2-way trunk is used for selected outgoing route— At distant office— Have trunk restored to service.	
27	At MTF— Restore all keys and switches and remove all patching cords not required in next test.	

S. Timing Features—ANI

12	Operate keys and set switches in accordance with Test Chart Test 127.	
13b	If 2-way trunk is used for selected outgoing route— At distant office— Have trunk removed from service.	
14	At sender test set— Momentarily operate ST key; <i>start timing</i> (refer to paragraph 3.01).	TTC, A lamps lighted. D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for each digit of called number outpulsed. D lamp momentarily lighted. At sender under test— RLT relay operated. At sender test set— Within 14 to 22 seconds after RLT relay

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STEP	ACTION	VERIFICATION
		operated— Overflow tone heard.
15	Momentarily operate RL key.	All lamps extinguished.
16	At MTF— Operate SDT2 key.	
17	Insert make-busy plug into MB_ jack of sender under test.	
18	At sender under test— Block nonoperated TR relay.	
19	At sender test set— Momentarily operate ST key; <i>start timing</i> (refer to paragraph 3.01).	TTC, A lamps lighted. D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for each digit of called number outpulsed. D lamp momentarily lighted. At sender under test— STT relay operated. At sender test set— Within 7 to 12 seconds after STT relay operated— Overflow tone heard. At sender test set— A lamp extinguished.
20	Momentarily operate RL key.	All lamps extinguished.
21	At sender under test— Remove blocking tool from TR relay.	
22	At MTF— Remove make-busy plug from MB_ jack associated with sender under test.	
23b	If 2-way trunk is used for selected outgoing route— At distant office— Have trunk restored to service.	
24	At MTF— Restore all keys and switches and remove all patching cords not required in next test.	
T. Zero Operator Call Routed to a Traffic Service Position Which Requires Automatically Identified Calling Number		
11	Operate keys and set switches in accordance with Test Chart Test 128.	

STEP	ACTION	VERIFICATION
12	At sender test set— Momentarily operate ST key (refer to paragraph 3.01).	TTC, A lamps lighted.
13	Operate REV key.	D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for 0 information digit and each digit of calling number outpulsed. D lamp momentarily lighted.
14	Momentarily operate RL key.	All lamps extinguished.
15	Restore REV key.	
16	At MTF— Restore all keys and switches and remove all patching cords not required in next test.	
U. Zero Operator Call Routed to a Traffic Service Position Which Requires Operator Identified Calling Number		
11	Operate keys and set switches in accordance with Test Chart Test 129.	
12	At sender test set— Momentarily operate ST key (refer to paragraph 3.01).	TTC, A lamps lighted.
13	Operate REV key.	D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted to indicate the information digit outpulsed. D lamp momentarily lighted.
14	Momentarily operate RL key.	All lamps extinguished.
15	Restore REV key.	
16	At MTF— Restore all keys and switches and remove all patching cords not required in next test.	
V. Special Start Signal (ANI) Via Crossbar Tandem TSP		
11	Operate keys and set switches in accordance with Test Chart Test 130.	
12	At sender test set— Momentarily operate ST key (refer to paragraph 3.01).	TTC, A lamps lighted. D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for each

STEP	ACTION	VERIFICATION
		digit of called number outpulsed. D lamp momentarily lighted.
13	Operate REV key.	D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for each digit of calling number outpulsed. D lamp momentarily lighted.
14	Momentarily operate RL key.	All lamps extinguished.
15	Restore REV key.	
16	Repeat Steps 11 through 15 as required for Test 131.	
17	At MTF— Restore all keys and switches and remove all patching cords not required in next test.	

W. Sender Busy

1	When sender being tested is idle— At sender under test— Block operated SB relay.	
2	At MTF— Insert make-busy plugs into MB_ jacks of all other senders in subgroup associated with sender under test (refer to paragraph 1.07).	At sender frame— Nonwire-spring-relay type senders Check for absence of ground on 1T, 5T, 3B of SB relay. Wire-spring-relay type senders Check for absence of ground on terminals 16, 27 of terminal strip A and 17 of terminal strip B of sender control unit.
3	At MTF— Insert make-busy plug into MB_ jack of sender under test.	
4	At sender under test— Remove blocking tool from SB relay.	Nonwire-spring-relay type senders Check for absence of ground on 1T, 5T, 3B of SB relay. Wire-spring-relay type senders Check for absence of ground on terminals 16, 27 of terminal strip A and 17 of terminal strip B of sender control unit.
5	At MTF— Remove make-busy plug from MB_ jack associated with sender under test.	At sender frame— Nonwire-spring-relay type senders Check for presence of ground on 1T, 5T, 3B, of SB relay. Wire-spring-relay type senders Check for presence of ground on terminals

