AUTOMATIC DATA SET 154A1 — TERMINATING CIRCUIT TESTS AND ADJUSTMENTS USING 166A1 TEST SET TELEGRAPH TEST CIRCUIT

1. GENERAL

1.01 This section describes a method for testing the terminating Automatic Data Set 154A1 using the 166A1 station test set SD-70908-01 when used in conjunction with the terminating DATA-PHONE line circuit SD-70914-01, at the serving test center.

1.02 Comparable tests for the terminating Automatic Data Set 154A1 installed for use on customer premises are covered in Section 591-010-502.

1.03 The tests covered are:

A. V3 Amplifier Adjustment: This test checks the adjustment of the V3 amplifier gain.

B. 43A1 Carrier Channel Terminal Line-Up: This test checks the alignment and operation of the 43A1 carrier channel terminal in the 154A1 set.

1.04 When testing a Data Set 154A1 arranged for dc supervision, the line must be made busy by grounding the ring conductor or by requesting the No. 5 office to do the equivalent.

1.05 All tests shall be made with the Data Set 154A1 terminated in the 166A1 station test set and the line terminated in the proper impedance.

1.06 *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.

2. APPARATUS

All Tests

2.01 166A1 station test set, J70141A (SD-70908-01).

2.02 Triplett 310-w volt-ohmmeter (furnished with 166A1 station test set per "Z" option).

2.03 Three patching cords, P3J cord, 6 feet long, equipped with two 241B plugs (3P14B cords).

Test B

2.04 Patching cord, P2A cord, 2 feet long, equipped with two 347A plugs (2P1B cord).

2.05 164C3 telegraph transmission measuring set, J70146A (SD-70886-01).

3. PREPARATION

STEP	ACTION	VERIFICATION
All Tests		
1	Disconnect cord normally patched to R connector of Data Set 154A1, connect to TERMINATING CUSTOMER EQUIPMENT connector of test set.	
2	Patch TERMINATING DATA-PHONE SET connector to R connector of Data Set 154A1 using a P1 cord, supplied with test set.	
3	Operate TER key in terminating portion of test set.	
4a	If Data Set 154A1 arranged for 2-wire operation — Terminate line by patching TER IMP 1 900 jacks to LINE 1 jacks using 3P14B cord.	
5b	If Data Set 154A1 arranged for 4-wire operation — Terminate line by patching TER IMP 1 600 jacks to LINE 1 jacks and TER IMP 2 600 jacks to LINE 2 jacks using 3P14B cords.	

4. METHOD

STEP	ACTION	VERIFICATION
	A. V3 Amplifier Adjustment	
	Note: This test is only applicable for 2-wire operation.	
Send V3 Amplifier (RX1)		
6	Patch TER IMP 2 900 jacks to EQUIP 1 jacks using a 3P14B cord.	
7c	If Data Set 154A1 arranged for dc supervision — Operate OFF HOOK key.	OFF HOOK lamp lights.
8	Set Triplett 310-W meter to 1-volt ac scale.	
9	Connect meter to SEND LEVEL and GRD pin jacks.	
10	At Data Set 154A1 — Adjust SEND LEV potentiometer of 43A1 carrier channel terminal for a −8 db indication on meter.	
11	Connect meter to BRIDGE T-R pin jacks.	
12	At Data Set 154A1 — Adjust SEND V3 amplifier potentiometer for same indication as read at SEND LEVEL and GRD pin jacks.	

