

CALL WAITING FEATURE
TESTS USING OFFICE TEST FRAME SD-27633-01 (J23260)
NO. 5 CROSSBAR OFFICES

1. GENERAL

PAGE

1.01 This section describes methods for testing dial tone marker circuit (SD-26001-01), completing marker circuit (SD-26002-01), call waiting link circuit (SD-27788-01), and call waiting circuit (SD-27787-01) using office test frame (OTF) SD-27633-01 (J23260), and the trouble indicator and connector circuit (TIC) SD-27634-01 in No. 5 crossbar offices arranged for call waiting service.

customer's line, it will release the level 0 (dialing protection) hold magnet in the call waiting link, take a trouble record, and then complete the dial tone job via the hold off-normal contacts on the call waiting link.

11

1.02 This section affects Equipment Test Lists.

1.03 The tests covered are:

E. Crossed LP Relay Detection Check:

This test checks that on an originating call, the dial tone marker will detect if two LP_ relays have been operated in the call waiting link circuit and will cause a stop progress indication to be passed to the call waiting link circuit, then will continue to set up the connection to an originating register, and will take a trouble record upon disconnect.

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CUSTOMER LINE TEST

PAGE

A. Customer Regular Line Link

Appearance: This test provides a ballistic check of a call waiting customer line through the line link frame and the call waiting link circuit.

10

B. (Reserved for Future Test.)

11

F. Hold Magnet Check: This test

checks that on an originating call, should the line hold magnet check fail in the call waiting link, the dial tone marker will cause a trouble record to be taken, then continue to set up the connection to an originating register.

12

DIAL TONE MARKER CIRCUIT TESTS

G. (Reserved for Future Test.) **13**

C. Originating Call Feature: This test checks the following: (1) The marker will pass the customer line location to the call waiting link circuit and will receive from the call waiting link circuit a mark indicating customer is or is not arranged for call waiting service. (2) The marker will establish dialing protection via level 0 in the call waiting link to prevent incoming calls completing to the customer until the dial tone connection has been released.

11

COMPLETING MARKER CIRCUIT TESTS—ORIGINATING CALLS

H. Originating Call From Call Waiting Line Routed to Permanent Signal:

This test checks the ability of the completing marker to maintain level 0 (dialing protection) in the call waiting link while a call waiting customer line is being routed to a permanent signal trunk.

13

D. Continuity Test Failure Feature:

This test checks that if a dial tone marker fails on continuity test on the

I. (Reserved for Future Test.)

14

COMPLETING MARKER CIRCUIT TESTS—TERMINATING CALLS

J. Customer Regular Line Link Appearance Busy, Call Waiting Appearance Idle: This test checks that when the marker finds the regular line link appearance busy, the following functions are completed: (1) Marker determines from the call waiting link if customer has call waiting service. (2) When customer has call waiting service, a call waiting circuit is attached to his line and the call waiting circuit number is received from the call waiting link circuit. (3) Marker recycles, passes the circuit number to the number group and receives the line location of the selected call waiting circuit. (4) Marker linkage to the line link frame appearance of the call waiting circuit. (5) Marker check of linkage and release.

14

K. Call Waiting Customer Regular Line Link and Attached Call Waiting Circuit Line Link Appearances Busy: This test checks that when the marker finds both the customer regular line link and the attached call waiting circuit line link appearances busy, a busy indication is returned to an incoming call.

15

L. Call Waiting Customer Connected to Level 0 on Call Waiting Link: This test checks that when a call waiting customer is connected to level 0 (dialing protection) on the call waiting link, a busy indication will be returned to a terminating call.

17

M. Call Waiting Circuit Identification: This test provides a means of checking that the marker may receive all call waiting circuit numbers from the call waiting link circuit.

17

N. Customer Not Arranged for Call Waiting Service: This test checks that a non-call waiting customer on a line link frame arranged for call waiting service will be denied call waiting service.

18

COMPLETING MARKER CIRCUIT TESTS—MISCELLANEOUS

O. Crossed LP Relay Detection Check: This test checks that on a terminating call, the marker will detect if two LP-relays have been operated in the call waiting link circuit and will cause a stop progress indication to be passed to the call waiting link circuit and a trouble record taken.

21

P. Stop Progress: This test checks that on a terminating call, when the call waiting link circuit detects a trouble, it will send a stop progress indication to the marker, which in turn will cause a trouble record to be taken.

22

Q. (Reserved for Future Test.)

22

R. (Reserved for Future Test.)

22

CALL WAITING LINK CIRCUIT TESTS—ORIGINATING CALLS

S. Originating Call Feature: This test checks the following: (1) The marker will pass the customer line location to the call waiting link circuit and will receive from the call waiting link circuit a mark indicating the customer is or is not arranged for call waiting service. (2) The marker will establish dialing protection via level 0 in the call waiting link to prevent incoming calls from completing to the customer until the dial tone connection has been released.

22

T. Call Waiting Customer Call Waiting Link Appearance: This test provides a check of a call waiting customer line through the call waiting circuit and the customer vertical on the call waiting link.

23

U. Call Waiting Customer Level 0 Test: This test provides a means of testing level 0 (dialing protection) on a customer vertical in the call waiting link.

24

CALL WAITING LINK CIRCUIT TESTS—TERMINATING CALLS

V. Terminating Call via Call Waiting

Circuit: This test checks that when a completing marker finds the customer regular line link appearance busy, the following functions are completed: (1) Marker determines from call waiting link if customer has call waiting service. (2) When customer has call waiting service, the call waiting link circuit attaches a call waiting circuit to the customer line and passes the number of preferred call waiting circuits to the marker. (3) Marker recycles, passes the circuit number to the number group and receives the line location of the selected call waiting circuit. (4) Marker sets linkage to the call waiting circuit from the incoming trunk and releases. (5) Call waiting alerting tone is sent to the customer. (6) When customer flashes the switchhook, call on regular line link appearance is put on hold, incoming call via the call waiting circuit is connected to customer. (7) When customer goes on-hook, all linkage released.

24

W. Call Waiting Customer Regular Line Link and Attached Call Waiting Circuit Line Link Appearances Busy:

This test checks that when the customer line link and the attached call waiting circuit line link appearances are both busy, the marker will receive a noncall waiting mark from the call waiting link and will cause a busy signal to be returned to the terminating call.

25

X. Call Waiting Circuit Reserve Test:

This test checks that when a call has been terminated to a customer line via a call waiting circuit and the calling party goes on-hook while the regular appearance remains busy, a subsequent call to the call waiting customer while he remains off-hook is completed via the same call waiting circuit.

27

Y. (Reserved for Future Test.)

28

Z. Call Waiting Circuit Selection:

This test checks the selection of a particular call waiting circuit. This test also verifies the directory number assignment of the call waiting circuit in the call waiting link circuit.

28

CALL WAITING LINK CIRCUIT TESTS—MISCELLANEOUS

AA. Call Waiting Link Made Busy:

This test checks that a made busy call waiting link may be seized for testing, but may not be seized for service.

29

AB. Call Waiting Circuit Made Busy:

This test checks that a made busy call waiting circuit may be seized for testing.

30

AC. Call Waiting Circuit Preference:

This test provides a method for checking call waiting circuit preference in the call waiting link circuit.

31

AD. All Call Waiting Circuits Busy:

This test checks that when all call waiting circuits are busy, the call waiting link circuit sends an NCW mark to the marker indicating that a busy indication is to be returned by the marker to the incoming call.

35

AE. Crossed Select Magnet Test:

This test checks that the call waiting link circuit will detect crossed select magnets on the call waiting link, send a stop progress indication to the marker which in turn will cause a trouble record to be taken.

36

AF. Crossed Hold Magnet Test—Dial Tone Marker Usage:

This test checks that on a dial tone job, the call waiting link circuit will detect crossed hold magnets on the call waiting link, send a stop progress indication to the marker which in turn will cause a trouble record to be taken.

36

AG. Crossed Hold Magnet Test—Completing Marker Usage:

This test checks that on a terminating call,

the call waiting link circuit will detect crossed hold magnets on the call waiting link, send a stop progress indication to the marker which in turn will cause a trouble record to be taken. 37

AH. Hold Magnet Check—Dial Tone Marker Usage: This test checks that on an originating call, should the line hold magnet check fail in the call waiting link, the dial tone marker will cause a trouble record to be taken, then continue to set up the connection to an originating register. 38

AI. Hold Magnet Check—Completing Marker Usage: This test checks that on a terminating call, should the line hold magnet check fail in the call waiting link circuit, the completing marker will time out and cause a trouble record to be taken. 38

AJ. Standing Cross Test: This test checks that when the SXT relay operates in the call waiting link circuit, a stop progress indication is passed to the marker which will cause a trouble record to be taken. 39

AK. (Reserved for Future Test.) 40

AL. (Reserved for Future Test.) 40

AM. (Reserved for Future Test.) 40

CALL WAITING CIRCUIT TESTS—TERMINATING CALLS

AN. Terminating Call Completed via Call Waiting Circuit: This test checks alerting, transfer, and disconnect features of the call waiting circuit. This test also checks the handling of new terminating calls following disconnect of previous calls. 40

AO. Terminating Call Completed via Call Waiting Circuit When Call Waiting Customer Returns to On-Hook Condition: This test checks that when a call waiting customer returns to an on-hook condition without answering a

waiting call, the call waiting circuit will pass ringing from the incoming trunk to the customer telephone set. This test also checks that a transfer flash of greater than 1.2 seconds will cause the linkage to be released in the call waiting link. 43

AP. Disconnect and Reseizure While Call Waiting Customer Remains Off-Hook: This test checks reseizure following disconnect of incoming calls to a call waiting customer from either the call waiting circuit or the customer's regular line link appearance. 44

AQ. Call Waiting Circuit Reserve Test: This test checks that when a call has been terminated to a customer line via a call waiting circuit and the calling party goes on-hook while the regular appearance remains busy, a subsequent call to the call waiting customer while he remains off-hook is completed via the same call waiting circuit. 46

CALL WAITING CIRCUIT TESTS—MISCELLANEOUS

AR. T1 Timer Test: This test checks that a second alerting tone from the call waiting circuit is sent to the call waiting customer in 8.3 to 15 seconds following the first alerting tone. 47

AS. T2 timer Test: This test checks that when the call waiting link circuit has selected a call waiting circuit, linkage must be established between the incoming trunk and the selected call waiting circuit in 3.5 to 6.2 seconds, otherwise the call waiting circuit will return to an idle condition. 47

AT. TM2 (SB), TM1 (SM), and TM (TO) Timers: This test prescribes the testing of the following times in the call waiting circuits: TM2 (SB) timer—200 ms, TM1 (SM) timer—60 ms, and TM (TO) timer—1.2 seconds. 48

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1.04 Tests P, AA, AC, AF, AG, and AJ will deny call waiting service to the customer or customers on the selected line link frame.

