# SS-1A SELECTIVE SIGNALING SYSTEM

# OVERALL TESTS

# PRIVATE LINE TELEPHONE SERVICE

## 1. GENERAL

**1.01** This section describes a method of testing the SS-1A Selective Signaling System prior to placing it in service. Detailed tests of the decoder and keyer are described in Section 480-622-502.

**1.02** The tests covered are:

*A. Dialing Operation:* This test checks the SS-1A dialing circuit from one station set to the keyer by observing relay operation and checking for busy tone at other stations of the same location. The remaining station sets are successively checked by observing operation of the 1st digit code relay circuit when a test digit is dialed from each station set.

*B. Decoder Operation:* This test checks the response of the decoder when pulsed by a 52B test set or equivalent. The 6-second time-out feature is checked initially and decoder relay operation is observed. Individual stations are then signaled to determine if the decoder properly recognizes the station codes dialed.

*C. Common Control (Automatic Privacy Operation):* This test checks the operation of the common control circuit and associated station control circuits. Verification of proper operation consists of observing relay operation, station signaling, busy tone, and the ability to converse between stations.

*D. Common Control (Manual Privacy Operation):* This test is similar to Test C except it is performed only at stations equipped for manual operation of the privacy feature. Privacy feature is activated at these stations by operation of an exclusion key.

*E. Keyer Line-up:* This test is required to adjust the output of the keyer to the proper level.

*F. SF Unit Sensitivity Adjustment:* This test checks the sensitivity of the SF unit for proper operation on the 4-wire private line. The input signal is generated by a transmission measuring set to eliminate the loop loss of the 4-wire facility.

*G. Overall Signaling:* This test checks that the correct station codes are transmitted between the customer location and the serving test center.

*H. Interarea Switching:* This test should be performed prior to connecting the customer location equipment to the 4-wire facility. Use a 52B test set or equivalent to pulse the decoder to obtain switch operation.

*I. 3-Digit Interarea Switching:* This test pulses the decoders at two customer locations to cause the 3-digit interarea switching circuit to function. When this test is to be performed other than during initial line-up, it should be scheduled during light traffic conditions.

**Tests J Through M**

***Dial Access to CO or PBX Unit:*** This series of tests is provided to check the operation of the dial access to or from manual or dial PBX. Perform one or more of the tests, as applicable, to check the feature(s) provided.


***The setting of the keyer potentiometer adjustments, with the exception of the LEV ADJ control (which may be adjusted by Test E) should not be changed during these tests. Potentiometers are factory adjusted;***

*see Section 480-622-502 for readjustment procedures.*

**1.03** Prior to applying power to the system, verify that all amplifiers are in place and that wire springs are properly seated in the relay cards. Visually check the equipment for loose connections and/or solder or stray wire clippings which could create a system failure.

**1.04** With power applied to the system, verify that P relay of the decoder unit and T3 relay of the common control unit (when supplied) are operated. If manual control is installed, verify that T4 and T6 relays are operated. These relays are operated when the system is idle.

**1.05** 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 on local conditions. The condition under which a lettered step or series of lettered steps should be made are 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.

## 2. APPARATUS

**2.01** The apparatus required for each test is shown in Table A. The description of each item is covered in the paragraph indicated by the number in parentheses.

**TABLE A**

| APPARATUS | TEST | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | A | B | C-D | E | F | G | H | I | J-M |
| 52B Test Set (2.02) | – | 1 | – | – | – | – | 1 | – | – |
| TMS (2.03) | – | – | – | 1 | 1 | – | – | – | – |
| 3P17B Cord (2.04) | – | – | – | 1 | – | – | – | – | – |
| 2W24A Cord (2.05) | – | – | – | – | 1 | – | – | – | – |
| 258-Type Dummy Plug | – | – | – | – | 1 | – | – | – | – |
| Tools (2.06) | – | – | – | √ | – | – | – | √ | – |

√ As required.

**2.02** 52B test set, a 6A dial in metal housing with S2M cord equipped with a 310 plug, dial terminals connected to tip and sleeve of plug (used to pulse decoder).

**2.03** 21A transmission measuring set (TMS), J94021A (SD-95115-01), or equivalent.

**2.04** Patching cord, P3N cord, 6 feet long, equipped with a 310 plug on one end and a 241A plug on the other end (3P17B cord).

**2.05** Testing cord, W2AY cord, 9-1/2 feet long, equipped with 289B plug on one end and two alligator clips on the other end (2W24A cord).

