

TYPE N2 REPEATER
REPEATERED HIGH-FREQUENCY LINE
CARRIER LINE-UP—HIGH-FREQUENCY
LINE MEASUREMENTS—REPEATER
OUTPUT—LEVEL OF INDIVIDUAL
CARRIERS

This section provides two procedures for measuring the carriers at an N2 repeater output to determine the frequency characteristics of the preceding high-frequency line. One method provides terminated measurements; the other, bridged measurements. The preferred procedure is to measure the individual carriers on an out-of-service basis with the repeater output terminated in 135 ohms. It should be remembered, however, that when a high-frequency line is terminated and the carriers are removed from the system, all of the repeaters following the terminated repeater will operate at maximum gain or regulate on noise. As a result, crosstalk from the system under test could be coupled into other carrier systems in the same cable.

Bridged measurements must be made when the system cannot be removed from service and should be made where experience has shown that terminating a repeater output may present a noise or crosstalk problem. Bridged measurements only approximate terminated measurements because the impedance of the devices attached to the repeater output do not match repeater impedance at all carrier frequencies. Therefore, it should be considered that bridged measurements are least accurate when made at locations where:

- (a) Equalizers or other networks (except span pads) are placed at the repeater output, or
- (b) The central office shielded pair between the repeater output and the cross-connect cabinet or cable terminal or terminal blocks are longer than 200 feet.

The purpose of this section is to provide a method of measuring individual carriers at the output of an N2 repeater. The measured carrier signal levels may be used for computing the repeater output slope if the N Line Deviation Test Set is not available. This section can also be used to sectionalize trouble when undesirable deviations in the high-frequency line characteristic are encountered because of impedance imperfections in the cable or equalizer network or improper gain characteristics in a repeater amplifier.

APPARATUS:

- 1 — Carrier Frequency Selective Voltmeter (CFSVM) KS-15538
- 1 — Modified ED-92717-30, G4 Adapter (See Section 362-415-515)
- 1 — W20C Cord
- 1 — P14C Cord

STEP	PROCEDURE
	<p style="text-align: center;">A. Measurements with Repeater Output Terminated in 135 Ohms</p> <p>1 Energize the CFSVM and adjust the set sensitivity for a 0 dbm reference in accordance with the section concerning the set (103-400- series sections).</p> <p>2 Remove the plug from either of the two switching jacks (J2 or J3) on the repeater mounting shelf, or on the N2 repeater to N1A adapter mounting assembly and connect the ED-92717-30, G4 adapter via the P14C cord to the vacated jack as shown in Fig. 1.</p> <p>3 Remove the plug from the other switching jack.</p> <p>4 Connect the CFSVM to the ED-92717-30, G4 adapter via the W20C cord.</p> <p>5 Operate the selector switch on the CFSVM to the W-E OUT or E-W OUT position, as required.</p> <p>6 Measure the level at each carrier frequency listed in Table A. Record on form number E-4558-6.</p> <p>7 Determine repeater output slope using the method described in Section 362-400-510.</p> <p>Requirement: (1) Each of the plotted individual channel carrier levels should be within ± 3.0 db of the computed slope line ($Y_0 - Y_{12}$) plotted on Form E-4558-6.</p> <p>(2) The computed slope should be within ± 1.0 db of the output slope for the repeater as specified by circuit order.</p> <p>Note: The Transmission Engineer should be notified if these requirements cannot be met on initial line-up. On routine measurements the effect of temperature (or other natural causes) on carrier slopes may prevent the requirements from being met on some systems. In cases such as this, the tests should be considered acceptable if the difference in slope variations does not exceed ± 0.5 db between two successive locally powered repeater points. (Locally powered repeater points are used as a standard because any temperature contributions to slope by the repeater itself cannot be discounted.)</p> <p>8 Replace the plug in the switching jack vacated in Step 3 and then disconnect the CFSVM and the adapter with the attached cords before finally replacing the plug in the other switching jack.</p>
	<p style="text-align: center;">B. Bridged Measurements at Repeater Output</p> <p>1 Energize the CFSVM and adjust the set sensitivity for a 0 dbm reference in accordance with the section concerning the set.</p> <p>2 Check that both plugs are in place in the J2 and J3 switching jacks on the repeater mounting shelf or on the N2 repeater to N1A adapter mounting assembly.</p>