1.05 The following tests require action and/or verification at the call waiting link circuit: Tests E, F, O, P, AA, AC, AE through AJ.

1.06 Tests AC and AS require action and verification at the call waiting link circuit and the call waiting circuit.

1.07 *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.

1.08 The statement between the asterisks(*___*) after action or verification statements is added to clarify the function being simulated in the test procedures of Part 4.

2. APPARATUS

Tests A, C Through F, H, J Through P, S Through X, Z Through AJ, AN Through AS

2.01 Office test frame SD-27633-01 (J23260).

Tests E, F, M, O, P, Z, AE Through AJ

2.02 Trouble indicator and connector circuit SD-27634-01.

Tests E, O

2.03 640-ohm, 2-watt, 5%, 147C resistor.

Tests E, O

2.04 Two testing cords, 893 cord, 6 feet long, equipped with two 360A tools (1W13B cord)

3. PREPARATION

and KS-6278 connecting clips (for connecting 640-ohm resistor across relay winding).

Tests F, P, AA, AE Through AI

2.05 Testing cord, 893 cord, 6 feet long, equipped with two 360A tools (1W13B cord), equipped with one KS-6278 connecting clip, one 639A (relay contact connector) tool, and one 651D (relay contact connector holder) tool (for connecting fixed contact of wire-spring-type relay to ground).

Tests J, K, M, O, P, V, W, X, Z, AA, AB, AC, AD, AG, AI, AN Through AS

2.06 Master test frame jack, lamp, and key circuit SD-25762-01.

Tests J, K, V, W, X, AA, AB, AN Through AR

2.07 1011G dial hand test set (handset) equipped with 2W38A cord assembly, consisting of W2CK cord, 310 plug, and 471A jack to be used in OTL and TM2 jacks.

Tests M, P, Z, AC, AG, AJ, AS

2.08 322A (make-busy) plugs as required.

Tests M, Z, AA, AH, AS

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

Tests P, AF, AG

2.10 1250-ohm, 2-watt, 5 percent, 147C resistor.

Tests AC, AS

2.11 32A (remote control) test set.

Tests AN, AR, AS

2.12 KS-3008 stopwatch or equivalent.

Test AJ

2.13 Testing cord, 893 cord, 6 feet long, equipped with two 360A tools (1W13B), two 639A (relay contact connector) tools and two 651D (relay contact connector holder) tools (for strapping fixed contacts of wire-spring-type relays).

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3. PREPARATION

STEP	ACTION	TEST									
		A	B	C	D	E	F	G	H	I	J
1	At TIC_ Momentarily operate RLS key.	x		x	x	x	x		x		x
2	At OTF_ Restore all keys and switches.	x		x	x	x	x		x		x
3	Momentarily operate RLS key.	x		x	x	x	x		x		x
4	Operate MKR_ key to select dial tone marker.			x	x	x	x		x		—
5	Set CST_, CSU_ to select class of service.			x	—	—	—		x		x
6	Set LLS_ switch to select call waiting link circuit.			x	x	x	x		x		x
7	Set L_L switch to 0.			x	x	x	x		x		x
8	Operate MKR_ key to select completing marker.			x					x		x
9	Operate 7D, MCB, IAO keys.			x					x		x
10	Operate A_ through G_ DIAL switches for IAO code and call waiting test line appearance on selected call waiting link.			x					x		x
11	Operate TTLD key.			—					—		x
12	Set PS_ switch to 11/56.			x					x		x
13	Set CWC_ switch to select call waiting circuit.										x
14	Plug hand telephone set into OTL jack.										x

— Omit Step

Proceed to METHOD

3. PREPARATION (Cont)

STEP	ACTION	TEST									
		K	L	M	N	O	P	Q	R	S	T
1	At TIC_ Momentarily operate RLS key.	x	x	x	x	x	x			x	x
2	At OTF_ Restore all keys and switches.	x	x	x	x	x	x			x	x
3	Momentarily operate RLS key.	x	x	x	x	x	x			x	x
4	Operate MKR_ key to select dial tone marker.	—	x	—	—	—	—			x	—
5	Set CST_, CSU_ to select class of service.	x	x	x	x	x	x			x	x
6	Set LLS_ switch to select call waiting link circuit.	x	x	—	—	x	x			x	—
7	Set L_L switch to 0.	x	x	x	x	x	x			x	x
8	Operate MKR_ key to select completing marker.	x	x	x	x	x	x			x	x
9	Operate 7D, MCB, IAO keys.	x	x	x	x	x	x			x	x
10	Operate A_ through G_ DIAL switches for IAO code and call waiting test line appearance on selected call waiting link.	x	x	x	—	x	x			x	—
11	Operate TTLD key.	x	x	x	—	x	x			x	x
12	Set PS_ switch to 11/56.	x	x	x	x	x	x			x	x
13	Set CWC_ switch to select call waiting circuit.	x									
14	Plug hand telephone set into OTL jack.	x									

— Omit Step

▒ Proceed to METHOD

3. PREPARATION (Cont)

STEP	ACTION	TEST									
		U	V	W	X	Y	Z	AA	AB	AC	AD
1	At TIC_ Momentarily operate RLS key.	X	X	X	X		X	X	X	X	X
2	At OTF_ Restore all keys and switches.	X	X	X	X		X	X	X	X	X
3	Momentarily operate RLS key.	X	X	X	X		X	X	X	X	X
4	Operate MKR_ key to select dial tone marker.	—	—	—	—		—	—	—	—	—
5	Set CST_, CSU_ to select class of service.	X	X	X	X		X	X	X	X	X
6	Set LLS_ switch to select call waiting link circuit.	—	X	X	X		—	X	X	X	X
7	Set L_L switch to 0.	X	X	X	X		X	X	X	X	X
8	Operate MKR_ key to select completing marker.	X	X	X	X		X	X	X	X	X
9	Operate 7D, MCB, IAO keys.	X	X	X	X		X	X	X	X	X
10	Operate A_ through G_ DIAL switches for IAO code and call waiting test line appearance on selected call waiting link.	—	X	X	X		X	X	X	X	X
11	Operate TTLD key.	X	X	X	X		X	X	X	X	X
12	Set PS_ switch to 11/56.	X	X	X	X		X	X	X	X	X
13	Set CWC_ switch to select call waiting circuit.		X	X	X			X	X		
14	Plug hand telephone set into OTL jack.		X	X	X			X	X		

— Omit Step

 Proceed to METHOD

3. PREPARATION (Cont)

STEP	ACTION	TEST									
		AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN
1	At TIC_ Momentarily operate RLS key.	X	X	X	X	X	X				X
2	At OTF_ Restore all keys and switches.	X	X	X	X	X	X				X
3	Momentarily operate RLS key.	X	X	X	X	X	X				X
4	Operate MKR_ key to select dial tone marker.	X	X	—	X	—	X				—
5	Set CST_, CSU_ to select class of service.	—	—	X	—	X	—				X
6	Set LLS_ switch to select call waiting link circuit.	X	X	X	X	X	X				X
7	Set L_L switch to 0.	X	X	X	X	X	X				X
8	Operate MKR_ key to select completing marker.			X		X					X
9	Operate 7D, MCB, IAO keys.			X		X					X
10	Operate A_ through G_ DIAL switches for IAO code and call waiting test line appearance on selected call waiting link.			X		X					X
11	Operate TTLD key.			X		X					X
12	Set PS_ switch to 11/56.			X		X					X
13	Set CWC_ switch to select call waiting circuit.			X		X					X
14	Plug hand telephone set into OTL jack.										X

— Omit Step

▒ Proceed to METHOD

3. PREPARATION (Cont)

STEP	ACTION	TEST					
		AO	AP	AQ	AR	AS	AT
1	At TIC_ Momentarily operate RLS key.	x	x	x	x	x	
2	AT OTF_ Restore all keys and switches.	x	x	x	x	x	
3	Momentarily operate RLS key.	x	x	x	x	x	
4	Operate MKR_ key to select dial tone marker.	—	—	—	—	—	
5	Set CST_, CSU_ to select class of service.	x	x	x	x	x	
6	Set LLS_ switch to select call waiting link circuit.	x	x	x	x	x	
7	Set L_L switch to 0.	x	x	x	x	x	
8	Operate MKR_ to select completing marker.	x	x	x	x	x	
9	Operate 7D, MCB, IAO keys.	x	x	x	x	x	
10	Operate A_ through G_ DIAL switches for IAO code and call waiting test line appearance on selected call waiting link.	x	x	x	x	x	
11	Operate TTLD key.	x	x	x	x	x	
12	Set PS_ switch to 11/56.	x	x	x	x	x	
13	Set CWC_ switch to select call waiting circuit.	x	x	x	x	x	
14	Plug hand telephone set into OTL jack.	x	x	x	x		

— Omit Step

Proceed to METHOD

4. METHOD

STEP	ACTION	VERIFICATION
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CUSTOMER LINE TEST

A. Customer Regular Line Link Appearance

Note: If customer should go off-hook, SL lamp will be extinguished.

