DIAL PULSE REPEATER CIRCUIT/PULSE CORRECTION (SD-2H155) TESTS NO. 2 AND NO. 2B ELECTRONIC SWITCHING SYSTEMS

1. GENERAL

1.01 This section describes the method for testing the dial pulse repeater circuit/pulse correction (SD-2H155) used in the No. 2 and No. 2B Electronic Switching Systems (ESS).

1.02 This section is reissued to include changes due to the EF-2 and 2B-EF-2 generic programs.

1.03 New (conventional) service order codes were adopted for use with the EF-2 and 2B-EF-2 generic programs. However, the translations can be configured with the old (No. 2 ESS unique) service order codes as an option. These old codes are common to all previous No. 2 and No. 2B ESS generic programs. The EF-2 and 2B-EF-2 generic programs can be arranged to recognize either option. In this section the term "conventional (new)" or "No. 2 ESS unique (old)" is used to identify the service order code for the keywords in each TTY input message given.

1.04 The following tests are described and may be performed in sequence or individually.

A. Circuit State and Scan Point Operation: This test verifies the operation of the circuit relays and the saturation of the ferrod sensors associated with the trunk circuits.

B. Transmission Loss Measurements: This test verifies that the transmission loss of each of the trunk circuits in its various states is within the prescribed tolerance.

1.05 The tests in this section are to be performed on a periodic basis as prescribed by the No. 2 ESS equipment test list or when a malfunction of one of the circuits is suspected.

1.06 The tests will be performed from the trunk test panel (TTP) in conjunction with the maintenance display buffer and teletypewriter (TTY). For more detailed information about the TTP and its operation, refer to Section 232-130-301, Trunk Test Panel—Method of Operation.

1.07 The keys on the TTP may be either a locking or a nonlocking type. In order to differentiate between the two types of keys, the use of a locking type key shall be identified by the words "operate" and "release" and the use of a nonlocking type key shall be identified by the word "depress" in the ACTION column.

> ***Note:*** Nonlocking keys require a depression of at least one-half second to ensure system recognition.

1.08 ***Lettered Steps:*** A letter, a, b, c, etc, added to a step number in Part 3 or 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.

1.09 Whenever the term TOUCH-TONE® telephone service is used, it refers to the equipment required to provide this service to the customer.

2. APPARATUS

2.01 The following apparatus is required for the dial pulse repeater circuit tests. The portable test equipment listed in 2.02 will not be required if this equipment is already mounted in the TTP. If the test equipment listed in 2.02 is not available, equivalent test equipment may be substituted.

2.02 Transmission measuring set (TMS), 23D. Equivalent apparatus must be capable of measuring power in 600- and 900-ohm circuits at 1 kHz. The accuracy must be ±0.1 dB from -15 dBm to +10.0 dBm at 1 kHz at normal room temperature.

2.03 Two 2P4A cord assemblies consisting of a P2B cord, at least 3 feet long, and two 310 plugs.

2.04 One 2W6A cord assembly consisting of a W2C cord, at least 10 feet long, with a 310 plug on one end and two 59-type cord tips on the other.

2.05 Test leads equipped with alligator clips at each end.

2.06 One 262C-type (900 ohm) plug.

3. PREPARATION

3.01 Refer to the office records to obtain the following information about the circuit to be tested:

(a) trunk group number (TGN)

(b) member number (MEMN)

(c) supervisory scan point number (SPN)

(d) the protector block assignment for the outgoing trunk circuit at the protector frame.

3.02 Verify the scan point numbers obtained from the office records as follows:

At the teletypewriter (TTY), type in:

A VY:TRK:aaa bbb!

aaa = TGN

bbb = MEMN

The system will respond with the following TTY message:

The system response for offices using No. 2 ESS unique (old) code is as follows:

AR VY TRK aaa bbb
TEN nn gcsl
PDB cxzy b
.
.
.
SPN ss rrbb
.
.
.
END

The system response for offices using conventional (new) code is as follows:

AR VY TRK
OE nn gcsl
PDA cxzy b
.
.
.
SP ss rrbb
.
.
.
END

ss = scanner number
rr = scanner row
bb = bit in row

The bb bit represents the first ferrod sensor (0) in the scanner row. All other ferrod sensors follow in consecutive order (0, 1, 2, etc).

3.03 Use the protector block assignment from 3.01 to locate and remove the protector block assigned to the outgoing trunk circuit.

Note: In order to perform these tests, the tip and ring leads coming into the circuit must be open. If the trunk circuit does not appear at the protector frame, open the tip and ring leads into the trunk circuit in accordance with local procedures.