STEP	ACTION	VERIFICATION
		16, 27 of terminal strip A and 17 of terminal strip B of sender control unit.
X. Comparative Frequency Test		
1	At MTF— Insert make-busy plug into MB_jack of sender under test.	
2	Insert make-busy plug into MB_jack of sender (having oscillators known to be at proper frequencies) to be compared with sender under test.	
3	At <i>each</i> sender made busy— Block operated ON relay.	
4	Connect one lead of 67C test set to terminal 13 of terminal strip M of one sender.	
5	Connect other lead of 67C test set to terminal 13 of terminal strip M of other sender.	
	<i>Note:</i> If senders are not within reach of the cords, available cords may be used to extend the cord provided with the test receiver.	
6	Listen at test receiver for beat frequency.	Oscillator frequency satisfactory if beats can be counted (usually 5 or less per second).
7	Remove 67C test set.	
8	Repeat Steps 4 through 7 to test each frequency, substituting in turn the following terminals: 23, 33, 14, 24, 34, for terminal 13 of terminal strip M in Step 4.	
9	Remove blocking tools from ON relays.	
10	At MTF— Remove make-busy plugs from MB_jacks.	
Y. Oscillator Output Voltage		
1	At MTF— Insert make-busy into MB_jack of sender under test.	
2	At sender under test— Using 893 cords, connect 275 - ohm resistor to terminals 11, 12 of terminal strip M of MF supply unit.	

STEP	ACTION	VERIFICATION
	<i>Note:</i> The 624B tool provides means for connecting to M_ terminals, and the KS-6278 connecting clip provides means for connecting to resistor.	
3	Set voltmeter to read AC volts in accordance with approved procedures for particular meter being used.	
4	Block operated ON relay.	
5	Connect voltmeter GND terminal to side of resistor connected to terminal 11 of terminal strip M of MF supply unit.	
6	Touch voltmeter probe to side of resistor connected to terminal 12 of terminal strip M of MF supply unit.	Output voltage is between 1.25 and 1.75 volts.
		<i>Note:</i> If output voltage of any of the six oscillators is not within the limits specified, proceed as outlined in notes accompanying schematic drawing (refer to paragraph 1.06).
7	Remove connection from terminal 12 and connect in turn to terminal 15, 21, 22, 25, and 35 of terminal strip M, repeating Step 6 for each connection.	
8	Remove all test connections.	
9	Remove blocking tool from ON relay.	
10	At MTF— Remove make-busy plug from MB_ jack associated with sender under test.	

Z. Frequency Test

- 1 At MTF—
Insert make-busy plug into MB_ jack of sender under test.
- 2 At sender under test—
Connect one end of 1100-ohm resistor to terminal 11 of terminal strip M of MF supply unit, using 893 cord.

Note: The 624B tool provides means for connecting to M_ terminals, and the KS-6278 connecting clips provide means for connecting to resistor.

STEP	ACTION	VERIFICATION
3	Connect remaining end of 1100-ohm resistor to first terminal in Table A using 893 cord.	
4	Connect testing cord to frequency meter.	
5	Connect clip associated with center conductor of testing cord to same side of 1100-ohm resistor as in Step 3.	
6	Connect clip associated with shield of testing cord to ground side of 1100-ohm resistor as in Step 2.	
7	Block operated ON relay.	
8	Measure frequency.	Frequency is within limits indicated in Table A.
9a	If output frequency is not within limits specified in Table A— Proceed as outlined in notes accompanying schematic drawing (refer to paragraph 1.06).	
10	Move test connection from terminal used in Table A to next terminal indicated in Table A.	
11	Repeat Steps 8 through 10 until all frequencies are tested.	
12	Remove all test connections.	
13	Remove blocking tool from ON relay.	
14	At MTF— Remove make-busy plug from MB_ jack associated with sender under test.	