- | | | |
|---|---|--------------------------------------|
| 4 | Operate SCO, LT keys. | SL lamp lighted.
Dial tone heard. |
| 5 | Dial digit C, if required, and numericals of line being tested. | Dial tone silenced. |

STEP	ACTION	VERIFICATION
		<i>Note:</i> If customer is off-hook, busy tone will be heard when dial tone is silenced.
6	Restore LT key.	
7	Operate G, T1 REV, VMT1 keys.	Momentary (ballistic) voltmeter deflection returning to a steady reading.
8	Restore T1 REV key.	Momentary (ballistic) voltmeter deflection returning to a steady reading.
9	Momentarily operate RLS key.	SL lamp extinguished.
10	Restore all keys and switches not required for next test.	

B. (Reserved for Future Test)**DIAL TONE MARKER CIRCUIT TESTS****C. Originating Call Feature**

13	Operate CW, CWDT keys.	
14	Operate ST key.	S, CWT, CWL, CWK, LOK lamps lighted. Dial tone heard.
15	Within 3 seconds— Operate CWH key. *Level 0 held by OTF.*	Dial tone silenced. CWH lamp lighted.
16	Restore ST key.	S, CWK, CWL lamps extinguished.
17	Restore CWDT key.	
18	Operate OTL, RA keys.	
19	Operate ST key.	OS, S, ED, LV0, NCW, RA lamps lighted. Busy tone heard. *Verifies level 0 still operated.*
20	Restore CW, CWH, ST keys.	All lamps extinguished. Busy tone silenced.
21	Restore all keys and switches not required in next test.	

D. Continuity Test Failure Feature

8	Operate CW, CWDT keys.
9	Operate RLHT key.

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STEP	ACTION	VERIFICATION
10	Operate ST key.	S, CWT, CWL, CWK, RLK lamps lighted. Dial tone heard.
11	Restore CW, ST keys.	All lamps extinguished. Dial tone silenced.
12	Restore all keys and switches not required in next test.	

E. Crossed LP Relay Detection Check

8	At selected call waiting link circuit— Connect 640-ohm resistor between 1L and 2L winding terminals of LP00 relay, switch 00.	
9	At OTF— Operate CW, CWDT keys.	
10	Operate ST key.	S, CWT, CWL lamps lighted. Dial tone heard. At TIC— CWF, XCW lamps lighted.
11	Momentarily operate RLS key.	All lamps extinguished.
12	At OTF— Restore CW, ST keys.	All lamps extinguished. Dial tone silenced.
13	Restore all keys and switches not required in next test.	
14a	If no further tests are to be performed— At selected call waiting link circuit— Remove resistor placed in Step 8.	

F. Hold Magnet Check

8	At selected call waiting link circuit— Connect ground to fixed contact 3 of CWT1 relay.	
9	Block non-operated hold magnet 00, switch 00 on selected call waiting link circuit.	
10	At OTF— Operate CW, CWDT keys.	
11	Operate ST key.	S, CWT, CWL lamps lighted. Dial tone heard. At TIC— CWF, GLH, XCW lamps lighted.

STEP	ACTION	VERIFICATION
12	Momentarily operate RLS key.	All lamps extinguished.
13	At OTF— Restore CW, ST keys.	All lamps extinguished. Dial tone silenced.
14	Restore all keys and switches not required in next test.	
15a	If no further tests are to be performed— At selected call waiting link circuit— Remove ground connected in Step 8.	
16a	Remove blocking tool placed in Step 9.	

G. (Reserved for Future Test)

COMPLETING MARKER CIRCUIT TESTS—ORIGINATING CALLS

H. Originating Call From Call Waiting Line Routed to Permanent Signal

13	Operate CW, CWDT keys.	
14	Operate ST key.	S, CWT, CWL, CWK, LOK lamps lighted. Dial tone heard— In 10 to 32 seconds— Dial tone silenced. Permanent signal tone heard.
15	Operate CWH key. *Level 0 holding path transferred from permanent signal trunk to OTF.*	Permanent signal tone silenced. CWH lamp lighted.
16	Restore ST key.	S, CWK lamps extinguished.
17	Restore CWDT key.	
18	Operate OTL, RA keys.	
19	Operate ST key.	S, OS, ED, LV0, NCW, RA lamps lighted. Busy tone heard. *Verifies level 0 still operated.*
20	Restore CW, CWH, ST keys.	All lamps extinguished. Busy tone silenced.
21	Restore all keys and switches not required in next test.	

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STEP	ACTION	VERIFICATION
I. (Reserved for Future Test)		
COMPLETING MARKER CIRCUIT TESTS—TERMINATING CALLS		
J. Regular Appearance Busy—Call Waiting Appearance Idle		
15	At jack, lamp, and key circuit— Operate TM2 key.	
16	At OTF— Operate CW, CWCT, ANS keys.	CWT, CWSV, ANS lamps lighted. *A connected to B (Fig. 1).*
17	Operate TN key.	700 Hz tone heard in speaker. CRA lamp lighted. *Connection verified.*
18	Restore TN key.	700 Hz tone silenced. CRA lamp extinguished.
19	Operate OTL key.	
20	Operate ST key.	S, OS, ED, CWK lamps lighted. Call waiting alerting tone heard in handset at OTL jack. Ringing tone heard in speaker. *C connected to call waiting circuit.*
21	Operate TN key.	700 Hz tone heard in handset at OTL jack. CRA lamp lighted. *A still connected to B.*
22	Restore ANS key for 1 second. *A flashes.*	Ringing tone silenced in speaker. 700 Hz tone silenced, 1300 Hz tone heard in handset at OTL jack. CRA lamp extinguished. CWA lamp lighted. *A connected to C, B on hold.*
23	Restore CW, ANS, ST keys.	All lamps extinguished. 1300 Hz tone silenced.
24	Restore all keys and switches not required in next test.	
25a	If no further tests are to be performed— Remove plug of handset from OTL jack.	
26a	At jack, lamp, and key circuit— Restore TM2 key.	

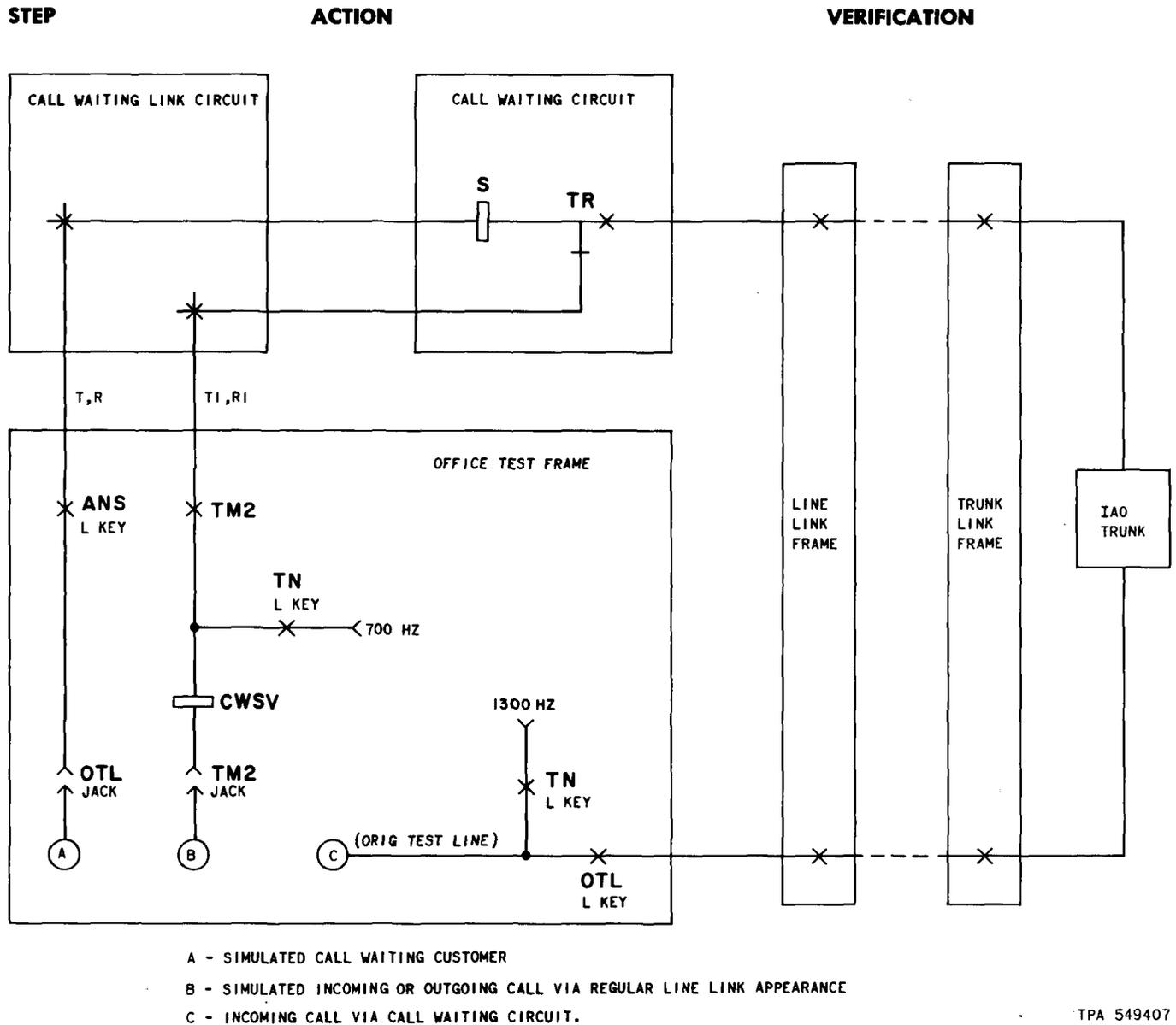


Fig. 1—Incoming calls via Call Waiting Circuit

K. Call Waiting Customer Regular Line Link and Call Waiting Link Appearances Busy

- 15 At jack, lamp, and key circuit—
Operate TM2 key.
- 16 At OTF—
Operate CW, CWCT, ANS keys.
- 17 Operate TN key.

