

**CAMA SERVICE OBSERVING CIRCUITS  
IN CROSSBAR TANDEM OFFICES  
TRANSMISSION TESTS**

**NO. 12 AND MODIFIED NO. 7 SERVICE OBSERVING DESKS**

**1. GENERAL**

**1.01** This section describes a method of performing transmission tests on CAMA service observing circuits (SOC's), associated with a No. 12 or modified No. 7 service observing desk in crossbar tandem offices. These tests involve the use of an SO desk position in addition to the SOC under test.

**1.02** This section is reissued to provide test and alignment procedures using the transmission check circuit of the SOC. Since this reissue covers a general revision, arrows ordinarily used to indicate changes have been omitted.

**1.03** The tests covered are:

**A. Service Observing Circuit Loss:** This test uses the 1000-cps test tone provided at the transmission check circuit to check the transmission path loss within the SOC. The loss is measured without voice frequency amplifier A or pad P. If the SOC is provided with amplifier A, the amplifier is replaced with a dummy plug. If the SOC is provided with pad P, an 89A resistor (0 db) is substituted for pad P. Any loss then measured is attributable to cathode follower V1, output repeating coil T, repeating coil T2 (if used), and the associated transmission check circuit.

**B. Overall Service Observing Transmission Path Loss and Noise:** This test checks the loss and noise of the overall SO transmission path from the input of cathode follower V1 or repeating coil T2 (if used) to the volume indicating meter of the SO desk. The gain of voice frequency amplifier A or the loss of pad P is adjusted to provide a 0-vu indication on the meter with a test signal applied to the transmission path from the transmission check circuit. The noise of the transmission path is

checked to ensure that it does not produce a meter indication of more power than -20vu. The transmission check circuit is then allowed to cycle through its loss and noise check modes to determine whether or not the cycling circuit functions properly.

**1.04** If the 21A transmission measuring set (TMS) is used for performing Test A, it should be checked and adjusted in accordance with Section 103-221-101. If the TTS-4 transmission measuring set (TMS) is used for performing Test A, it should be checked and adjusted in accordance with Section 103-204-100.

**1.05** The 1000-cps test tone power at the MW-CHK jack of the SOC should be checked periodically and maintained, using the 22A milliwatt reference meter, in accordance with Sections 103-335-300 and 103-335-500.

**1.06** When performing Test B, a talking path should be established between the SOC relay frame and the service observing desk to facilitate the testing.

**1.07** The volume indicator measuring path of the service observing desk position used for the tests should be adjusted in accordance with Section 210-112-501 before performing Test B.

**1.08 Lettered Steps:** A letter a, b, c, etc. added to a step number in Part 3 of this section indicates an action which may or may not be required, depending upon 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.

**SECTION 210-116-501**

**2. APPARATUS**

**All Tests**

**2.01** Blocking and insulating tools, as required.  
Apply tools as covered in Section 069-020-801.

**Test A**

**2.02** 21A Transmission Measuring Set (TMS), J94021A, or equivalent.

**2.03** One of the following:

- (a) No. 360B (dummy) plug (if SOC is provided with amplifier A)
- (b) No. 89A (0 db) resistor (if SOC is provided with 1C pad)

**2.04** If 21A TMS is used: testing cord, W2AY cord, 9 feet 6 inches long, equipped with one No. 289B plug and two No. 59 cord tips (No. 2W24A cord).

**2.05** Testing cord, No. 893 cord, 3 feet long, equipped with No. 360 tools at each end (No. 1W13A cord) and two KS-6278 (test connector) tools (for connecting relay terminals together).

**Test B**

**2.06** No. 1020B Head Telephone Set

**2.07** Three testing cords, No. 893 cord, 3 feet long, equipped with No. 360 tools at each end (No. 1W13A cords). Equip each cord with two No. 365 (test clip) tools for connecting ground to trunk patching cord.

**3. METHOD**

<b>STEP</b>	<b>ACTION</b>	<b>VERIFICATION</b>
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**A. Service Observing Circuit Loss**

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|----|--|--|
| 1  | Arrange with traffic department for release of SOC to be tested.   |  |
| 2  | At SOC to be tested —<br>Block ST relay nonoperated.   |  |
| 3a | If SOC is in same building as SO desk —<br>Arrange to have SW (loop reduction) key for circuit under test at SO desk set for full group operation (normal position). |  |
| 4b | If SOC is not in same building as SO desk —<br>At distributing frame —<br>Remove heat coils for T and R leads.   |  |
| 5c | If SOC is provided with 1C pad —<br>At SOC —<br>Remove 89-type resistor and replace with 89A (0 db) resistor.  |  |
| 6d | If SOC is provided with amplifier A —<br>At SOC —<br>Remove amplifier from socket and replace with No. 360B dummy plug.  |  |

STEP	ACTION	VERIFICATION
7	Insulate contact 6B of ST1 relay.	
8	Block NCK relay nonoperated.	
9	Block CAL1 relay operated.	
10e	If YU option is not provided in SOC — Using 1W13A testing cord, connect 3 and 4B of ST1 relay together to energize cathode follower electron tube heater. Allow 5-minute warmup before proceeding to Step 11.	
11	Using appropriate testing cord, connect DET in 600 $\Omega$ jack of TMS to terminals 2 and 5 of repeating coil T.	<p>(a) If repeating coil T2 is provided in SOC, 21A TMS meter indicates <math>-35.1</math> to <math>-32.0</math> db.</p> <p>(b) If repeating coil T2 is not provided in SOC, 21A TMS meter indicates <math>-34.5</math> to <math>-31.5</math> db.</p>
12	Remove testing cords connected in Steps 10e and 11.	
13	Remove blocking tools from CAL1 and NCK relays.	
14	Remove insulator from ST1 relay.	
15d	If SOC is provided with amplifier A — Remove No. 360B plug from amplifier socket and replace amplifier.	
16c	If SOC is provided with 1C pad — Remove 89A resistor and replace original 89-type resistor.	
17	Remove blocking tool from ST relay.	
18b	If SOC is not in same building as SO desk — At distributing frame — Replace heat coils for T and R leads.	
19a	If SOC is in same building as SO desk — At SO desk — Restore SW key to position in which it was set prior to Step 3a.	

