

**TYPE N AND ON CARRIER REPEATERS – REPEATERED HIGH-FREQUENCY LINE
CARRIER LINE-UP – HIGH-FREQUENCY LINE MEASUREMENTS
TOTAL CARRIER POWER OUTPUT**

This section is reissued to incorporate minor corrections and bring the section up to date. Since this re-issue covers a general revision, arrows ordinarily used to indicate changes have been omitted.

The carriers are modulated and amplified in the repeater and applied to the cable pair. In case of a system failure which removes the carrier power, the repeaters increase their gain and amplify noise and crosstalk signals from other systems in the cable until they provide nearly normal output power. The 2J set includes a receiver which permits the power to be monitored audibly. Normal carrier power will be heard as varying 8000-cycle tones.

When the L-L ON repeater is used with the output connected to group receiving units, it is necessary to use the 400-type vacuum tube voltmeter with the 2J repeater test set in order to measure the low level output.

For initial line-up, the transmitting tests and adjustment of the group and twin channel units should be completed before this test is made. Grounds on the T jacks of the channel units may be left in place for the initial tests.

The purpose of this test is to measure the total carrier power output of the repeater and to determine if the total power measured is carrier or noise.

APPARATUS:

- 1 — 2J Repeater Test Set (J94002J)
- 1 — 400-type Vacuum Tube Voltmeter
- 1 — W2DW Cord (to connect VTVM to 2J test set for L-L repeater measurement)

STEP	PROCEDURE
1	Remove the repeater connector from J2 or J3, leaving the regular repeater connector in the other jack.
2	Connect the 2J repeater test set to the jack cleared in Step 1. (See Fig. 1.) Type N (J98703) or Type ON (J98706) Repeater Output Connected to Cable Pair
3	Set the rotary switch of the 2J to ADD 10 for the L-H repeater or to 0 for the H-L or L-L repeater. Set the DBM toggle switch to E-W or W-E as required. Read the power output on the meter scale. Requirements: H-L or L-L repeater $+3.0 \pm 1.5$ dbm L-H repeater $+12.0 \pm 1.5$ dbm