CWT, CWSV, ANS lamps lighted.
A connected to B (Fig. 1).

700 Hz tone heard in speaker.
CRA lamp lighted.
Connection verified.

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STEP	ACTION	VERIFICATION
18	Restore TN key.	700 Hz tone silenced. CRA lamp extinguished.
19	Operate OTL key.	
20	Operate ST key.	S, OS, ED, CWK lamps lighted. Call waiting alerting tone heard in handset at OTL jack. Ringing tone heard in speaker. *C connected to call waiting circuit.*
21	Operate TN key.	700 Hz tone heard in handset at OTL jack. CRA lamp lighted. *A still connected to B.*
22	Restore ANS key for 1 second. *A flashes.*	Ringing tone silenced in speaker. 700 Hz tone silenced, 1300 Hz tone heard in handset at OTL jack. CRA lamp extinguished. CWA lamp lighted. *A connected to C, B on hold.*
23	At jack, lamp, and key circuit— Operate TM1 key.	
24	At OTF— Operate RA key.	
25	Restore ST, TN keys.	S, OS, ED, CWA, CWK lamps extinguished. 1300 Hz tone silenced.
26	Operate ST key.	S, OS, ED, RA, NCW lamps lighted. Busy tone heard in speaker. *Both appearances of call waiting customer busy.*
27	Restore CW key.	
28	At jack, lamp, and key circuit— Restore TM1 key.	CWSV lamp extinguished. Busy tone silenced.
29	At OTF— Restore ANS, ST keys.	All lamps extinguished.
30	Restore all keys and switches not required in next test.	
31a	If no further tests are to be performed— Remove plug of handset from OTL jack.	
32a	At jack, lamp, and key circuit— Restore TM2 key.	

STEP	ACTION	VERIFICATION
L. Call waiting Customer Connected to Level 0 on Call Waiting Link		
13	Operate CW, CWDT keys.	
14	Operate ST key.	S, CWT, CWL, CWK, LOK lamps lighted. Dial tone heard.
15	Within 3 seconds— Operate CWH key. *Level 0 held by OTF.*	Dial tone silenced. CWH lamp lighted.
16	Restore ST key.	S, CWK lamps extinguished.
17	Restore CWDT key.	
18	Operate OTL, RA keys.	
19	Operate ST key.	OS, S, ED, LV0, NCW, RA lamps lighted. Busy tone heard. *Verifies level 0 still operated.*
20	Restore CW, CWH, ST keys.	All lamps extinguished. Busy tone silenced.
21	Restore all keys and switches not required in next test.	
M. Call Waiting Circuit Identification		
13	At jack, lamp, and key circuit— Insert make-busy plug into M-C-MB jack associated with marker under test.	
14	Operate TM2 key.	
15	At completing marker under test— Block non-operated HMT1 relay.	
16	At OTF— Set LLS_ switch to select call waiting link associated with selected call waiting circuit. (See Table A.)	
17	Operate CW, CWCT, ANS keys.	CWT, CWSV, ANS lamps lighted. *A connected to B.*
18	Operate OTL key.	
19	Set CWC_ switch to select call waiting circuit. (See Table A.)	

STEP	ACTION	VERIFICATION
20	Operate ST key.	S, OS, ED, CWK, TRL lamps lighted. At TIC— FUT_, VGT_, HGT_, VFT_ lamps lighted corresponding to line location of selected call waiting circuit.
21	Momentarily operate RLS key.	All lamps extinguished.
22	At OTF— Restore ST key.	All lamps extinguished except CWT, CWSV, ANS lamps.
23	Repeat Steps 18 through 22 for call waiting circuit directory numbers (Table A) until all CWH, CWT, and CWU leads used have been checked on a 2/5 basis.	
24	Restore CW, ANS keys.	All lamps extinguished.
25	Restore all keys and switches not required in next test.	
26a	If no further tests are to be performed— At completing marker circuit— Remove blocking tool from HMT1 relay.	
27a	At jack, lamp, and key circuit— Remove make busy plug placed in Step 13.	
28a	Restore TM2 key.	

N. Customer Not Arranged for Call Waiting Service

13	Operate A_ through G_ Dial switches assigned to a particular line not arranged for call waiting service but on a line link frame arranged for call waiting service.	
14	Set LLS_ switch to select call waiting link which has the appearance of the selected line.	
15	Operate CW, CWCV, T, LT keys.	CWT, SL lamps lighted. Dial tone heard. *OTF connected to no-test trunk.*
16	Dial number (4 digits) selected in Step 13.	Dial tone silenced. Note: If customer is off-hook, busy tone heard when dial tone silenced.
17	Restore LT key.	

ION									
VU 2/5			CW LINK FRAME NO.	CW CIRCUIT NO.	CW CIRCUIT LINE LOCATION				
2	4	7	FU_	CWC_ 1-11	FT-	FU-	VG-	HG-	VF-



STEP	ACTION	VERIFICATION
	<i>Note:</i> Lighted COH lamp indicates customer off hook. Test call will be released.	
18	Operate OTL key.	
19	Operate ST key.	S, OS lamps momentarily lighted. ED, NCW, NCWC lamps lighted. TF lamp momentarily lighted.
20	Restore CW, RLS, ST keys.	All lamps extinguished.
21	Restore all keys and switches not required in next test.	

COMPLETING MARKER CIRCUIT TESTS—MISCELLANEOUS

O. Crossed LP Relay Detection Check

13	At selected call waiting link circuit— Connect 640-ohm resistor between 1L and 2L winding terminals of LP00 relay, switch 00.	
14	At jack, lamp, and key circuit— Operate TM2 key.	
15	At OTF— Operate CW, CWCT, ANS keys.	CWT, CWSV, ANS lamps lighted. *A connected to B.*
16	Operate OTL key.	
17	Operate ST key.	S, ED, TRL lamps lighted. At TIC— XCW lamp lighted.
18	Momentarily operate RLS key.	All lamps extinguished.
19	At OTF— Restore ST key.	All lamps extinguished except CWT, CWSV, ANS lamps.
20a	If no further tests are to be performed— Restore CW, ANS keys.	All lamps extinguished.
21a	At selected call waiting link circuit— Remove resistor placed in Step 13.	
22a	At jack, lamp, and key circuit— Restore TM2 key.	
23	At OTF— Restore all keys and switches not required in next test.	

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STEP	ACTION	VERIFICATION
P. Stop Progress		
	<i>Note:</i> Refer to 1.04.	
13	At jack, lamp, and key circuit— Insert make-busy plug into CWLMB_ jack associated with selected call waiting link circuit.	
14	Operate TM2 key.	
15	At selected call waiting link circuit— Connect 1250-ohm resistor between fixed contact 12 of HMS relay and -48 volts.	
16	At OTF— Operate CW, CWCT, ANS keys.	CWT, CWSV, ANS lamps lighted. *A connected to B.*
17	Operate OTL key.	
18	Operate ST key.	S, ED, TRL lamps lighted. At TIC— XHM, XCW lamps lighted.
19	Momentarily operate RLS key.	All lamps extinguished.
20	At OTF— Restore ST key.	All lamps extinguished except CWT, CWSV, ANS lamps.
21a	If no further tests are to be performed— Restore CW, ANS keys.	All lamps extinguished.
22a	At selected call waiting link circuit— Remove resistor placed in Step 15.	
23a	At jack, lamp, and key circuit— Remove make-busy plug placed in Step 13.	
24a	Restore TM2 key.	
25	At OTF— Restore all keys and switches not required in next test.	

Q. (Reserved for Future Test)

R. (Reserved for Future Test)

CALL WAITING LINK CIRCUIT—ORIGINATING CALLS

S. Originating Call Feature

13 Operate CW, CWDT keys.

STEP	ACTION	VERIFICATION
14	Operate ST key.	S, CWT, CWL, CWK, LOK lamps lighted. Dial tone heard.
15	Within 3 seconds— Operate CWH key. *Level 0 held by OTF.*	Dial tone silenced. CWH lamp lighted.
16	Restore ST key.	S, CWK, CWL lamps extinguished.
17	Restore CWDT key.	
18	Operate OTL, RA keys.	
19	Operate ST key.	OS, S, ED, LV0, NCW, RA lamps lighted. Busy tone heard. *Verifies level 0 still operated,*
20	Restore CW, CWH, ST keys.	All lamps extinguished. Busy tone silenced.
21	Restore all keys and switches not required in next test.	

T. Call Waiting Customer Call Waiting Link Appearance

13	Operate A_ through G_ DIAL switches for IAO code and the number assigned to selected call waiting customer.	
14	Set LLS_ switch to select call waiting link associated with selected customer	
15	Set CWC_ switch to select call waiting circuit.	
16	Operate CW, CWCV, T, LT keys.	SL, CWT lamps lighted. Dial tone heard. *OTF connected to no-test trunk.*
17	Dial number (4 digits) selected in Step 15.	Dial tone silenced. Note: If customer is off-hook, busy tone heard when dial tone is silenced.
18	Restore LT key. Note: Lighted COH lamp indicates customer off-hook. Test call will be released.	
19	Operate OTL key.	