TABLE A

M-TERMINAL	OSCILLATOR OUTPUT FREQUENCY	MAXIMUM PERMISSABLE VARIATION (HZ \pm 1 PERCENT)
M12	700	698 to 705
M15	900	897 to 906
M21	1100	1097 to 1108
M22	1300	1296 to 1309
M25	1500	1495 to 1510
M35	1700	1695 to 1712

STEP	ACTION	VERIFICATION
AA. Special Start Signal (ANI) to TSPS No. 1		
11	Operate keys and set switches in accordance with Test Chart Test 132.	
12	At sender test circuit— Momentarily operate ST key (refer to paragraph 3.01).	TTC, A lamps lighted. One 0 to 9 lamp momentarily lighted for each digit of called number outpulsed. For Test 131— D1 lamp momentarily lighted. For Test 132— D7 lamp momentarily lighted. For Test 133— D0 lamp momentarily lighted. For Test 134— D4 lamp momentarily lighted.
13	Momentarily operate RL key.	All lamps extinguished.
14	Repeat Steps 11 through 13, as required for Tests 133 through 135.	
15	At MTF— Restore all keys and switches and remove all patching cords not required in next test.	
AB. Intersender Timing—Automatic Intercept System		
12	Operate keys and set switches in accordance with Test Chart Test 136.	
13	Operate PBXH, NTLN keys.	
14	Set TBT, TBU switches as required to select tens block within circuit group for access to circuit under test.	
15	Select units digit in tens block selected.	
16b	If line circuit group is allotted— Operate NGT, NG_ keys (for all but selected number group frame).	
17	Operate REV key.	
18	At outgoing sender group release circuit— Block operated R_ relay of sender group associated with sender under test.	
19	At sender test set— Momentarily operate ST key; <i>start timing</i> (refer to paragraph 3.01).	TTC lamp lighted. In 14 to 22 seconds— Overflow tone heard.

STEP	ACTION	VERIFICATION
20	Momentarily operate RL key.	All lamps extinguished. Overflow tone silenced.
21	At outgoing sender group release circuit— Remove blocking tool from R_ relay.	
22	Repeat Tests 12 through 21, as required for Test 137.	
23	At MTF— Restore all keys and switches and remove all patching cords not required in next test.	
AC. IDDD-LAMA Call		
11	Operate keys and set switches in accordance with Test Chart Test 138.	
12	Operate REC key.	
13	At sender test set— Momentarily operate ST key (refer to paragraph 3.01).	TTC, A lamps lighted. D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for each of 5 digits outpulsed (KP-XXX-ST). D lamp momentarily lighted.
14	Within 5 seconds— Momentarily operate REV key.	D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for each of remaining digits outpulsed. D lamp momentarily lighted. Two trouble records taken. Line location, CP_, MB_, RNT0, 1, or 2, RN_ designations perforated on each trouble record. MKR, A_ through L_ designations perforated on first trouble record. TV, A_ through L_ designations perforated on second trouble record.
15	Momentarily operate RL key.	All lamps extinguished.
16	Repeat Steps 11 through 15 as required for Tests 138 through 147.	
17	At MTF— Restore all keys and switches and remove all patching cords not required in next test.	
AD. IDDD-LAMA Gateway Timing		
12	Operate keys and set switches in accordance with Test Chart Test 148.	

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STEP	ACTION	VERIFICATION
13	Momentarily operate ST key (refer to paragraph 3.01).	TTC, A lamps lighted. D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for each of 5 digits outputted (KP-XXX-ST). D lamp momentarily lighted. For Test Chart Test 147— In 14 to 29 seconds— Overflow tone heard.
14	For Test Chart Test 149— Operate REV key; <i>start timing</i> .	In 7 to 14 seconds— Overflow tone heard.
15	Momentarily operate RL key.	All lamps extinguished. Overflow tone silenced.
16	Repeat Steps 12 through 15, as required for Test 149.	
17	At MTF— Restore all keys and switches and remove all patching cords not required in next test.	
AE. Abandoned Call—IDDD-LAMA		
11	Operate keys and set switches in accordance with Test Chart Test 150.	
12	Momentarily operate ST key (refer to paragraph 3.01).	TTC, A, C lamps lighted. D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for each of 5 digits outputted (KP-XXX-ST). D lamp momentarily lighted.
13	Within 5 seconds— Momentarily operate REV key.	D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for all except last digit.
14	Operate DISC key.	TTC, C, A lamps remain lighted.
15	Momentarily operate RT key.	TTC, C, A lamps extinguished.
16	Momentarily operate RL key.	All lamps extinguished.
17	At MTF— Restore all keys and switches and remove all patching cords not required in next test.	
AF. IDDD-TSPS Call		
11	Operate keys and set switches in accordance with Test Chart Test 151.	