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	<p>Note 1: In case these requirements are not met, a repeater may be considered satisfactory if the measured output is ± 1.0 dbm of the average of the other repeaters at this location transmitting in the same direction in the same cable, however, any L-H repeater less than $+9.0$ dbm or H-L or L-L repeater less than 0 dbm should be reported to the Transmission Engineer through proper channels.</p> <p>Note 2: Where artificial lines, span pads, or deviation equalizers are used at the output of the repeater, the applicable corrections in Tables A and B should be added to the value read on the 2J test set before applying requirements above.</p> <p>Note 3: If a 70A spectrum generator is being used as a signal source, the output of the first several repeaters will measure lower because of the waveshape of the signals from the 70A spectrum generator.</p>																																
4	<p>To determine if the value read on the meter is due to actual carriers or to noise, operate the rotary switch on the 2J set to MON and the DBM toggle switch to E-W or W-E as required and monitor the output on the 2J set. Normal carrier will be heard as varying 8000-cycle tones. The absence of these tones or the presence of excessive noise is an indication of trouble in the repeater under test or in a preceding repeater.</p> <p style="text-align: center;">Type ON H-L (J98706) and ON L-L (J98706, List 2) Repeaters (Repeaters per J98706C, D, E, and F Modified per Section 362-405-510 and Newer Repeaters)</p>																																
5	<p>Set the rotary switch to 0. Set the DBM toggle switch to E-W or W-E as required. Read the power output on the meter scale.</p> <p>Requirements: $+3.0 \pm 1.5$ db.</p> <p>Make noise check as in Step 4.</p> <p style="text-align: center;">Type ON L-L (J98706, List 1) Repeater (Repeaters Not Modified per Section 362-405-510) Output Connected to Group Receiving Units</p>																																
6	<p>Set the rotary switch to any position. Set the DBM switch to E-W or W-E as required.</p>																																
7	<p>Connect the 400-type VTVM between the bottom DBM jack on the 2J test set and repeater chassis ground. DO NOT connect the ground terminal of VTVM to the 2J test set.</p>																																
8	<p>Read the power output on the vacuum tube voltmeter scale.</p> <p>Requirements:</p> <table border="0" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;"></th> <th style="width: 20%; text-align: center;">ON 1</th> <th style="width: 30%;"></th> <th style="width: 20%; text-align: center;">ON 2</th> </tr> <tr> <th style="text-align: center;">GROUPS EQUIPPED</th> <th style="text-align: center;">VTVM READING</th> <th style="text-align: center;">GROUPS EQUIPPED</th> <th style="text-align: center;">VTVM READING</th> </tr> </thead> <tbody> <tr> <td>1 + LCO</td> <td style="text-align: center;">-17.5 ± 1.5 db</td> <td>1 + LCO</td> <td style="text-align: center;">-17.5 ± 1.5 db</td> </tr> <tr> <td>1, 2, + LCO</td> <td style="text-align: center;">-18.3 ± 1.5 db</td> <td>1, 2, + LCO</td> <td style="text-align: center;">-18.3 ± 1.5 db</td> </tr> <tr> <td>1, 2, 3, + LCO</td> <td style="text-align: center;">-20.0 ± 1.5 db</td> <td>1, 2, 3, + LCO</td> <td style="text-align: center;">-20.0 ± 1.5 db</td> </tr> <tr> <td>1, 2, 3, 5, + LCO</td> <td style="text-align: center;">-20.3 ± 1.5 db</td> <td>1, 2, 3, 6, + LCO</td> <td style="text-align: center;">-21.5 ± 1.5 db</td> </tr> <tr> <td>1, 2, 3, 4</td> <td style="text-align: center;">-19.0 ± 1.5 db</td> <td>1, 2, 3, 5, 6, + LCO</td> <td style="text-align: center;">-21.5 ± 1.5 db</td> </tr> <tr> <td>1, 2, 3, 4, 5</td> <td style="text-align: center;">-20.5 ± 1.5 db</td> <td>1, 2, 3, 4, 5, 6</td> <td style="text-align: center;">-21.7 ± 1.5 db</td> </tr> </tbody> </table> <p>Make noise check as in Step 4 by listening to earphone of 2J set.</p>		ON 1		ON 2	GROUPS EQUIPPED	VTVM READING	GROUPS EQUIPPED	VTVM READING	1 + LCO	-17.5 ± 1.5 db	1 + LCO	-17.5 ± 1.5 db	1, 2, + LCO	-18.3 ± 1.5 db	1, 2, + LCO	-18.3 ± 1.5 db	1, 2, 3, + LCO	-20.0 ± 1.5 db	1, 2, 3, + LCO	-20.0 ± 1.5 db	1, 2, 3, 5, + LCO	-20.3 ± 1.5 db	1, 2, 3, 6, + LCO	-21.5 ± 1.5 db	1, 2, 3, 4	-19.0 ± 1.5 db	1, 2, 3, 5, 6, + LCO	-21.5 ± 1.5 db	1, 2, 3, 4, 5	-20.5 ± 1.5 db	1, 2, 3, 4, 5, 6	-21.7 ± 1.5 db
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1, 2, 3, 4	-19.0 ± 1.5 db	1, 2, 3, 5, 6, + LCO	-21.5 ± 1.5 db																														
1, 2, 3, 4, 5	-20.5 ± 1.5 db	1, 2, 3, 4, 5, 6	-21.7 ± 1.5 db																														
9	<p>Disconnect 2J test set and replace connector in J2 or J3:</p>																																

TABLE A

N CARRIER – HIGH-LOW REPEATER				
DEV EQL*	ART LINE	SPAN PAD LOSS-DB	CORRECTION FOR CHS 1-12	CORRECTION FOR CHS 2-13
Not Used	1 Mile	0	+0.3	+0.1
		2	+0.2	+0.1
		4	+0.1	+0.1
		6	+0.1	+0.1
		8	+0.1	0.0
		10	0.0	0.0
Used	1 Mile	0	+0.5	+0.5
		2	+0.4	+0.4
		4	+0.2	+0.2
		6	+0.2	+0.2
		8	+0.1	+0.1
		10	0.0	0.0
Used or Not Used	2 Mile or 4 Mile	0	+2.9	+2.7
		2	+1.9	+1.7
		4	+1.3	+1.0
		6	+0.7	+0.7
		8	+0.5	+0.5
		10	+0.3	+0.2
Used	Not Used	Any	0.0	0.0
N CARRIER – LOW-HIGH REPEATER				
Not Used	1 Mile	0	+2.4	+2.7
		2	+1.5	+1.4
		4	+0.9	+0.9
		6	+0.7	+0.7
		8	+0.4	+0.3
		10	+0.2	+0.2
Not Used	2 Mile or 4 Mile	0	+4.8	+5.7
		2	+3.0	+3.2
		4	+1.6	+2.0
		6	+1.0	+1.2
		8	+0.6	+0.8
		10	+0.4	+0.5
Not Used	Not Used	Any	0.0	0.0