3.04 Use the following procedure to make the trunk circuit traffic busy, connect it to the TTP, and display the ferrod sensors associated with the circuit on the display buffer.

STEP	ACTION	VERIFICATION
1	At telephone set on TTP— Operate access trunk 1 key.	
2	Lift handset off-hook, or operate TRFR key at TEL CKT if using headset.	Access trunk 1 key lamp lighted. Dial tone received. At ACCESS TRUNK 1 CONTROL— SUPV lamp lighted. At TEL CKT— TRFR lamp lighted if TRFR key operated.
3	At TOUCH-TONE dial— Dial 1 + TGN + MEMN + ST.	At ACCESS TRUNK 1 CONTROL— EQPT ST lamp lighted steadily, or flashing at 120 interruptions per minute. At MISC TEST CONTROL— P & E lamp lighted steadily if connection was successful. ***Note:*** If the EQPT ST lamp is flashing and P & E lamp is not lighted steadily, the TTP is not connected to the trunk to be tested. Perform Steps 4a and 5a.
4a	If the P & E lamp is not lighted steadily— At ACCESS TRUNK 1 CONTROL— Depress RLS key.	
5a	Repeat Step 3 until connection is successful.	
6	Place handset on-hook, or release TRFR key.	At TRANSMISSION MEASURING CONTROL— CS lamp indicates state of trunk side ferrod sensor of trunk circuit under test.

4. METHOD

4.01 If the verification procedure fails or if a circuit malfunction is indicated during any part of these tests, proceed as follows:

(1) Discontinue the test.

(2) Troubleshoot the circuit which failed.

(3) Replace faulty circuit components using standard repair procedures.

(4) Repeat the test that failed. If verification is successful, continue the test.

STEP	ACTION	VERIFICATION
	A. Circuit State and Scan Point Operation	
7	From the TTY printout obtained in 3.02, determine the trunk scanner number and the number of the scanner row associated with the scan points assigned to the circuit under test.	
8	At maintenance TTY— For No. 2 ESS offices type in: UBRL TS:RSN:ssrr!	At maintenance frame— Scanner row containing specific scan points displayed on DISPLAY BUFFER lamps.

STEP	ACTION	VERIFICATION
	ss = Number of trunk scanner in decimal (00-11) from Step 7. rr = Number of scanner row in decimal (00-63) from Step 7. For No. 2B ESS offices type in: MON:TSSN ssrr;RDT LAMPS! ▶ss = Number of trunk scanner in decimal (00-11 for the 2B EF-1 generic program) or (00-30 for the 2B-EF-2 or later generic programs) from Step 7.◀ rr = Number of scanner row in decimal (00-63) from Step 7. RDT LAMPS = Direct the result to the DISPLAY BUFFER.	Lamps associated with ferrod sensors connected to circuit under test lighted.
9	At ACCESS TRUNK 1 CONTROL— Depress VM key.	At ACCESS TRUNK 1 CONTROL— VM lamp lighted. At VOLTMETER CONTROL— 100K lamp lighted. At VOLTMETER— Meter indicates 0.
10	At VOLTMETER CONTROL on TTP— Operate TR REV key.	At VOLTMETER CONTROL— TR REV lamp lighted. At VOLTMETER— Meter indicates 0.
11	Depress FEMF key.	At VOLTMETER CONTROL— FEMF lamp lighted. At VOLTMETER— Meter indicates 0.
12	Release TR REV key.	At VOLTMETER CONTROL— TR REV lamp extinguished. At VOLTMETER— Meter indicates 0.
13	Depress MET VM key.	At VOLTMETER CONTROL— FEMF lamp extinguished. MET VM lamp lighted.
14	At STATE CHANGE CONTROL— Set PD GROUP switch to 0-5 position.	
15	At PERIPHERAL DECODER POINTS— Operate 2 key.	At PERIPHERAL DECODER POINTS— 2 lamp lighted.
16	Depress AT 1 key.	At circuit under test— Relay C operated. At VOLTMETER— Meter indicates 0.