STEP	ACTION	VERIFICATION
12	Operate REC key.	
13	At sender test set— Momentarily operate ST key (refer to paragraph 3.01).	TTC, A lamps lighted. D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for each digit outpulsed (KP-1-called number-ST). D lamp momentarily lighted. Two trouble records taken. Calling line location, NOB designations perforated on each trouble record. MKR, TP or RP, called number, CL1, CL3, CL5, CL8 designations perforated on first trouble record. TV, calling number, TPT or RPT designations perforated on second trouble record.
14	Operate REV key.	D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for each digit outpulsed (KP-0-calling number-ST). D lamp momentarily lighted.
15	Momentarily operate RL key.	
16	Repeat Steps 11 through 15, as required for Tests 152 through 160.	
17	At MTF— Restore all keys and switches and remove all patching cords not required in next test.	

AG. Directory Assistance Charging

11	Operate keys and set switches in accordance with Test Chart Test 161.	
12b	If 2-way trunk is used for selected outgoing route— At distant office— Have trunk removed from service.	
13	At MTF— Operate REC key.	
14	At sender test set— Momentarily operate ST key.	TTC, A lamps lighted. D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for each digit outpulsed. D lamp momentarily lighted. Two trouble records taken. Both trouble records FR, CN, S, calling line location, OBS or NOB, RNT0, 1, 2, RN, designations perforated.

STEP	ACTION	VERIFICATION
		<p>If test is for 411 or 555-1212 observed or nonobserved 2-line entry— CP3, MB6, LST designations perforated. If test is for 555-1212 observed or nonobserved 4-line entry— CP3, MB9, 4DG designations perforated. First trouble record SRT, MKR, called number, called number class, TP or RP designations perforated. Second trouble record TV, 2L or 4L, TPT or RPT designations perforated. If test is for 411 or 555-1212 observed or nonobserved 2-line entry— Called number designations not perforated. If test is for 555-1212 observed or nonobserved 4-line entry— Called number designations perforated.</p>
15	Momentarily operate RL key.	All lamps extinguished.
16b	<p>If 2-way trunk is used for selected outgoing route— At distant office— Have trunk restored to service.</p>	
17	Repeat Steps 11 through 16b, as required for Test 162 through 164.	
18	<p>At MTF— Restore all keys and switches and remove all patching cords not required in next test.</p>	
AH. 211 Code Routed to a Traffic Service Position as a Zero Operator Call		
11	Operate keys and set switches in accordance with Test Chart Test 165.	
12	<p>Momentarily operate ST key. Note: Refer to paragraph 3.01.</p>	<p>TTC, A, lamps lighted. D lamp momentarily lighted. One 0 to 9 lamp momentarily lighted for each digit outpulsed. D lamp momentarily lighted.</p>
13	Momentarily operate RL key.	All lamps extinguished.
14	<p>At MTF— Restore all keys and switches and remove all patching cords not required in next test.</p>	

STEP	ACTION	VERIFICATION
A1.	Digit 8 Access Call to Enhanced Private Switched Communications Systems (EPSCS) No. 1 ESS	
11	Operate keys and set switches in accordance with Test Chart Test 166.	
12	At distant office— Have trunk removed from service.	
13	At sender test set— Momentarily operate ST key (refer to paragraph 3.01).	TTC, A lamps lighted.
14	Operate REV key.	D lamp lighted. One 0 to 9 lamp momentarily lighted for each digit of calling number outpulsed. D lamp momentarily lighted.
15	Momentarily operate RL key.	All lamps extinguished.
16	Restore REV key.	
17	At distant office— Have trunk restored to service.	
18	At MTF— Restore all keys and switches and remove all testing cords not required in next test.♦	
5. PREPARATION OF TEST CHART		(3) In the MISCELLANEOUS KEYS AND/OR SWITCHES column, record FS, TS keys.
5.01 The Test Chart is used as a particular number chart and provides the priming information required for each test. Information obtained from local office records should be used to fill in the Test Chart in the following manner:		(4) For trunks requiring CX supervision, record MF-CX in SENDER TEST SET, SDT column. For all other trunks record MF.
(a) Selection of a Particular Trunk: When it is desired to use a particular trunk for test, select the trunk as follows:		(5) Record GPA or GPB as required in the MISCELLANEOUS KEYS AND/OR SWITCHES column when the trunks served by the sender are in allotted groups.
Note: When 2-way trunks are required to be used for the selected outgoing route, a particular trunk must always be selected.		(b) When it is necessary to simulate a test call from an incoming trunk to reach a desired outgoing tandem or intertoll trunk, record an incoming subclass of test for the selected route.
(1) Consult local office records for location of desired trunk. Wherever possible, avoid the use of 2-way or intertoll trunks.		(c) For non-DDD calls, record the A_, B_, and C_ digits for an office code that can be reached by the sender.
(2) Record trunk location and trunk number in the TRUNK SELECTION column.		