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

## 3. METHOD

| STEP | ACTION | VERIFICATION |
|---|---|---|
| **A. Dialing Operation** | | |
| | *Note:* Unless otherwise noted, relays referred to in the following tests are located on the J53047A unit. | |
| 1 | Remove a station handset from switch hook. | P relay operated. |
| 2 | Dial the digit 0 and hold. | ON relay operated. |
| 3 | Release dial. | P relay pulsed.<br>ON relay released after dial returned to normal. |
| 4 | Dial digit 0 and hold. | |
| 5 | Release dial. | ON1 and AUX relays operated.<br>M1, PA, and PB relays pulsed.<br>ON1 and AUX relays released after dial returned to normal. |
| 6a | If more than one station set is provided and station control circuits on the J53047D unit are also provided—<br>Allow 6 seconds to elapse; then dial two successive digits (excluding the digit 1) within 6 seconds. | |
| 7a | At one or more stations, other than the one used for dialing tests—<br>Momentarily remove station handset and monitor line. | Busy tone heard. |
| 8b | If more than one station set is provided and station control circuits on the J53047C unit are also provided— Remove handset of second station set and monitor line. | No tone heard. |
| 9b | At station set used for dialing tests—<br>Dial digit 0. | At station monitoring line—<br>Busy tone heard while digit is dialed and for 6 seconds after dial returns to normal. |
| 10b | Replace handset of second station set. | |
| 11 | At station used for dialing tests—<br>Replace handset. | P relay released. |
| 12c | If more than one station set is provided—<br>Successively check dialing circuit of each station set by removing handset, dialing digit 0, and | P relay operated.<br>ON relay operated.<br>P relay pulsed. |

| STEP | ACTION | VERIFICATION |
|---|---|---|
| | replacing handset. | ON relay released.<br>P relay released. |
| **B. Decoder Operation** | | |
| 1 | Connect 52B test set to PLS jack on J53047A unit. | |
| 2 | Operate switch to On position. | P relay operated. (ON relay may also be operated but all other relays should be released.) |
| 3 | Dial digit 0 on 52B test set. | P relay pulsed.<br>ON relay released, if operated.<br>P1 through P5 relays operated momentarily.<br>RA, RA1, B, TA, and RT relays operated for approximately 6 seconds, then released as ON relay operates. |
| 4 | Dial digit 0 on 52B test set, followed immediately by the digit 1. | P relay pulsed.<br>ON relay released.<br>P1 through P5 relays operated momentarily.<br>RA, RA1, B, TA, and TR relays operated until digit 1 is dialed, then released as ON relay operates. (RA and RA1 relays also released momentarily between digits.) |
| 5 | Successively dial station codes assigned to station sets. | Proper station signaled as each station code is dialed. (Restore station signaling circuit after each station is signaled by momentarily lifting handset at the signaled station set.) |
| **C. Common Control (Automatic Privacy Operation)** | | |
| | ***Note:*** Relays referred to in this test are located on the J53047A or J53047D unit. | |
| 1 | Remove a station handset from the switch hook. | P relay operated. |
| 2 | Dial 0 and hold. | LO- relay associated with station used for test operated.<br><br>***Note:*** Only one LO- relay should be operated. |
| 3 | Release station dial. | PR relay pulsed.<br>RA2 relay operated.<br>All BT- relays, except the one associated with station used for test, operated.<br><br>***Note:*** Busy tone heard at all stations, except the station used for test. |

| STEP | ACTION | VERIFICATION |
|---|---|---|
| 4 | Allow approximately 6 seconds to elapse. | BT- and RA2 relays released when decoder times out. |
| 5 | Dial station code of one other station. (Complete dialing within 6 seconds). | PR relay pulsed each digit.<br>RA2 relay operated at start of first digit and released at end of second digit.<br>All BT- relays, except the one associated with the station used for test, operated.<br>PS and AL relays operated at end of second digit.<br>SC- relay associated with called station operated. (Called station will be signaled.)<br>BT- relay associated with called station released.<br><br>***Note:*** Busy tone at called station not audible if monitored at the time. |
| 6 | Remove handset of called station. | Called and calling stations can converse. |
| 7 | Replace handset of called station. | |
| 8 | Replace handset of calling station. | T1 and T2 relays operated, then released in sequence (T1 followed by T2).<br>T3, PS, and AL relays released.<br>Operated SC-, BT- and LO- relays released.<br>T3 relay reoperated. |