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STEP	ACTION	VERIFICATION
20	Operate ST key.	S, O, ED, CWK, CWLK lamps lighted. Call waiting alerting tone heard in speaker. Within 2 seconds— Call released. CWT, S, OS lamps extinguished. *Continuity through customer's vertical for selected call waiting circuit verified.*
21	Restore CW, RLS, ST keys.	All lamps extinguished.
22	Restore all keys and switches not required in next test.	

U. Call Waiting Customer Level 0 Test

13	Operate A_ through G_ DIAL switches for IAO code and the number assigned to selected call waiting customer.	
14	Set LLS_ switch to select call waiting link associated with selected customer.	
15	Set CWC_ switch to select call waiting circuit.	
16	Operate CW, LVOT, OTL keys.	
17	Operate ST key.	CWT, S, OS, ED, CWK lamps lighted. *Level 0 set for selected customer—call placed on hold.* S, OS, ED, CWK lamps extinguished. *OTF released.* S, OS, ED, CWK, NCW, LV0, TOK lamps lighted. Busy tone heard. *2nd call finds level 0 set—1st call released—customer vertical idle.*
18	Restore CW, ST keys.	All lamps extinguished. Busy tone silenced.
19	Restore all keys and switches not required in next test.	

CALL WAITING LINK CIRCUIT TEST—TERMINATING CALLS

V. Terminating Call via Call Waiting Circuit

15	At jack, lamp, and key circuit— Operate TM2 key.	
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STEP	ACTION	VERIFICATION
16	At OTF— Operate CW, CWCT, ANS keys.	CWT, CWSV, ANS lamps lighted. *A connected to B (Fig. 1).*
17	Operate TN key.	700 Hz tone heard in speaker. CRA lamp lighted. *Connection verified*
18	Restore TN key.	700 Hz tone silenced. CRA lamp extinguished.
19	Operate OTL key.	
20	Operate ST key.	S, OS, ED, CWK lamps lighted. Call waiting alerting tone heard in handset at OTL jack. Ringing tone heard in speaker. *C connected to call waiting circuit.*
21	Operate TN key.	700 Hz tone heard in handset at OTL jack. CRA lamp lighted. *A still connected to B.*
22	Restore ANS key for 1 second. *A flashes.*	Ringing tone silenced in speaker. 700 Hz tone silenced, 1300 Hz tone heard in handset at OTL jack. CRA lamp extinguished. CWA lamp lighted. *A connected to C, B on hold.*
23	Restore CW, ANS, ST keys.	All lamps extinguished. 1300 Hz tone silenced.
24	Restore all keys and switches not required in next test.	
25a	If no further tests are to be performed— Remove plug of handset from OTL jack.	
26a	At jack, lamp, and key circuit— Restore TM2 key.	

**W. Call Waiting Customer Regular Line Link and
Call Waiting Link Appearances Busy**

15	At jack, lamp, and key circuit— Operate TM2 key.	
16	At OTF— Operate CW, CWCT, ANS keys.	CWT, CWSV, ANS lamps lighted. *A connected to B (Fig. 1).*

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STEP	ACTION	VERIFICATION
17	Operate TN key.	700 Hz tone heard in speaker. CRA lamp lighted. *Connection verified*
18	Restore TN key.	700 Hz tone silenced. CRA lamp extinguished.
19	Operate OTL key.	
20	Operate ST key.	S, OS, ED, CWK lamps lighted. Call waiting alerting tone heard in handset at OTL jack. Ringing tone heard in speaker. *C connected to call waiting circuit.*
21	Operate TN key.	700 Hz tone heard in handset at OTL jack. CRA lamp lighted. *A still connected to B.*
22	Restore ANS key for 1 second. *A flashes.*	Ringing tone silenced in speaker. 700 Hz tone silenced, 1300 Hz tone heard in handset at OTL jack. CRA lamp extinguished. CWA lamp lighted. *A connected to C, B on hold.*
23	At jack, lamp, and key circuit— Operate TM1 key.	
24	At OTF— Operate RA key.	
25	Restore ST, TN keys.	S, OS, ED, CWA, CWK lamps extinguished. 1300 Hz tone silenced.
26	Operate ST key.	S, OS, ED, RA, NCW lamps lighted. Busy tone heard in speaker. *Both appearances of call waiting customer busy.*
27	Restore CW key.	
28	At jack, lamp, and key circuit— Restore TM1 key.	CWSV lamp extinguished. Busy tone silenced.
29	At OTF— Restore ANS, ST keys.	All lamps extinguished.
30	Restore all keys and switches not required in next test.	

STEP	ACTION	VERIFICATION
31a	If no further tests are to be performed— Remove plug of handset from OTL jack.	
32a	At jack, lamp, and key circuit— Restore TM2 key.	
X. Call Waiting Circuit Reserve Test		
15	At jack, lamp, and key circuit— Operate TM2 key.	
16	At OTF— Operate CW, CWCT, ANS keys.	CWT, CWSV, ANS lamps lighted. *A connected to B (Fig. 1).*
17	Operate TN key.	700 Hz tone heard in speaker. CRA lamp lighted. *Connection verified.*
18	Restore TN key.	700 Hz tone silenced. CRA lamp extinguished.
19	Operate OTL key.	
20	Operate ST key.	S, OS, ED, CWK lamps lighted. Call waiting alerting tone heard in handset at OTL jack. Ringing tone heard in speaker. *C connected to call waiting circuit.*
21	Operate TN key.	700 Hz tone heard in handset at OTL jack. CRA lamp lighted. *A still connected to B.*
22	Restore ANS key for 1 second. *A flashes.*	Ringing tone silenced in speaker. 700 Hz tone silenced, 1300 Hz tone heard in handset at OTL jack. CRA lamp extinguished. CWA lamp lighted. *A connected to C, B on hold.*
23	Restore ANS key for 1 second. *A flashes.*	CWSV lamp remains lighted. 1300 Hz tone silenced, 700 Hz tone heard in handset at OTL jack. CWA lamp extinguished. CRA lamp lighted. *A connected to B, C on hold.*
24	Restore TN, ST keys. <i>Start timing.</i>	All lamps extinguished except CWT, CWSV, ANS lamps. 700 Hz tone silenced.
25	Set CWC_ switch to OFF.	

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STEP	ACTION	VERIFICATION
26	After 32 seconds— Repeat Steps 20, 21, 22.	*Verifies that same call waiting circuit previously used was selected.*
27	Restore CW, ANS, ST keys.	All lamps extinguished.
28	Restore all keys and switches not required in next test.	
29a	If no further tests are to be performed— Remove plug of handset from OTL jack.	
30a	At jack, lamp, and key circuit— Restore TM2 key.	

Y. (Reserved for Future Test)

Z. Call Waiting Circuit Selection

13	At jack, lamp, and key circuit— Insert make-busy plug into M-C-MB jack associated with marker under test.	
14	Operate TM2 key.	
15	At completing marker under test— Block non-operated HMT1 relay.	
16	At OTF— Set LLS_ switch to select call waiting link associated with selected call waiting circuit.	
17	Operate CW, CWCT, ANS keys.	CWT, CWSV, ANS lamps lighted. *A connected to B.*
18	Operate OTL key.	
19	Set CWC_ switch to select call waiting circuit.	
20	Operate ST key.	S, OS, ED, CWK, TRL lamps lighted. At TIC— FUT_, VGT_, HGT_, VFT_ lamps lighted corresponding to line location of selected call waiting circuit.
21	Momentarily operate RLS key.	All lamps extinguished.
22	At OTF— Restore ST key.	All lamps extinguished except CWT, CWSV, ANS lamps.
23	Restore CW, ANS keys.	All lamps extinguished.

STEP	ACTION	VERIFICATION
24	Restore all keys and switches not required in next test.	
25a	If no further tests are to be performed— At completing marker circuit— Remove blocking tool from HMT1 relay.	
26a	At jack, lamp, and key circuit— Remove make busy plug placed in Step 13.	
27a	Restore TM2 key.	
CALL WAITING LINK CIRCUIT TESTS—MISCELLANEOUS		
AA. Call Waiting Link Made Busy		
<i>Note:</i> Refer to 1.04.		
15	At jack, lamp, and key circuit— Insert make-busy plug into CWLMB_ jack associated with call waiting link to be tested.	
16	Operate TM2 key.	
17	At OTF— Operate CW, CWCT, ANS KEYS.	CWT, CWSV, ANS lamps lighted. *A connected to B.*
18	Operate OTL key.	
19	Operate ST key.	S, OS, ED, CWK lamps lighted. Call waiting alerting tone heard in handset at OTL jack. Ringing tone heard in speaker. *Test call completed via made busy link.*
20	Restore CW, ANS, OTL, ST keys.	All lamps extinguished. Ringing tone silenced.
21	Operate CW, ANS keys.	CWT, CWSV, ANS lamps lighted. *A connected to B.*
22	Operate OTL key.	
23	At selected call waiting link circuit— Connect ground to fixed contact 12 of CWT1 relay.	
24	At OTF— Operate ST, RA keys.	S, OS, ED, RA lamps lighted. Busy tone heard in speaker.
25	Restore CW, ANS, ST keys.	All lamps extinguished. Busy tone silenced.