*Does not apply to ADE per J98703BE

TABLE B

ON CARRIER — HIGH-LOW OR LOW-LOW REPEATER											
GROUPS EQUIPPED											
DEV EQL	ART LINE	SPAN PAD LOSS-DB	1 LCO	1,2 LCO	1,2,3 LCO	1,2,3, 5,1CO	1,2,3, 6,1CO	1,2,3, 4	1,2,3, 4,5	1,2,3,5 6,1CO	1,2,3, 4,5,6
Not Used	1 Mile	0	-0.5	+0.8	+0.1	+0.2	0.0	+0.3	+0.2	+0.1	+0.1
		2	-0.5	+0.5	+0.1	+0.2	0.0	+0.2	+0.2	+0.1	+0.1
		4	-0.5	+0.2	0.0	+0.1	0.0	+0.2	+0.2	+0.1	+0.1
		6	-0.5	0.0	0.0	+0.1	0.0	+0.1	+0.1	+0.1	+0.1
		8	-0.5	-0.1	-0.1	+0.1	-0.1	+0.1	+0.1	0.0	0.0
10	-0.5	-0.2	-0.1	0.0	-0.1	0.0	+0.1	0.0	0.0		
Used	1 Mile	0	-0.3	0.0	+0.3			+0.6	+0.4		+0.5
		2	-0.5	-0.2	+0.1			+0.3	+0.2		+0.4
		4	-0.5	-0.2	0.0			+0.2	+0.2		+0.2
		6	-0.5	-0.3	0.0			+0.2	+0.1		+0.2
		8	-0.5	-0.4	-0.1			+0.1	+0.1		+0.1
10	-0.5	-0.4	-0.1			0.0	0.0		0.0		
Used or Not Used	2 Mile or 4 Mile	0	+2.0	+2.5	+2.7	+3.1	+2.6	+3.0	+2.9	+2.7	+2.7
		2	+1.1	+1.5	+1.7	+1.9	+1.6	+1.9	+1.8	+1.8	+1.7
		4	+0.3	+0.8	+1.1	+1.2	+1.0	+1.3	+1.2	+1.1	+1.0
		6	+0.2	+0.4	+0.6	+0.9	+0.7	+0.8	+0.7	+0.8	+0.7
		8	+0.1	+0.1	+0.3	+0.4	+0.4	+0.5	+0.5	+0.6	+0.5
10	+0.2	0.0	+0.2	+0.2	+0.2	+0.3	+0.3	+0.3	+0.2		
Used	Not Used	Any	-0.5	-0.4	-0.1	0.0	0.0	0.0	0.0	0.0	0.0
ON CARRIER — LOW-HIGH REPEATER											
Not Used	1 Mile	0	+1.5	+1.7	+1.9	+2.0	+2.3	+2.3	+2.3	+2.3	+2.7
		2	+0.7	+0.8	+1.0	+1.5	+1.5	+1.4	+1.4	+1.5	+1.4
		4	+0.2	-0.1	+0.2	+0.9	+0.8	+0.5	+0.8	+1.0	+0.9
		6	-0.2	-0.1	+0.2	+0.7	+0.6	+0.6	+0.6	+0.6	+0.7
		8	-0.4	-0.3	-0.1	+0.4	+0.3	+0.3	+0.4	+0.4	+0.3
10	-0.6	-0.5	-0.2	+0.2	+0.1	+0.2	+0.2	+0.2	+0.2		
Not Used	2 Mile or 4 Mile	0	+4.1	+4.1	+4.3	+4.9	+5.1	+4.7	+4.7	+5.2	+5.7
		2	+2.2	+2.2	+2.5	+2.9	+2.8	+2.9	+2.9	+3.0	+3.2
		4	+0.8	+0.9	+1.2	+1.9	+1.8	+1.6	+1.6	+2.0	+2.0
		6	+0.2	+0.3	+0.7	+1.5	+1.1	+1.0	+1.0	+1.3	+1.2
		8	-0.2	-0.1	+0.2	+0.7	+0.7	+0.4	+0.6	+0.8	+0.8
10	-0.5	-0.3	0.0	+0.3	+0.5	+0.4	+0.4	+0.5	+0.5		
Not Used	Not Used	Any	-0.8	-0.7	-0.4	0.0	0.0	0.0	0.0	0.0	0.0