**SECTION 210-116-501**

<b>STEP</b>	<b>ACTION</b>	<b>VERIFICATION</b>
20f	If no further tests are to be performed — Notify traffic department that testing is completed.	

**B. Overall Service Observing Transmission Path Loss and Noise**

1	Arrange with traffic department for release of SO desk position provided with volume indicating meter to be used for test and for SOC to be tested.	
2	At SO desk position to be used for test — Operate all CO- class exclusion keys except CO MA.	
3	At all other desk positions — Operate CO MA class exclusion key.	
4	At SO desk cable turning section — Operate OS keys for all trunks of the type being tested.	
5a	If SOC under test is provided with loop reduction feature — Set SW key associated with circuit under test for full group operation (normal position).	
6	Restore OS key for SOC under test to normal.	
7	At SO desk position used for test — Operate STBY key.	STBY lamp lights.
8	At SOC — Block NCK relay nonoperated.	
9	Operate NOISE-ORIG-TERM key to TERM.	
10	Operate CAL-OFF-ON key to CAL.	
11	Connect 1020B head telephone set to C and D telephone jacks.	
12	At SOC relay frame — Remove one patch cord associated with SOC under test from the CAMA trunk socket only.	

STEP	ACTION	VERIFICATION
	<i>Note:</i> If SOC is equipped for observing DP incoming trunks, choose patch cord associated with non-PBX connector socket.	
13b	If SOC is equipped for observing PCI or MF incoming trunks — At trunk socket plug of patch cord removed in Step 12 — Connect terminal 3 of patch cord plug to ground, using 1W13A testing cord equipped with No. 365 tools.	
14c	If SOC is equipped for observing DP incoming trunks — At trunk socket plug of patch cord removed in Step 12 — Connect terminals 3 and 5 of patch cord plug together and connect terminal 3 to ground using 1W13A testing cords equipped with No. 365 tools.	
15	At SO desk position used for test — Restore STBY key to normal.	STBY lamp is extinguished.
16	At SOC relay frame — Momentarily disconnect ground from terminal 3 of patch cord plug.	TRK lamp lights.
	<i>Note:</i> If the SOC under test should be seized by one of the patched CAMA trunks during the interval between Steps 15 and 16, momentarily operate the RLS key at the SO desk used for test; then proceed with Step 16.	
17	At SOC — Manually operate the SA relay momentarily and allow it to release.	At SO desk position — 1000-cps tone is heard in telephone set. Volume indicating meter should read 0 vu.
18d	If SOC is provided with 1C pad and requirement of Step 17 is not met — At SOC — With loss of SOC within requirements specified in Test A, replace 89-type resistor (which is available in 0.25-db steps) with resistor having loss which results in volume indicating meter reading as close to 0 as possible.	

**SECTION 210-116-501**

<b>STEP</b>	<b>ACTION</b>	<b>VERIFICATION</b>
19e	If SOC is provided with amplifier A and requirement of Step 17 is not met — At SOC — With loss of SOC within requirements specified in Test A, adjust gain control of amplifier A until volume indicating meter reads 0 vu.	
20	At SOC — Remove blocking tool from NCK relay.	1000-cps tone is no longer heard. Volume indicating meter indication drops.
21	At SO desk — Operate NOISE-ORIG-TERM key to NOISE.	Volume indicating meter should not read more power than -20 vu.
22f	If requirement of Step 21 is not met — Locate and correct source of noise before SOC or SO desk position is returned to service.	
23	Operate NOISE-ORIG-TERM key to TERM.	
24	Operate CAL-OFF-ON key momentarily to OFF then back to CAL.  <i>Note:</i> This will cause transmission check circuit to cycle normally through loss and noise checks, since the NCK relay is no longer blocked.	1000-cps tone is heard in telephone set and volume indicating meter reads same as in appropriate Step 18d or 19e for approximately 4 seconds; then 1000-cps tone is removed and meter reading drops.
25	Operate NOISE-ORIG-TERM key to NOISE.	Volume indicating meter reads no more power than -20 vu.
26	Operate CAL-OFF-ON key to OFF.	Volume indicating meter needle returns to resting position.
27	At SOC relay frame — Remove 1W13A testing cord(s) from patch cord plug.	RSV lamp lights.
28	At SO desk position — Operate RLS key momentarily.	TRK lamp is extinguished. RSV lamp is extinguished.
29	Remove head telephone set from C and D telephone jacks.	
30	Reconnect patch cord removed in Step 12.	
31a	If SOC under test is provided with loop reduction feature — Restore SW key to position in which it was set prior to Step 5a.	

STEP	ACTION	VERIFICATION
32	At SO desk cable turning section — Restore to normal all OS keys operated in Step 4.	
33	Restore to normal all CO- keys operated in Steps 2 and 3.	
34	Notify traffic department that testing is completed.	