**D. Common Control (Manual Privacy Operation)**

***Note:*** Relays referred to in this test are located on the J53047A or J53047C unit.

| | | |
|---|---|---|
| 1 | Select station equipped with exclusion key from which to perform this test. Remove handset from switch hook. | |
| 2 | Dial 0 and hold. | LO- relay associated with station used for test operated.<br><br>***Note:*** Only one LO-relay operated. |
| 3 | Release station dial. | PR relay pulsed.<br>RA2 relay operated, then released.<br>All BT- relays, except the one associated with station used for test, operated.<br><br>***Note:*** Busy tone heard at all stations, except the station used for test, if monitored. |
| 4 | Allow 6 seconds to elapse. | BT- and RA2 relays released when decoder times out. |

| STEP | ACTION | VERIFICATION |
|---|---|---|
| 5 | Dial station code of one other station. (Complete dialing within 6 seconds.) | PR relay pulsed each digit.<br>RA2 relay operated at start of first digit and released at end of second digit.<br>All BT- relays, except the one associated with the station used for test, operated, then released at end of second digit.<br>PS and AL relays operated at end of second digit.<br>SC- relay associated with called station operated. (Called station will be signaled). |
| 6 | Remove handset of called station. | Called and calling stations can converse. |
| 7 | Operate exclusion key at calling station. | T1 and T2 relays operated, then released in sequence<br>(T1 followed by T2).<br>T6 relay released.<br><br>***Note:*** T4 relay may be released at this time, but should immediately be reoperated .<br>All BT- relays, except those associated with the called and calling stations, operated. |
| 8 | Momentarily remove handset of one station other than the called and calling stations. | Busy tone heard.<br><br>***Note:*** Busy tone should not be heard at either the called or calling station. |
| 9 | Replace handset of called station. | |
| 10 | Replace handset of calling station. | T5, T1 and T2 relays operated, then released in sequence (T5 followed by T1 followed by T2).<br>T4 and T3 relays released in sequence (T4 followed by T3).<br>PS and AL relays released.<br>Operated SC-, BT-, and LO- relays released.<br>T3, T4, and T6 relays reoperated. |

**E. Keyer Line-Up**

***Note:*** This adjustment must be made after the 4-wire private line terminating circuit transmit amplifier has been adjusted.

1 Insert a dummy plug into the PB test jack.

2 Block operated the M1 relay in the keyer circuit.

| STEP | ACTION | VERIFICATION |
|---|---|---|
| 3 | Request serving central office to measure the incoming level of the signal. | |
| 4 | Adjust LEV ADJ potentiometer to provide the required level at the serving central office. | |
| 5 | Remove dummy plug and unblock M1 relay. | |

**F. SF Unit Sensitivity Adjustment**

| | | |
|---|---|---|
| 1 | Using 2W24A cord—<br>Connect OSC OUT 600Ω jacks of TMS to terminals TSH23 and TSH13 of decoder unit. | |
| 2 | Insert dummy plug into M jack. | M Relay of SF unit released. |
| 3 | Turn SS potentiometer of the SF unit fully counterclockwise. | |
| 4 | Adjust TMS to provide an output of -28dBm at 2600 Hz. | |
| 5 | Slowly turn the SS potentiometer of SF unit in a clockwise direction, until RG relay operates. | RG relay of SF unit operated. |
| 6 | Remove 2W24A cord from OSC OUT 600Ω jack of TMS. | RG relay of SF unit released. |
| 7 | Adjust TMS for output of -30dBm at 2600 Hz. | |
| 8 | Reinsert 2W24A cord in OSC OUT 600Ω jack of TMS. | RG relay in SF unit should not operate.<br><br>***Note:*** If RG relay should operate in Step 8, remove 2W24A cord from TMS, adjust SS control of SF unit slightly in a counterclockwise direction. Reinsert cord in TMS, RG relay should not operate. Repeat the slight adjustment of the SS control, as necessary, to meet the requirement of Step 8. |
| 9a | If SS potentiometer had to be readjusted per the note of Step 8—<br>Increase output of TMS to -28dBm to recheck operation of RG relay with the original input signal power. | RG relay operated. |
| 10 | Remove 2W24A cord from TMS and TSH. | RG relay of SF unit released. |
| 11 | Remove dummy plug from jack M. | M relay of SF unit operated. |