STEP	ACTION	VERIFICATION
		DISPLAY BUFFER lamp associated with ferrod sensor 1 lighted.
17	At PERIPHERAL DECODER POINTS— Operate 1 key.	At PERIPHERAL DECODER POINTS— 1 lamp lighted.
18	Depress AT 1 key.	At circuit under test— Relay B operated. Relay C remains operated.
19	At PERIPHERAL DECODER POINTS— Operate 0 key. Release 2 key.	At PERIPHERAL DECODER POINTS— 0 lamp lighted. 2 lamp extinguished.
20	Depress AT 1 key.	At circuit under test— Relay A operated. Relay C released. Relay B remains operated. At VOLTMETER— Meter indicates between 42.75 and 52.5 volts on 120-volt scale.
21	At front of writing shelf on TTP— Insert 262C-type (900 ohm) plug into ACCESS TRK-1 jack.	At VOLTMETER— Meter indicates 0. At DISPLAY BUFFER— Lamp associated with ferrod sensor 0 extinguished.
22	At PERIPHERAL DECODER POINTS— Release 0 and 1 keys.	At PERIPHERAL DECODER POINTS— 0 and 1 lamps extinguished.
23	Depress AT 1 key.	At circuit under test— All relays released. At DISPLAY BUFFER— DISPLAY BUFFER lamp associated with ferrod sensor 0 lighted.
24	At front of writing shelf on TTP— Remove 262C-type (900 ohm) plug from ACCESS TRK-1 jack.	
25	At ACCESS TRUNK 1 CONTROL— Depress RLS key.	At ACCESS TRUNK 1 CONTROL— VM lamp extinguished. SUPV lamp extinguished. EQPT ST lamp extinguished. At MISC TEST CONTROL— P & E lamp extinguished.
26	At maintenance TTY— For No. 2 ESS offices type in: UB SY:CLB!	

STEP	ACTION	VERIFICATION
	For No. 2B ESS offices type in: STOP:UTIL!	At DISPLAY BUFFER— Ferrod sensor display removed from DISPLAY BUFFER.
27	At telephone set on TTP— Operate green release key.	
28	Replace the protector block or connection opened in 3.03.	

B. Transmission Loss Measurements

7	Using a 2W6A cord connect the trunk side appearance of the tip and ring of the circuit to the SP jack nearest the protector frame. ***Note:*** Make sure no other connection is made to the SP jack in the office.	
8	At the front of the writing shelf— Use 2P4A cord to connect TRANS MEAS—DBM-0 jack to SP jack.	
9	At ACCESS TRUNK 1 CONTROL— Depress XMSN key.	At ACCESS TRUNK 1 CONTROL— XMSN lamp lighted.
10	At TRANSMISSION MEASURING CONTROL— Set TEST SET switch to TMS position. Set MEASURE switch to MEAS 1 position. Set SEND switch to OFF position.	
11b	If TTP is not equipped with TMS— At front of writing shelf— Use 2P4A cord to connect external TMS to TRANS MEAS—TM-1 jack.	
12	At TMS— Set ADD DBM switch to 0 position.	
13	At PERIPHERAL DECODER POINTS— Operate 2 key.	At PERIPHERAL DECODER POINTS— 2 lamp lighted.
14	Depress AT 1 key.	At circuit under test— Relay C operated. At TMS— Meter will indicate some value of loss through the office wiring. This value should be recorded as it will be used as a reference in the following steps to determine the actual loss through the circuit.

STEP	ACTION	VERIFICATION
15	At PERIPHERAL DECODER POINTS— Operate 1 key.	At PERIPHERAL DECODER POINTS— 1 lamp lighted.
16	Depress AT 1 key.	At circuit under test— Relay B operated. Relay C remains operated. At TMS— Meter should indicate a maximum loss of 0.1 dBm more than reference from Step 16.
17	At circuit under test— Block SR ( ) relay nonoperated.	
18	At PERIPHERAL DECODER POINTS— Release 2 key. Operate 0 key.	At PERIPHERAL DECODER POINTS— 2 lamp extinguished. 0 lamp lighted.
19	Depress AT 1 key.	At circuit under test— Relay B remains operated. Relay C released. Relay A operated. At TMS— Meter should indicate a maximum loss of 0.5 dBm more than reference from Step 16.
20	Remove block from SR ( ) relay.	
21	At PERIPHERAL DECODER POINTS— Release 1 key.	At PERIPHERAL DECODER POINTS— 1 lamp extinguished.
22	Depress AT 1 key.	At circuit under test— Relay B released. Relay A remains operated. At TMS— Meter should indicate a maximum loss of 0.35 dBm more than reference from Step 16.
23	At PERIPHERAL DECODER POINTS— Release 0 key.	At PERIPHERAL DECODER POINTS— 0 lamp extinguished.
24	Depress AT 1 key.	At circuit under test— All relays released.
25	Remove connections made in Step 7, 8, and 11b.	
26	At ACCESS TRUNK 1 CONTROL— Depress RLS key.	At ACCESS TRUNK 1 CONTROL— VM lamp extinguished. SUPV lamp extinguished. EQPT ST lamp extinguished. At MISC TEST CONTROL— P & E lamp extinguished.

STEP	ACTION	VERIFICATION
27	At telephone set— Operate green release key.	