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STEP	ACTION	VERIFICATION
26	Restore all keys and switches not required in next test.	
27a	If no further tests are to be performed— At selected call waiting link circuit— Remove connection placed in Step 23.	
28a	At OTF— Remove plug of handset from OTL jack.	
29a	At jack, lamp, and key circuit— Remove make-busy plug placed in Step 15.	
30a	Restore TM2 key.	
AB. Call Waiting Circuit Make-Busy		
15	When selected call waiting circuit is idle— At call waiting link circuit— Operate MB switch associated with selected call waiting circuit.	
16	At jack, lamp, and key circuit— Operate TM2 key.	
17	At OTF— Operate CW, CWCT, ANS keys.	CWT, CWSV, ANS lamps lighted. *A connected to B.*
18	Operate OTL key.	
19	Operate ST key.	S, OS, ED, CWK lamps lighted. Call waiting alerting tone heard in handset at OTL jack. Ringing tone heard in speaker. *Test call completed via made busy call waiting circuit.*
20	Restore CW, ANS, ST keys.	All lamps extinguished. Ringing tone silenced.
21	Restore all keys and switches not required in next test.	
22a	If no further tests are to be performed— At call waiting link circuit— Restore MB switch operated in Step 15.	
23a	At OTF— Remove plug of handset from OTL jack.	
24a	At jack, lamp, and key circuit— Restore TM2 key.	

STEP	ACTION	VERIFICATION
AC.	Call Waiting Circuit Preference	
	<i>Note:</i> Refer to 1.04	
13	At jack, lamp, and key circuit— Insert make-busy plug into CWLMB_ jack associated with call waiting link to be tested.	
14	Operate TM2 key.	
15	At OTF— Operate CW, CWCT, ANS, OTL keys.	CWT, CWSV, ANS lamps lighted.
16	At call waiting link under test— Insert plug of 32A test set into RC jack on miscellaneous circuit for all frames. <i>Note:</i> Before any further steps are performed, all call waiting circuits associated with link under test must idle.	
17	Manually operate EP1, EP4 relays.	
18	Manually restore EP2, EP3 relays.	EP1, EP4 relays remain operated.
19a	If any ON relays on call waiting circuits 1 through 11 (as provided) are operated— Manually restore ON relay.	
20	Momentarily operate ST (white) key.	CP1 relay momentarily operated. CB1, EP2 relays operated. EP1 relay remains operated. EP4 relay released.
21	Operate MB1 key.	
22	Momentarily operate RL (red) key.	
23	At call waiting circuit 1— Manually restore ON relay.	At call waiting link circuit— EP1, EP2, CB1 relays remain operated.
24	Momentarily operate ST (white) key.	CP2 relay momentarily operated. CB2, EP3 relays operated. EP2 relay remains operated. EP1 relay released.
25	Operate MB2 key.	
26	Momentarily operate RL (red) key.	

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STEP	ACTION	VERIFICATION
27	At call waiting circuit 2— Manually restore ON relay.	At call waiting link circuit— EP2, EP3, CB2 relays remain operated.
28	Momentarily operate ST (white) key.	CP3 relay momentarily operated. EP3 relay remains operated. EP2 relay released. CB3, EP4 relays operated.
29	Operate MB3 switch.	
30	Momentarily operate RL (red) key.	
31	At call waiting circuit 3— Manually restore ON relay.	At call waiting link circuit— EP3, EP4, CB3 relays remain operated.
32	Momentarily operate ST (white) key.	CP4 relay momentarily operated. EP4 relay remains operated. EP3 relay released. CB4, EP1 relays operated.
33	Operate MB4 switch.	
34	Momentarily operate RL (red) key.	
35	At call waiting circuit 4— Manually restore ON relay.	At call waiting link circuit— EP4, EP1, CB4 relays remain operated.
	<i>Note:</i> Since the number of call-waiting circuits assigned to a call waiting link may vary, perform Steps 36b through 63b as required to seize and make-busy all assigned call waiting circuits, then proceed with Step 64.	
36b	If more than 4 call waiting circuits are associated with call-waiting link under test— Momentarily operate ST (white) key.	CP5 relay momentarily operated. EP1 relay remains operated. EP4 relay released. EP2, CB5 relays operated.
37b	Operate MB5 switch.	
38b	Momentarily operate RL (red) key.	
39b	At call waiting circuit 5— Manually restore ON relay.	At call waiting link circuit— EP1, EP2, CB5 relays remain operated.
40b	Momentarily operate ST (white) key.	CP6 relay momentarily operated. EP2 relay remains operated. EP1 relay released. EP3, CB6 relays operated.
41b	Operate MB6 switch.	

STEP	ACTION	VERIFICATION
42b	Momentarily operate RL (red) key.	
43b	At call waiting circuit 6— Manually restore ON relay.	At call waiting link circuit— EP2, EP3, CB6 relays remain operated.
44b	Momentarily operate ST (white) key.	CP7 relay momentarily operated. EP3 relay remains operated. EP2 relay released. EP4, CB7 relays operated.
45b	Operate MB7 switch.	
46b	Momentarily operate RL (red) key.	
47b	At call waiting circuit 7— Manually restore ON relay.	At call waiting link circuit— EP3, EP4, CB7 relays remain operated.
48b	Momentarily operate ST (white) key.	CP8 relay momentarily operated. EP4 relay remains operated. EP3 relay released. EP1, CB8 relays operated.
49b	Operate MB8 switch.	
50b	Momentarily operate RL (red) key.	
51b	At call waiting circuit 8— Manually restore ON relay.	At call waiting link circuit— EP4, EP1, CB8 relays remain operated.
52b	Momentarily operate ST (white) key.	CP9 relay momentarily operated. EP1 relay remains operated. EP4 relay released. EP2, CB9 relays operated.
55b	Operate MB9 switch.	
54b	Momentarily operate RL (red) key.	
55b	At call waiting circuit 9— Manually restore ON relay.	At call waiting link circuit— EP1, EP2, CB9 relays remain operated.
56b	Momentarily operate ST (white) key.	CP10 relay momentarily operated. EP2 relay remains operated. EP1 relay released. EP3, CB10 relays operated.
57b	Operate MB10 switch.	
58b	Momentarily operate RL (red) key.	
59b	At call waiting circuit 10— Manually restore ON relay.	At call waiting link circuit— EP2, EP3, CB10 relays remain operated.

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STEP	ACTION	VERIFICATION
60b	Momentarily operate ST (white) key.	CP11 relay momentarily operated. EP3 relay remains operated. EP2 relay released. EP4, CB11 relays operated.
61b	Operate MB11 switch.	
62b	Momentarily operate RL (red) key.	
63b	At call waiting circuit 11— Manually restore ON relay.	At call waiting link circuit— EP3, EP4, CB11 relays remain operated.
64	Restore MB2 switch.	CB2 relay released.
65	Manually operate EP1, EP4 relays.	
66	Manually restore EP2, EP3 relays, if operated.	EP1, EP4 relays remain operated.
67	Momentarily operate ST (white) key.	CP2 relay momentarily operated. EP1 relay remains operated. EP4 relay released. EP2, CB2 relays operated.
68	Operate MB2 switch.	
69	Momentarily operate RL (red) key.	
70	At call waiting circuit 2— Manually restore ON relay.	At call waiting link circuit— EP1, EP2, CB2 relays remain operated.
71	Restore MB3 switch.	CB3 relay released.
72	Momentarily operate ST (white) key.	CP3 relay momentarily operated. EP2 relay remains operated. EP1 relay released. EP3, CB3 relays operated.
73	Operate MB3 switch.	
74	Momentarily operate RL (red) key.	
75	At call waiting circuit 3— Manually restore ON relay.	At call waiting link circuit— EP2, EP3, CB3 relays remain operated.
76	Restore MB4 switch.	CB4 relay released.
77	Momentarily operate ST (white) key.	CP4 relay momentarily operated. EP3 relay remains operated. EP2 relay released. EP4, CB4 relays operated.
78	Operate MB4 switch.	

STEP	ACTION	VERIFICATION
79	Momentarily operate RL (red) key.	EP3, EP4, CB4 relays remain operated.
80	At call waiting circuit 4— Manually restore ON relay.	At call waiting link circuit— EP3, EP4, CB4 relays remain operated.
81	Restore MB1 switch.	CB1 relay released.
82	Momentarily operate ST (white) key.	CP1 relay momentarily operated. EP4 relay remains operated. EP3 relay released. EP1, CB1 relays operated.
83	Momentarily operate RL (red) key.	EP4, EP1 relays remain operated.
84	Restore all MB_ switches.	All CB_ relays released.
85	Remove plug of 32A test set from RC jack on miscellaneous circuit.	
86	At jack, lamp, and key circuit— Remove make-busy plug placed in Step 13.	
87	At OTF— Restore CW, ANS keys.	All lamps extinguished.
88	Restore all keys and switches not required in next test.	
89	At jack, lamp, and key circuit— Restore TM2 key.	

AD. All Call Waiting Circuits Busy

13	At jack, lamp, and key circuit— Operate TM2 key.	
14	At OTF— Operate CW, CWCT, ANS, CWCB keys.	CWT, CWSV, ANS lamps lighted. *A connected to B.*
15	Operate OTL, RA keys.	
16	Operate ST key.	S, OS, ED, NCW, RA lamps lighted. Busy tone heard in speaker.
17	Restore CW, ANS, ST keys.	All lamps extinguished. Busy tone silenced.
18	Restore all keys and switches not required in next test.	
19	At jack, lamp, and key circuit— Restore TM2 key.	