STEP	ACTION	VERIFICATION
13	Remove all patches, connections, restore all keys to normal.	All lamps extinguished.
Receive V3 Amplifier (RX2)		
14	Patch FREQ STD OUT jacks to EQUIP 1 jacks using 3P14B cord.	
15c	If Data Set 154A1 arranged for dc supervision — Operate OFF HOOK key.	OFF HOOK lamp lights.
16	Set Triplett 310-W meter to 1-volt ac scale.	
17	Operate FREQ STD switch to 2330 OSC.	
18	Connect −48V pin jack of terminating portion of test set to −48V pin jack of originating portion of test set using a P9 cord, supplied with test set.	
19	Connect meter to BRIDGE T-R pin jacks, note reading.	
20	Disconnect meter.	
21	Connect meter to REC LEVEL and GRD pin jacks.	
22	At Data Set 154A1 — Adjust RX2 V3 amplifier potentiometer for same reading noted in Step 19.	
23	Remove all patches, connections, restore all keys to normal.	All lamps extinguished.

B. 43A1 Carrier Channel Terminal Line-Up

Initial Send Level Adjustment

6	Patch TER IMP 2 900 jacks to EQUIP 1 jacks using 3P14B cord.	
7c	If Data Set 154A1 arranged for dc supervision — Operate OFF HOOK key.	OFF HOOK lamp lights.
8	Set Triplett 310-W meter to 1-volt ac scale.	
9	Connect meter to SEND LEVEL and GRD pin jacks.	
10	Adjust SEND LEV potentiometer of 43A1 carrier channel terminal for a −8 db indication.	
11	Remove all patches, connections, restore all keys to normal.	All lamps extinguished.

STEP	ACTION	VERIFICATION
Send Frequency Check		
12	Patch FREQ STD OUT jacks to EQUIP 1 jacks using 3P14B cord.	
13	Operate OFF HOOK key.	OFF HOOK lamp lights.
14	Operate FREQ STD switch to 1990 OSC.	
15	Set Triplett 310-W meter to 1-volt ac scale.	
16	Connect meter to BRIDGE T-R pin jacks.	Meter needle swings back and forth.
17	Count number of times needle goes back and forth in 10-second interval.	The fluctuations should be less than ten.
18d	If requirement of Step 17 is not met — Adjust OSC potentiometer in 43A1 carrier channel terminal to give a count of less than ten.	
19	Remove all patches, connections, restore all keys to normal.	All lamps extinguished.
Receive Gain Adjustment		
20c	If Data Set 154A1 arranged for dc supervision — Operate OFF HOOK key.	OFF HOOK lamp lights.
21a	If Data Set 154A1 arranged for 2-wire operation — Patch FREQ STD OUT jacks to EQUIP 1 jacks using 3P14B cord.	
22b	If Data Set 154A1 arranged for 4-wire operation — Patch FREQ STD OUT jacks to EQUIP 2 jacks using 3P14B cord.	
23	Set Triplett 310-W meter to 15-volt ac scale.	
24	At Data Set 154A1 — Connect meter to the A2 to G pin jacks of 43A1 carrier channel terminal.	
25	Connect −48V pin jack of terminating portion of test set to −48V pin jack of originating portion of test set using P9 cord, supplied with test set.	
26	Operate 40DB PAD key.	
27	Operate FREQ STD switch to 2330 OSC.	
28	At Data Set 154A1 — Adjust REC GAIN potentiometer of 43A1 carrier channel terminal for a 5.6-volt indication on meter.	
29	Remove all patches, connections, restore all keys to normal.	All lamps extinguished.