(d) For DDD calls, record the A_, B_, and C_ digits for the area code sent by the sender, and the office code D_, E_, and F_ digits that can be reached by the sender.

(e) Record an originating class of call and translator indication required by the marker to select a route and sender group associated with sender under test.

(f) Record the various classes of service, and when the office is arranged for rate treatment, record various rate treatments. When 2-party class of service is selected, record TP in the MISCELLANEOUS KEYS AND/OR SWITCHES column.

(g) Record any arbitrary digits used (for information only).

(h) Record the line location when a specific line location is required.

Note: When a specific line location is not required, record the appropriate SDT switch position.

(i) Record NTC key in the MISCELLANEOUS KEYS AND/OR SWITCHES column when a specific line location (h) is required.

5.02 Test A

(1) Determine from local office records:

(a) The office code for each office that can be reached by the sender on an AMA or non-AMA basis.

(b) The DDD codes being sent by the sender.

(2) For Tests 1 through 34, apply (a), (c), and (e) through (i) of paragraph 5.01, selecting AMA office codes and classes of service that will check office code (A_, B_, and C_), class (CL_), and deletion (DL_) leads.

(3) For Tests 35 through 45, apply (a), (d), and (e) through (i) of paragraph 5.01, selecting DDD codes used with AMA or CAMA and classes of service. When call is AMA, record SDT1, REC keys in MISCELLANEOUS KEYS AND/OR SWITCHES column.

(4) For Tests 46 through 62, apply (a) through (i) of paragraph 5.01, selecting office codes and classes of service that do not require AMA.

(5) For Tests 63 through 66, apply (a) through (i) of 5.01, selecting office codes and classes of service that require 2-way or intertoll routing.

(6) For Tests 67 and 68, apply (a) through (i) of paragraph 5.01, selecting office codes and classes of service that require coin zone trunk in junctor routing.

(7) For Test 69, apply (a) through (i) of paragraph 5.01, selecting office code and class of service that requires local coin zone trunk or junctor routing.

(8) For Tests 70 and 71, apply (a) through (i) of paragraph 5.01, selecting office code and class of service that requires tandem trunk routing (non-AMA).

(9) For Tests 72 and 73, apply (a) through (i) of paragraph 5.01, selecting office code and class of service for CCSA AMA tandem trunk routing.

(10) For Tests 74 and 75, apply (a) through (i) of paragraph 5.01, selecting office code and class of service for routing via trunks to TSPS No. 1.

5.03 Test B

(1) Apply (a) through (i) of paragraph 5.01, selecting an office code, class of service, and a particular trunk that requires AMA routing.

5.04 Test C

(1) Apply (a) through (i) of paragraph 5.01, selecting a non-AMA office code, class of service, and a particular trunk.

5.05 Test D

(1) Apply (a) through (i) of paragraph 5.01, selecting an office code and class of service for a detail-billed AMA call. If a bulk-billed AMA call must be used, record the TOF key in MISCELLANEOUS KEYS AND/OR SWITCHES column.

5.06 Test E

- (1) Apply (a) through (i) of paragraph 5.01, selecting an office code and class of service requiring AMA that will route to a coin zone trunk.

5.07 Test F

- (1) Apply (a) through (i) of paragraph 5.01, selecting an office code and class of service requiring AMA routing.

5.08 Test G

- (1) Apply (a) through (i) of paragraph 5.01, selecting an office code, class of service, and an interoffice trunk requiring AMA routing.