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STEP	ACTION	VERIFICATION
AE. Crossed Select Magnet Test		
8	At selected call waiting link— Connect ground to fixed contact 5 of CWT1 relay.	
9	At OTF— Operate CW, CWDT keys.	
10	Operate ST key.	CWT, CWL, TRL lamps lighted. At TIC— CWF, XCW, XS lamps lighted.
11	Momentarily operate RLS key.	All lamps extinguished.
12	At OTF— Restore CW, ST keys.	All lamps extinguished.
13	Restore all keys and switches not required in next test.	
14a	If no further tests are to be performed— At selected call waiting link— Remove ground connection placed in Step 8.	
AF. Crossed Hold Magnet Test—Dial Tone Marker Usage		
	<i>Note:</i> Refer to 1.04.	
8	At jack, lamp, and key circuit— Insert make-busy plug into CWLMB_ jack associated with selected call waiting link circuit.	
9	At selected call waiting link— Connect 1250-ohm resistor between fixed contact 12 of HMS relay and -48 volts.	
10	At OTF— Operate CW, CWDT keys.	
11	Operate ST key.	CWT, CWL lamps lighted. At TIC— CWF, XCW, XHM lamps lighted.
12	Momentarily operate RLS key.	All lamps extinguished.
13	At OTF— Restore CW, ST keys.	All lamps extinguished.

STEP	ACTION	VERIFICATION
14	Restore all keys and switches not required in next test.	
15a	If no further tests are to be performed— At selected call waiting link circuit— Remove resistor placed in Step 9.	
16a	At jack, lamp, and key circuit— Remove plug placed in Step 8.	
AG. Crossed Hold Magnet Test—Completing Marker Usage		
<i>Note:</i> Refer to 1.04.		
14	At jack, lamp, and key circuit— Insert make-busy plug into CWLMB_ jack associated with selected call waiting link circuit.	
15	Operate TM2 key.	
16	At selected call waiting link circuit— Connect 1250-ohm resistor between fixed contact 12 of HMS relay and -48 volts.	
17	At OTF— Operate CW, CWCT, ANS keys.	CWT, CWSV, ANS lamps lighted. *A connected to B.*
18	Operate OTL key.	
19	Operate ST key.	S, ED, TRL lamps lighted. At TIC— XHM, XCW lamps lighted.
20	Momentarily operate RLS key	All lamps extinguished.
21	At OTF— Restore ST key.	All lamps extinguished except CWT, CWSV, ANS lamps.
22a	If no further tests are to be performed— Restore CW, ANS keys.	All lamps extinguished.
23a	At selected call waiting link circuit— Remove resistor placed in Step 16.	
24a	At jack, lamp, and key circuit— Remove make-busy plug placed in Step 14.	
25a	Restore TM2 key.	

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STEP	ACTION	VERIFICATION
26	At OTF— Restore all keys and switches not required in next test.	
AH. Hold Magnet Check—Dial Tone Marker Usage		
8	At selected call waiting link circuit— Connect ground to fixed contact 3 of CWT1 relay.	
9	Block non-operated hold magnet 00, switch 00 on selected call waiting link circuit.	
10	At OTF— Operate CW, CWDT keys.	
11	Operate ST key.	S, CWT, CWL lamps lighted. Dial tone heard. At TIC— CWF, GLH, XCW lamps lighted.
12	Momentarily operate RLS key.	All lamps extinguished.
13	At OTF— Restore CW, ST keys.	All lamps extinguished. Dial tone silenced.
14	Restore all keys and switches not required in next test.	
15a	If no further tests are to be performed— At selected call waiting link circuit— Remove ground placed in Step 8.	
16a	Remove blocking tool placed in Step 9.	
AI. Hold Magnet Check—Completing Marker Usage		
14	At selected call waiting link circuit— Connect 1250-ohm resistor between fixed contact 3 of CWT1 relay and ground.	
15	At jack, lamp, and key circuit— Operate TM2 key.	
16	At OTF— Operate CW, CWCT, ANS keys.	CWT, CWSV, ANS lamps lighted. *A connected to B.*
17	Operate OTL key.	
18	Operate ST key.	S, ED, TRL lamps lighted. At TIC— CWF, GLH lamps lighted.

STEP	ACTION	VERIFICATION
19	Momentarily operate RLS key.	All lamps extinguished.
20	At OTF— Restore CW, ANS, ST keys.	All lamps extinguished.
21	Restore all keys and switches not required in next test.	
22a	If no further tests are to be performed— At selected call waiting link circuit— Remove resistor placed in Step 14.	
23a	At jack, lamp, and key circuit— Restore TM2 key.	

AJ. Standing Cross Test

Note: Refer to 1.04.

8	At jack, lamp, and key circuit— Insert make-busy plug into CWLMB_ jack associated with selected call waiting link circuit.	
9	At selected call waiting link circuit— Connect fixed contact 9 of T1 relay to fixed contact 8 of DTM relay.	
10	At OTF— Operate CW, CWDT keys.	
11	Operate ST key.	S, CWT, CWL, CWK lamps lighted. At TIC— XCW, CWF, SXT lamps lighted.
12	Momentarily operate RLS key.	All lamps extinguished.
13	At OTF— Restore CW, ST keys.	All lamps extinguished.
14	Restore all keys and switches not required in next test.	
15a	If no further tests are to be performed— At selected call waiting link circuit— Remove connection placed in Step 9.	
16a	At jack, lamp, and key circuit— Remove make-busy plug placed in Step 8.	

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STEP	ACTION	VERIFICATION
AK. (Reserved for Future Test)		
AL. (Reserved for Future Test)		
AM. (Reserved for Future Test)		
CALL WAITING CIRCUIT TESTS—TERMINATING CALLS		
AN. Terminating Calls Completed via Call Waiting Circuit		
15	At jack, lamp, and key circuit— Operate TM2 key.	
16	Plug hand telephone set into TM2 jack.	
17	At OTF— Operate CW, CWCT, ANS keys.	CWT, CWSV, ANS lamps lighted. *A connected to B (Fig. 1).*
18	Operate TN key.	700 Hz tone heard in speaker. CRA lamp lighted. *Connection verified.*
19	Restore TN key.	700 Hz tone silenced. CRA lamp extinguished.
20	Operate OTL key.	
21	Operate ST key.	S, OS, ED, CWK lamps lighted. Call waiting alerting tone heard in handset at OTL jack and not heard in handset at TM2 jack. <i>Start timing.</i> In approximately 10-seconds— Second alerting tone heard in handset at OTL jack. Ringing tone heard in speaker. *C connected to call waiting circuit.*
22	Operate TN key.	700 Hz tone heard in handset at OTL jack. CRA lamp lighted. *A still connected to B.*
23	Restore ANS key for 1 second. *A flashes.*	CWSV lamp remains lighted. Ringing tone silenced in speaker. 700 Hz tone silenced, 1300 Hz tone heard in handset at OTL jack. CRA lamp extinguished. CWA lamp lighted. *A connected to C, B on hold.*

STEP	ACTION	VERIFICATION
24	Restore ANS key for 1 second. *A flashes.*	CWSV lamp remains lighted. 1300 Hz tone silenced, 700 Hz tone heard in handset at OTL jack. CWA lamp extinguished. CRA lamp lighted.
25	Restore ST key. <i>Start timing.</i> *C disconnects.*	CWSV lamp remains lighted. 700 Hz tone still heard. S, OS, ED, CWK lamps extinguished
26	Restore TN key.	700 Hz tone silenced CRA lamp extinguished.
27	After 32 seconds— Operate ST key.	S, OS, ED, CWK lamps lighted. Call waiting alerting tone heard in handset at OTL jack and not heard in handset at TM2 jack. Ringing tone heard in speaker. *C connected to call waiting circuit.*
28	Operate TN key.	700 Hz tone heard in handset at OTL jack. CRA lamp lighted. *A still connected to B.*
29	Restore ANS key for 1 second. *A flashes.*	CWSV lamp remains lighted. Ringing tone silenced in speaker. 700 Hz tone silenced, 1300 Hz tone heard in handset at OTL jack. CRA lamp extinguished. CWA lamp lighted. *A connected to C, B on hold.*
30	At jack, lamp, and key circuit— Restore TM2 key. *B disconnects.*	At OTF— CWSV lamp extinguished.
31	Restore TN key.	1300 Hz tone silenced. CWA lamp extinguished.
32	At jack, lamp, and key circuit— Operate TM2 key.	At OTF— Alerting tone heard in handset at OTL jack and not heard in handset at TM2 jack. *B connected to call waiting circuit via regular line link appearance.*
33	Operate TN key.	1300 Hz tone heard in handset at OTL jack. CWA lamp lighted. *A still connected to C.*
34	Restore ANS key for 1 second. *A flashes.*	CWSV lamp lighted. 1300 Hz tone silenced, 700 Hz tone heard in handset at OTL jack.