STEP	PROCEDURE
3	Remove one of the plugs from either switching jack J2 or J3 and leave the other in place.
4	Connect the CFSVM to the vacant switching jack with a W20C cord in conjunction with a P14C cord as shown in Fig. 2.
5	Operate the selector switch on the CFSVM to the W-E OUT or E-W OUT position, as required.
6	Measure the level at each carrier frequency listed in Table A. Record on form number E-4558-6.
7	<p>Determine repeater output slope using the method described in Section 362-400-510.</p> <p>Requirement: (1) Each of the plotted individual channel carrier levels should be within approximately ± 3.0 db of the computed slope line ($Y_0 - Y_{12}$) plotted on form E-4558-6.</p> <p>(2) The computed slope should be within approximately ± 1.0 db of the output slope for the repeater as specified by circuit order.</p> <p>Note: The Transmission Engineer should be notified if these requirements cannot be met on initial line-up. On routine measurements the effect of temperature (or other natural causes) on carrier slopes may prevent the requirements from being met on some systems. In cases such as this, the tests should be considered acceptable if the difference in slope variations does not exceed ± 0.5 db between two successive locally powered repeater points. (Locally powered repeater points are used as a standard because any temperature contributions to slope by the repeater itself cannot be discounted.)</p>
8	Disconnect the CFSVM and the associated cords from the switching jack and replace the plug.

TABLE A
N-SYSTEM CARRIER FREQUENCIES AT OUTPUT OF N2 REPEATER

CARRIER NUMBER N1 or N2 SYSTEM	CARRIER NUMBER N3 or ON2 SYSTEM	LOW-GROUP OUTPUT (KC)	HIGH-GROUP OUTPUT (KC)
1	—	136	168
2	1	128	176
3	2	120	184
4	3	112	192
5	4	104	200
6	5	96	208
7	6	88	216
8	7	80	224
9	8	72	232
10	9	64	240
11	10	56	248
12	11	48	256
13	12	40	264
CARRIER NUMBER ON1 SYSTEM	LOW-GROUP OUTPUT (KC)		HIGH-GROUP OUTPUT (KC)
1	132		172
2	124		180
3	112		192
4	104		200
5	92		212
6	84		220
LCO	76		228
7	72		232
8	64		240
9	52		252
10	44		260

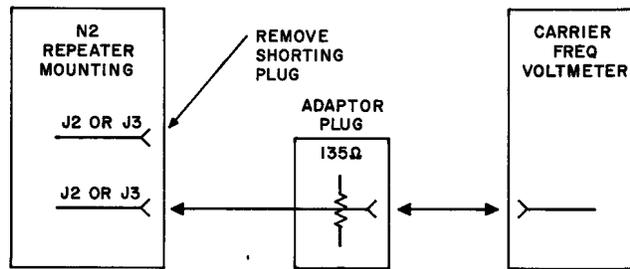


Fig. 1 — Test Setup for 135-Ohm Termination Measurements

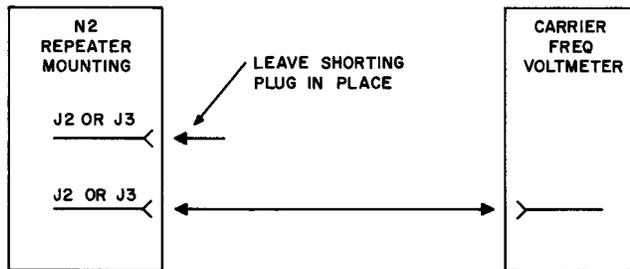


Fig. 2 — Test Setup for Bridged Measurements