5.09 Test H

- (1) For AMA offices, apply (a) through (i) of paragraph 5.01, selecting an office code and class of service requiring AMA routing.
- (2) For non-AMA offices, apply (a) through (i) of paragraph 5.01, selecting a non-AMA office code and class of service.

5.10 Tests I, J, L, M, N, and O

- (1) Test I cannot be made on coin zone, 2-way, or intertoll trunks.
- (2) For Tests J, L, and M, use interoffice codes.
- (3) Test L cannot be made on trunks with CX supervision.
- (4) For AMA offices, apply (a) through (i) of paragraph 5.01, selecting office codes and classes of service requiring AMA routing.
- (5) For non-AMA offices, apply (a) through (i) of paragraph 5.01, selecting non-AMA office codes and classes of service.

5.11 Test K

- (1) For AMA offices, apply (a) through (i) of paragraph 5.01, selecting an office code and class of service requiring AMA that will route to a coin zone trunk.

- (2) For non-AMA offices, apply (a) through (i) of paragraph 5.01, selecting a non-AMA office code and class of service that will select a coin zone trunk.

5.12 Test P

- (1) Apply (a) through (i) of paragraph 5.01, selecting the ANI office codes for each office that can be reached by the sender and individual or 2-party class of service.

5.13 Tests Q and S

- (1) Apply (a) through (i) of paragraph 5.01, selecting an ANI code and individual or 2-party class of service.

5.14 Test R

- (1) Apply (a) through (i) of paragraph 5.01, selecting an ANI office code and multiparty class of service.

5.15 Test R.1

- (1) Apply (a) through (i) of paragraph 5.01, selecting an ANI code and individual or 2-party class of service.

5.16 Test T

- (1) Apply (a), (e) through (i) of paragraph 5.01, selecting an individual or 2-party class of service.

5.17 Test U

- (1) Apply (a), (e) through (i) of paragraph 5.01, selecting a multiparty class of service.

5.18 Test V

- (1) Apply (a), (e) through (i) of paragraph 5.01, selecting a coin class of service and an office code requiring service by a traffic service position via crossbar tandem.

5.19 Test AA

- (1) For Tests 132 and 133, apply (a) and (e) through (i) of paragraph 5.01, selecting a coin class of service and an office code requiring service by TSPS No. 1.

- (2) For Tests 134 and 135, apply (a) and (e) through (i) of paragraph 5.01, selecting a noncoin class of service and an office code requiring service by TSPS No. 1.

5.20 Test AB

- (1) Record A_ through G_ digits and a class of service that will route the call to AIS—blank, regular, or trouble intercept.
- (2) Apply (a), (c), (e), (f), and (g) of paragraph 5.01.
- (3) Select an incoming subclass of test.

5.21 Tests AC, AD, AE

- (1) Apply (a), (b), (f), (g), (h), and (i) of paragraph 5.01.
- (2) Record working country codes in DIGITS CODE(S) AND NUMBER (CALLED NUMBER) Column as follows:
 - (a) When country code is one digit, record A_ digit of code and any B_ and C_ digits that the marker will not recognize as another working or unused code.
 - (b) When country code is two digits, record A_ and B_ digits of code and any C_ digit that the marker will not recognize as another working or unused code.
 - (c) When country code is three digits, record A_, B_, and C_ digits of the code.

5.22 Test AF

- (1) Apply (a), (b), (f), (g), (h), and (i) of paragraph 5.01.
- (2) Record working country codes and national numbers DIGITS-CODE(S) AND NUMBER (CALLED NUMBER) column as follows:
 - (a) When country code is one digit, record A_ digit of code and B_ through M_ digits of the national number as required.
 - (b) When country code is two digits, record A_ and B_ digits of code and C_ through M_ digits of the national number as required.
 - (c) When country code is three digits, record A_, B_, and C_ digits of code and D_ through M_ digits of the national number as required.

5.23 Test AG

- (1) Apply (e), (f), (g), and (h) of paragraph 5.01, selecting a class of service requiring AMA routing.

5.24 Test AH

- (1) Apply (a), (e), (h), (i) of paragraph 5.01.

5.25 Test AI

- (1) Apply (a), (e), (h), (i), of paragraph 5.01, selecting a class of service requiring routing to EPSCS No. 1 ESS.♦