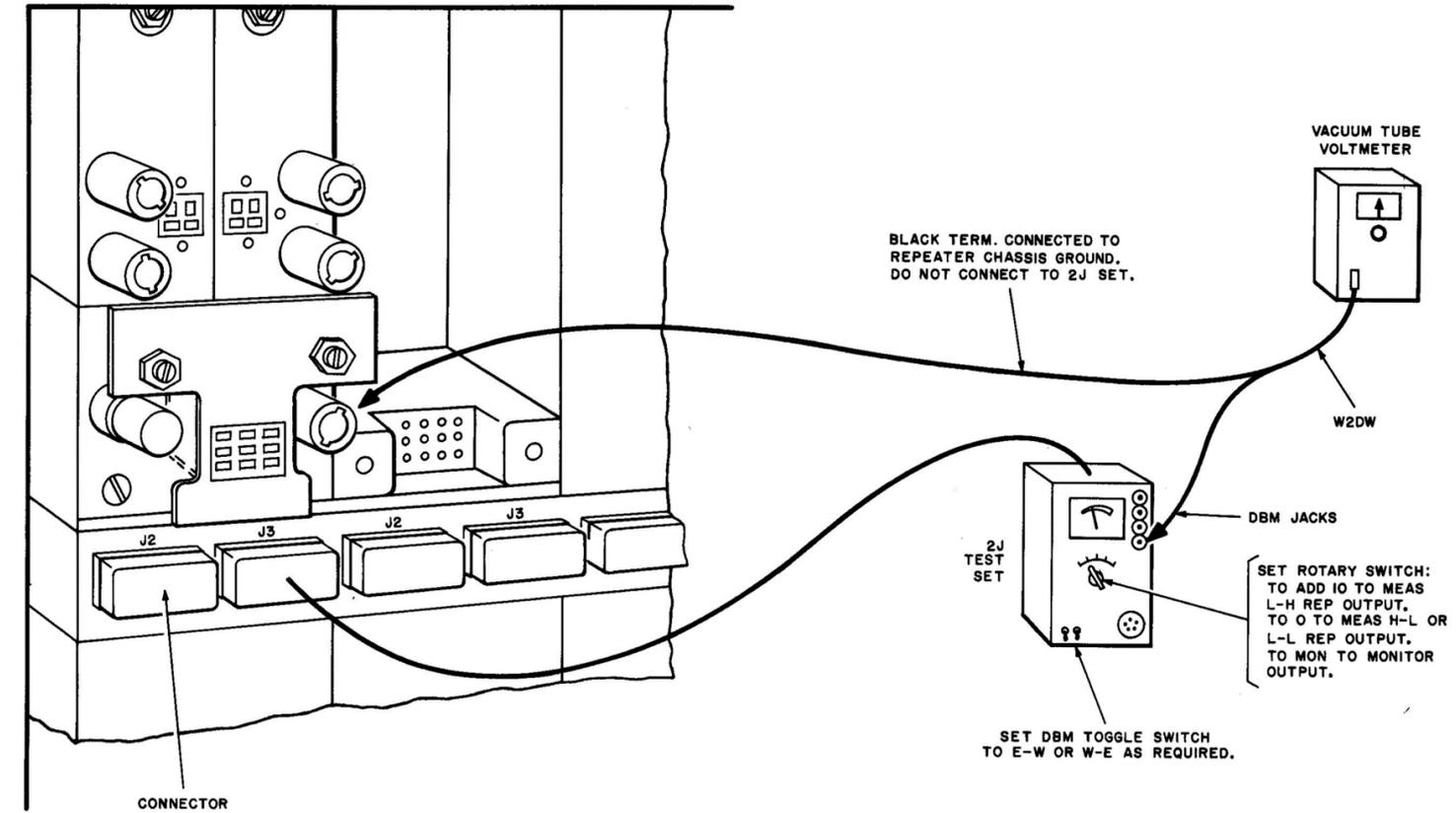


Fig. 1 — Total Carrier Power Measurement