STEP	ACTION	VERIFICATION
Voltage and Current Checks		
30b	If Data Set 154A1 arranged for 4-wire operation — Patch EQUIP 1 jacks to EQUIP 2 jacks using 3P14B cord.	
31e	If Data Set 154A1 arranged for carrier supervision — Operate CONVR switch to TER SET.	
32e	Set Triplett 310-W meter to 150-volt dc scale.	
33e	Connect meter into +80 R-LP and GRD pin jacks.	
34e	At Data Set 154A1 — Adjust LP CUR potentiometer in 43A1 carrier channel terminal for a +80 volt indication on meter.	
35e	Disconnect meter.	
36e	Patch RCV LOOP jack to METER jack using 2P1B cord.	
37e	Set Triplett 310-W meter to 30 ma scale.	
38e	Connect meter to METER pin jacks.	
39e	Operate OFF HOOK key.	OFF HOOK lamp lights. Meter reads 18 to 22 ma.
40e	Disconnect meter.	
41e	Set Triplett 310-W meter to 150-volt dc scale.	
42e	Connect meter to +80 S-LP and GRD pin jacks.	Meter reads 79 to 81 volts.
43e	Disconnect meter.	
44e	Remove patch from RCV LOOP jack to METER jack.	
45e	Patch SEND LOOP jack to METER jack using 2P1B cord.	
46e	Set Triplett 310-W meter to 30 ma scale.	
47e	Connect meter to METER pin jacks.	Meter reads 18 to 22 ma.
48c	If Data Set 154A1 arranged for dc supervision — Operate CONVR switch to TER SET.	
49c	Operate OFF HOOK key.	OFF HOOK lamp lights.
50c	Set Triplett 310-W meter to 150-volt dc scale.	

STEP	ACTION	VERIFICATION
51c	Connect meter to +80 R-LP and GRD pin jacks.	
52c	With SEND SPACE key operated — Adjust LP CUR potentiometer in 43A1 carrier channel terminal for +80 volts indication on meter.	
53c	Disconnect meter.	
54c	Patch RCV LOOP jack to METER jack using 2P1B cord.	
55c	Set Triplett 310-W meter to 30 ma scale.	
56c	Connect meter to METER pin jacks.	Meter reads 18 to 22 ma.
57c	Disconnect meter.	
58c	Remove patch from RCV LOOP jack to METER jack.	
59c	Set Triplett 310-W meter to 150-volt dc scale.	
60c	Connect meter to +80 S-LP and GRD pin jacks.	Meter reads 79 to 81 volts.
61c	Disconnect meter.	
62c	Patch SEND LOOP jack to METER jack using 2P1B cord.	
63c	Set Triplett 310-W meter to 30 ma scale.	
64c	Connect meter to METER pin jacks.	Meter reads 18 to 22 ma.
65	Remove all patches, connections, restore all keys to normal.	All lamps extinguished.
Final Send Level Adjustment		
66e	If Data Set 154A1 arranged for carrier supervision — Operate OFF HOOK key.	OFF HOOK lamp lights.
67	Set Triplett 310-W meter to 1-volt ac scale.	
68	Patch meter to BRIDGE T-R pin jacks.	
69	At Data Set 154A1 — The SEND LEV potentiometer in 43A1 carrier channel terminal shall be adjusted to a level indication on meter which would produce a −11 db input at line link frame of No. 5 office. ***Example:*** Assume a 10 db loop is provided for use by Data Set 154A1. Then meter should indicate a −1 db level at BRIDGE T-R pin jacks of 166A1 station test set in order to produce a −11 db level at No. 5 office.	

STEP	ACTION	VERIFICATION
Receive Bias Adjustment		
70a	If Data Set 154A1 arranged for 2-wire operation — Remove patch between TER IMP 1 900 jacks and LINE 1 jacks.	
71b	If Data Set 154A1 arranged for 4-wire operation — Remove patch between TER IMP 1 600 jacks and LINE 1 jacks and TER IMP 2 600 jacks and LINE 2 jacks.	
72	Contact test position of Serving Test Center (STC) and request a source of signals, to allow adjustment of receive bias of 43A1 carrier channel terminal.	
73	The STC shall place a call from test position via No. 5 office to Data Set 154A1, which is terminated in 166A1 station test set.	INC CALL lamp lights.
74	Operate OFF HOOK key.	OFF HOOK lamp lights.
75	Patch 164C3 telegraph transmission measuring set, which is set to read signals in a 20 ma loop into RCV LOOP jack.	
76	At Data Set 154A1 — Adjust REC BIAS potentiometer of 43A1 carrier channel terminal for minimum distortion.	
77	Remove all patches, connections, restore all keys to normal.	All lamps extinguished.