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STEP	ACTION	VERIFICATION
		CWA lamp extinguished. CRA lamp lighted. *A connected to B, C on hold.*
35	At jack, lamp, and key circuit— Restore TM2 key. *B disconnects.*	At OTF— CWSV lamp extinguished. 700 Hz tone silenced. CRA lamp extinguished. *C still on hold.*
36	Restore ANS key for 1 second.	1300 Hz tone heard in handset at OTL jack. CWA lamp lighted. *A connected to C.*
37	Restore TN key.	1300 Hz tone silenced. CWA lamp extinguished.
38	At jack, lamp, and key circuit— Operate TM2 key.	At OTF— Call waiting alerting tone heard in handset at OTL jack and not heard in handset at TM2 jack. *B connected to call waiting circuit via regular line link appearance.*
39	Operate TN key.	1300 Hz tone heard in handset at OTL jack. CWA lamp lighted. *A still connected to C.*
40	Restore ANS key for 1 second. *A flashes.*	CWSV lamp lighted. 1300 Hz tone silenced, 700 Hz tone heard in handset at OTL jack. CWA lamp extinguished. CRA lamp lighted. *A connected to B, C on hold.*
41	Restore ANS key for 1 second. *A flashes.*	CWSV lamp remains lighted. 700 Hz tone silenced, 1300 Hz tone heard in handset at OTL jack. CRA lamp extinguished. CWA lamp lighted. *A connected to C, B on hold.*
42	Restore ST key. *C disconnects.*	CWSV lamp remains lighted. S, OS, ED, CWK lamps extinguished. 1300 Hz tone silenced. CWA lamp extinguished. *B still on hold.*
43	Restore ANS key for 1 second. *A flashes.*	700 Hz tone heard. CRA lamp lighted. *A connected to B.*

STEP	ACTION	VERIFICATION
44	Restore CW, ANS keys.	All lamps extinguished. 700 Hz tone silenced. *All linkages released.*
45	Restore all keys and switches not required in next test.	
46a	If no further tests are to be performed— Remove plug of handset from OTL jack.	
47a	At jack, lamp, and key circuit— Remove plug of handset from TM2 jack.	
48a	Restore TM2 key.	
AO. Terminating Call Completed via Call Waiting Circuit When Call Waiting Customer Returns to On-Hook Condition		
15	At jack, lamp, and key circuit— Operate TM2 key.	
16	At OTF— Operate CW, CWCT, ANS keys.	CWT, CWSV, ANS lamps lighted. *A connected to B.*
17	Operate OTL key.	
18	Operate ST key.	S, OS, ED, CWK lamps lighted. Call waiting alerting tone heard in handset at OTL jack. Ringing tone heard in speaker. *C connected to call waiting circuit.*
19	Restore ANS key. *A goes on-hook.*	Ringing lamp flashes in unison with ringing tone.
20	Operate TN key.	
21	Operate ANS key.	1300 Hz tone heard in handset at OTL jack. CWA lamp lighted. Ringing tone silenced. Ringing lamp extinguished. *A connected to C.*
22	Restore CW, ANS, ST keys.	All lamps extinguished. 1300 Hz tone silenced.
23	Restore all keys and switches not required in next test.	
24a	If no further tests are to be performed— Remove plug of handset from OTL jack.	

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STEP	ACTION	VERIFICATION
25a	At jack, lamp, and key circuit— Restore TM2 key.	
AP. Disconnect and Reseizure of Call Waiting Circuit While Call Waiting Customer Remains Off-Hook		
15	At jack, lamp, and key circuit— Operate TM2 key.	
16	At OTF— Operate CW, CWCT, ANS keys.	CWT, CWSV, ANS lamps lighted. *A connected to B (Fig. 1).*
17	Operate TN key.	700 Hz tone heard in speaker. CRA lamp lighted. *Connection verified.*
18	Restore TN key.	700 Hz tone silenced. CRA lamp extinguished.
19	Operate OTL key.	
20	Operate ST key.	S, OS, ED, CWK lamps lighted. Call waiting alerting tone heard in handset at OTL jack. Ringing tone heard in speaker. *C connected to call waiting circuit.*
21	Operate TN key.	700 Hz tone heard in handset at OTL jack. CRA lamp lighted. *A still connected to B.*
22	Restore ANS key for 1 second. *A flashes.*	CWSV lamp remains lighted. Ringing tone silenced in speaker. 700 Hz tone silenced, 1300 Hz tone heard in handset at OTL jack. CRA lamp extinguished. CWA lamp lighted. *A connected to C, B on hold.*
23	At jack, lamp, and key circuit— Restore TM2 key. *B disconnects.*	At OTF— CWSV lamp extinguished.
24	Restore ANS key for 1 second. *A flashes.*	1300 Hz tone silenced, 700 Hz tone <i>not</i> heard in handset at OTL jack. CWA lamp extinguished. CRA lamp not lighted. *C on hold, B disconnected.*
25	At jack, lamp, and key circuit— Operate TM2 key.	At OTF— Alerting tone heard in handset at OTL jack.

STEP	ACTION	VERIFICATION
		New call from B connected to call waiting circuit via regular line link appearance.
26	Restore ANS key for 1 second. *A flashes.*	1300 Hz tone heard in handset at OTL jack. CWA lamp lighted. *A connected to C.*
27	Restore ANS key for 1 second. *A flashes.*	CWSV lamp lighted. 100 Hz tone silenced, 700 Hz tone heard in handset at OTL jack. CWA lamp extinguished. CRA lamp lighted. *A connected to new call from B, C on hold.*
28	Restore ST key. *C disconnects.*	S, OS, ED, CWK lamps extinguished. *C released.*
29	Restore ANS key for 1 second. <i>Start timing.</i> *A flashes.*	700 Hz tone silenced, 1300 Hz tone <i>not</i> heard in handset at OTL jack. CRA lamp extinguished. CWSV lamp remains lighted. CWA lamp not lighted. *B on hold, C disconnected.*
30	Restore TN key.	
31	Operate RA key.	
32	After 32 seconds— Operate ST key.	S, OS, ED, RA, NCW lamps lighted. Busy tone heard in speaker. *New call from C finds busy condition.*
33	Operate TN key.	
34	Restore ANS key for 1 second. *A flashes.*	700 Hz tone heard in handset at OTL jack. CRA lamp lighted. *A connected to B.*
35	Restore CW, ANS, ST keys.	All lamps extinguished. 700 Hz tone silenced. Busy tone silenced. *All linkages released.*
36	Restore all keys not required in next test.	
37a	If no further tests are to be performed— Remove plug of handset from OTL jack.	
38a	At jack, lamp, and key circuit— Restore TM2 key.	

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STEP	ACTION	VERIFICATION
AQ. Call Waiting Circuit Reserve Test		
15	At jack, lamp, and key circuit— Operate TM2 key.	
16	At OTF— Operate CW, CWCT, ANS keys.	CWT, CWSV, ANS lamps lighted. *A connected to B (Fig. 1).*
17	Operate TN key.	700 Hz tone heard in speaker. CRA lamp lighted. *Connection verified.*
18	Restore TN key.	700 Hz tone silenced. CRA lamp extinguished.
19	Operate OTL key.	
20	Operate ST key.	S, OS, ED, CWK lamps lighted. Call waiting alerting tone heard in handset at OTL jack. Ringing tone heard in speaker. *C connected to call waiting circuit.*
21	Operate TN key.	700 Hz tone heard in handset at OTL jack. CRA lamp lighted. *A still connected to B.*
22	Restore ANS key for 1 second. *A flashes.*	Ringing tone silenced in speaker. 700 Hz tone silenced, 1300 Hz tone heard in handset at OTL jack. CRA lamp extinguished. CWA lamp lighted. *A connected to C, B on hold.*
23	Restore ANS key for 1 second. *A flashes.*	CWSV lamp remains lighted. 1300 Hz tone silenced, 700 Hz tone heard in handset at OTL jack. CWA lamp extinguished. CRA lamp lighted. *A connected to B, C on hold.*
24	Restore TN, ST keys. <i>Start timing.</i>	All lamps extinguished except CWT, CWSV, ANS lamps. 700 Hz tone silenced.
25	Set CWC_ switch to OFF.	
26	After 32 seconds— Repeat Steps 20, 21, 22.	*Verifies that same call waiting circuit previously used was selected.*
27	Restore CW, ANS, ST keys.	All lamps extinguished.

STEP	ACTION	VERIFICATION
28	Restore all keys and switches not required in next test.	
29a	If no further tests are to be performed— Remove plug of handset from OTL jack.	
30a	At jack, lamp, and key circuit— Restore TM2 key.	

CALL WAITING CIRCUIT TESTS—MISCELLANEOUS

AR. T1 Timer

15	At jack, lamp, and key circuit. Operate TM2 key.	
16	At OTF— Operate CW, CWCT, ANS keys.	CWT, CWSV, ANS lamps lighted.
17	Operate OTL key.	
18	Operate ST key.	S, OS, ED, CWK lamps lighted. Call waiting alerting tone heard in handset at OTL jack. <i>Start timing.</i> In 8.3 to 15 seconds— Second alerting tone heard.
19	Restore CW, ANS, ST keys.	All lamps extinguished.
20	Restore all keys and switches not required in next test.	
21a	If no further tests are to be performed— Remove plug of handset from OTL jack.	
22a	At jack, lamp, and key circuit— Restore TM2 key.	

AS. TM2 Timer Test

14	At jack, lamp, and key circuit— Insert make-busy plug into M-C-MB jack associated with selected marker.	
15	Operate TM2 key.	
16	At selected marker— Block non-operated HMT1 relay.	
17	At OTF— Operate CW, CWCT, ANS keys.	CWT, CWSV, ANS lamps lighted.

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STEP	ACTION	VERIFICATION
18	At call waiting link frame— Operate MB switch associated with selected call waiting circuit. <i>Note:</i> Do not proceed until ON relay on selected call waiting circuit is released.	
19	Insert plug of 32A test set into RC jack on miscellaneous circuit for all frames.	
20	Momentarily operate ST (white) key on 32A test set.	At selected call waiting circuit— ON relay operated. <i>Start timing.</i> In 3.5 to 6.2 seconds— CRL relay momentarily operates. ON, RS relays released.
21	Momentarily operate RL (red) key on 32A test set.	
22	Remove plug of 32A test set from RC jack.	
23	Restore MB switch operated in Step 18.	
24	At selected marker— Remove blocking tool from HMT1 relay.	
25	At jack, lamp, and key circuit— Remove make-busy plug placed in Step 14.	
26	Restore TM2 key.	
27	At OTF— Restore CW, ANS keys.	All lamps extinguished.
28	Restore all keys and switches not required in next test.	

AT. TM2(SB), TM1(SM), and TM (TO) Timers

These timers will be tested in accordance with timing requirements outlined in SD-27787-01.