| STEP | ACTION | VERIFICATION |
|---|---|---|
| **G. Overall Signaling** | | |
| 1 | Notify the central office which functions as the serving test center that it is desired to test signal between customer locations. | |
| 2 | Conduct tests from the customer location to the central office; the central office can serve as a customer location by dialing the assigned station codes. | Proper stations signaled at the customer location. |
| **H. Interarea Switching (Fig. 15 of SD-98093-01)** | | |
| | *Note:* Relays referred to in this test are located on J99252G unit. | |
| 1 | On the J53047A unit—<br>Connect 52B test set to PLS jack. Operate switch to ON position. | |
| 2 | Dial interarea connect code. | SW relay operated. |
| 3 | Dial interarea disconnect code. | D relay operated momentarily SW relay released. |
| 4 | Remove 52B test set from PLS jack of decoder. | |
| **I. 3-Digit Interarea Switching (Fig. 32 of SD-98093-01)** | | |
| | *Note:* Relays referred to in this test are on the J99252BU unit. | |
| 1 | Select a station set of area A—<br>Dial digit 2. | BTB relay operated for 6 seconds, then released. |
| | *Note:* Areas A and B will be used during this test to indicate two separate SS-1A systems. | |
| 2a | If calling station is used in the privacy mode—<br>Dial code of another station set in area A. | BTB relay operated and remains operated. |
| 3a | Replace handset momentarily. | BTB relay released. |
| 4 | Block BTA relay operated to simulate a busy condition in area B. | |
| 5 | Dial interarea connect code. | TNA relay operated for approximately 2 seconds.<br>EC relay pulsed while TNA relay is operated.<br>2400 Hz interrupted busy tone is heard for 2 seconds at station used for test. |

| STEP | ACTION | VERIFICATION |
|---|---|---|
| 6 | Remove blocking tool from BTA relay. | |
| 7 | Dial interarea connect code.<br><br>***Note:*** Steps 8 through 10 should be performed within 6 seconds. | BTB relay operated during dialing and remains operated if calling station is used in privacy mode.<br>D and SW relays operated. |
| 8 | Dial first digit of station code in area B. | DEL relay operated.<br>SW relay released. |
| 9 | Dial digit 1. | SW relay reoperated.<br>BTB relay released, if operated. |
| 10 | Dial second digit of station code in area B. | BTB relay operated during dialing and remains operated if calling station is used in privacy mode.<br>DEL relay released.<br>EC and PLS relays operated then released in sequence (EC followed by PLS).<br>TNS and TNB relays operated when EC relay released and released when PLS relay released. |
| 11a | If calling station is used in privacy mode—<br>Replace handset on hook. | RLS relay operated.<br>SW, BTB, and D relays released.<br>RLS relay released. |
| 12b | If calling station is not used in privacy mode—<br>Dial interarea disconnect code. | RLS relay operated.<br>SW and D relays released.RLS relay released. |
| 13 | At station set of area B—<br>Dial digit 2. | BTA relay operated for 6 seconds, then released. |
| 14a | If calling station is used in privacy mode—<br>Dial code of another station in area B. | BTA relay operated and remains operated. |
| 15a | Replace handset momentarily. | BTA relay released. |
| 16 | Block BTB relay operated to simulate busy condition in area A. | |
| 17 | Dial interarea connect code. | TNB relay operated for approximately 2 seconds.<br>EC relay pulsed while TNB relay is operated.<br>2400 Hz interrupted busy tone heard for 2 seconds at station used for test. |
| 18 | Remove blocking tool from BTB relay. | |
| 19 | Dial interarea connect code. | BTA relay operated during dialing and remains operated if calling station is used in privacy mode.<br>D, SW, and PV relays operated. |

| STEP | ACTION | VERIFICATION |
|---|---|---|
| 20 | Dial first digit of station code in area A.<br><br>*Note:* Steps 20 through 22 should be performed within 6 seconds. | DEL relay operated.<br>SW relay released. |
| 21 | Dial digit 1. | DEL relay released and BTA relay released, if operated.<br>SW relay reoperated. |
| 22 | Dial second digit of station code in area A. | BTA relay operated during dialing and remains operated if calling station is used in privacy mode.<br>EC and PLS relays operated, then released in sequence (EC followed by PLS).<br>TNA and TNB relays operated when EC relay released and released when PLS relay released. |
| 23a | If calling station is used in privacy mode—Replace handset on hook. | RLS relay operated.<br>SW, BTA, and D relays released.<br>RLS relay released. |
| 24b | If calling station is not used in privacy mode—Dial interarea disconnect code. | RLS relay operated.<br>SW and D relays released.<br>RLS and PV relays released. |

**J. J99252BW Unit, Provides Access to CO or Dial PBX**

| | | |
|---|---|---|
| 1 | Dial the access code assigned for CO or PBX. | C1 relay (J99252BW unit) operated.<br>WL relay (J53047A unit) operated.<br>Dial tone heard at calling station. |
| 2 | Replace handset on hook. | C1 relay (J99252BW unit) released.<br>WL relay (J53047A unit) released.<br>Dial tone removed from station. |

**K. J99252BW Unit, Provides Access to Manual PBX.**

*Note 1:* Unless otherwise stated, relays referred to in this test are located on the J99252BW unit.

*Note 2:* Steps 1 and 2 should be performed within 6 seconds.

| | | |
|---|---|---|
| 1 | Dial first digit of PBX access code. | BY relay operated.<br>SS-1A indicating lamp lighted at PBX operator position. |
| 2 | Dial second digit of PBX access code. | DT relay operated.<br>WL relay (J53047A unit) operated. |

| STEP | ACTION | VERIFICATION |
|---|---|---|
| | | SS-1A indicating lamp lighted at PBX operator position. |
| 3 | PBX operator inserts cord in SS-1A trunk jack. | T, S, S1, BG, PR and PR1 relays operated.<br>SS-1A indicating lamp extinguished at PBX operator position. |
| 4 | Announce test call. | |
| 5 | Replace handset on hook at customer location. | BY relay released.<br>WL relay (J53047A unit) released. |
| 6 | PBX operator removes cord from SS-1A trunk jack. | T, DT, S, S1, BG, PR, and PR1 relays released. |

**L. J99252BW Unit, Provides Access from Dial PBX**

***Note:*** Relays referred to in this test are located on the J99252BW unit.

| | | |
|---|---|---|
| 1 | Arrange to have test call placed from PBX station to SS-1A station. | |
| 2 | SS-1A station code dialed from PBX station set. | T, PR, and PR1 relays operated. |
| 3 | First SS-1A station code digit is dialed. | PR relay pulsed.<br>A, ON1, B, and DT relays operated while digit is pulsed; then all relays except DT relay released.<br>BY relay operated.<br>SS-1A busy lamp lighted at PBX operator position. |
| 4 | Second SS-1A station code digit is dialed. | PR relay pulsed.<br>A, ON1, and B relays operated while digit is pulsed, then all released.<br>SS-1A station is signaled. |
| 5 | Test call completed. PBX station goes on-hook. | PR relay released.<br>A and ON1 relays operated momentarily.<br>PR1 relay released, followed by release of BY, T, and DT relays.<br>SS-1A busy lamp extinguished at PBX operator position. |

**M. J99252BW Unit, Provides Access From Manual PBX**

***Note:*** Relays referred to in this test are located on the J99252BW unit.

| STEP | ACTION | VERIFICATION |
|---|---|---|
| 1 | Arrange to have PBX operator place a test call to an SS-1A station set. | |
| 2 | PBX operator inserts cord in SS-1A trunk jack. | S, S1, BG, T, PR, and PR1 relays operated. |
| 3a | If PBX is 552 type, 556A, 605A, or 607B—<br>PBX operator inserts spare calling cord into SS-1A dial jack. | DL relay operated.<br>S1 and BG relays released. |
| 4 | First SS-1A station code digit is dialed. | PR relay pulsed.<br>A, ON1, B, and DT relays operated while digit is pulsed; then all except DT released.<br>BY relay operated.<br>SS-1A busy lamp lights at PBX operator position.<br>If PBX is 606A, 606B, 607A, 608A, or 608D—<br>S1 and BG relays released at beginning of digit, then reoperated after digit is pulsed. |
| 5 | Second SS-1A station code digit is dialed. | PR relay pulsed.<br>A, ON1, and B relays operated while digit is pulsed, then all released.<br>SS-1A station is signaled.<br>If PBX is 606A, 606B, 607A, 608A, or 608D—<br>S1 and BG relays released at beginning of digit, then reoperated after digit is pulsed. |
| 6a | If PBX is 552 type, 556A, 605A, or 607B—<br>PBX operator removes dial cord. | DL relay released.<br>S1 and BG relays operated. |
| 7 | Test call completed. PBX operator removes cord from SS-1A trunk jack. | S, S1, BG, and PR relays released.<br>A and ON1 relays operated momentarily.<br>PR1 relay released, followed by release of BY, T, And DT relay.<br>SS-1A busy lamp extinguished at PBX operator position. |