

**TL MICROWAVE RADIO
TRANSMITTER TESTS
BASEBAND AMPLIFIER**

This section describes tests made on the transmitter baseband amplifier without removing the unit from its mounting. The TL test set is used both as a source of test signals and as a measuring device in this practice. These tests, with the exception of the bias check, require an interruption of baseband continuity; therefore, the proper procedures should be followed to obtain a service release of the radio channel involved prior to test and adjustment. The sequence of these tests is arranged to minimize service outage time on systems where a diversity channel is not available to maintain service.

If requirements for the various tests cannot be met, the baseband amplifier should be replaced with a spare unit.

Tests in this section are as follows:

- (a) Bias Check
- (b) Check of Frequency Characteristic
- (c) Output Capability of Amplifier
- (d) Checks Required Following Amplifier Replacement

Note: For routine maintenance, only the bias check need be performed.

APPARATUS:

KS-14510, List 1 Volt-ohm-milliammeter (VOM)
J99262AA TL Test Set (portable)

STEP	PROCEDURE
BIAS CHECK	
1	Set the VOM to indicate 12 volts DC full scale and connect it between the BIAS and GRD jacks. The negative lead of the VOLTMETER should be connected to the BIAS jack.
2	Observe the VOM indication. Requirement: The VOM shall indicate -7.0 ± 0.2 volts.
3	If this requirement is not met, adjust the baseband amplifier BIAS control to -7.0 volts. If the requirement still cannot be met, a trouble condition in the amplifier is indicated, and the amplifier should be replaced. (See Section 409-304-504 for replacement procedures.)

STEP	PROCEDURE
CHECK OF FREQUENCY CHARACTERISTIC	
4	Set up the test circuit of Fig. 1, option A.
5	With the INPUT switch on the TL test set on TER (75Ω), adjust the output of the test oscillator to -10.5 dbm at 100 kc. Record the indication of the TL test set VOLTMETER. Repeat this procedure at 2.6 kc, 1 mc, and 4.5 mc. (See Section 104-440-300 for TL test set operating procedure.)
6	Change the test connections to those shown in Fig. 1, option B, and repeat Step 5.
7	At each test frequency, subtract the test VOLTMETER indication in Step 5 from that in Step 6. This gives the gain between the IN jack and the MON jack on the amplifier. Requirement: The gain at 2.6 kc, 1 mc, and 4.5 mc shall be within ±0.25 db of that at 100 kc.
OUTPUT CAPABILITY OF AMPLIFIER	
Whenever an amplifier is replaced, it is necessary to check its ability to fully deviate a klystron having the minimum allowable modulation sensitivity. This ability is determined by sending a 100-kc test signal at a level of -10.5 dbm into the amplifier input jack and checking that it is possible to adjust the GAIN control for a -8 dbm output at the MON jack measured with the TL test set on a terminated basis. The actual klystron with which the amplifier under test is associated will, in most cases, have a modulation sensitivity other than minimum. Therefore, after the tests detailed below are completed, the gain of the amplifier must be set to its required value per Section 409-304-502 before restoring the transmitter to service.	
8	Set up the test circuit of Fig. 1, option A.
9	With the INPUT switch on the TL test set on TER (75Ω) and the RANGE switch on -10 dbm, send a 100-kc signal at -8 dbm into the test set VOLTMETER.
10	Observe and record the indication of the VOLTMETER. Requirement: The VOLTMETER indication shall be approximately +2.
11	Change the test signal to 4.5 mc at -8 dbm and again record the indication of the VOLTMETER.
12	Change the test circuit to that of Fig. 1, option B, and adjust the BIAS control on the amplifier per Steps 1 through 3.
13	Send a 100-kc signal at -10.5 dbm into the amplifier input.
14	Observe the indication of the VOLTMETER in the TL test set while adjusting the GAIN control on the transmitter baseband amplifier. Requirement: The VOLTMETER indication shall be set at the same level as was observed in Step 10.
15	Send a 4.5-mc test signal at -10.5 dbm into the amplifier and observe the VOLTMETER indication. Requirement: The test set VOLTMETER indication shall be that in Step 11, ±0.25 db.
16	If the amplifier meets this requirement, adjust the 100-kc gain by means of the GAIN control per Section 409-304-502 before restoring to service. If it does not meet the requirement, replace it and repeat Steps 8 through 16.

STEP	PROCEDURE
	<p style="text-align: center;">CHECKS REQUIRED FOLLOWING AMPLIFIER REPLACEMENT</p> <p>The extent of the checks performed on a replacement amplifier is dependent on the degree of urgency in restoring service. A sudden failure of an amplifier in a nondiversity working system calls for the minimum possible amount of testing before restoring service. On the other hand, when an amplifier is replaced during routine testing or on a diversity system, more extensive checking of the replacement amplifier is possible. The checking procedure employed in each of these cases is as follows:</p> <p style="text-align: center;">Emergency Replacement</p> <p>17 Perform Steps 1 through 3.</p> <p>18 Adjust the amplifier gain per Section 409-304-502.</p> <p style="text-align: center;">Routine Replacement or Replacement in a Diversity System</p> <p>19 Perform Steps 4 through 16.</p>

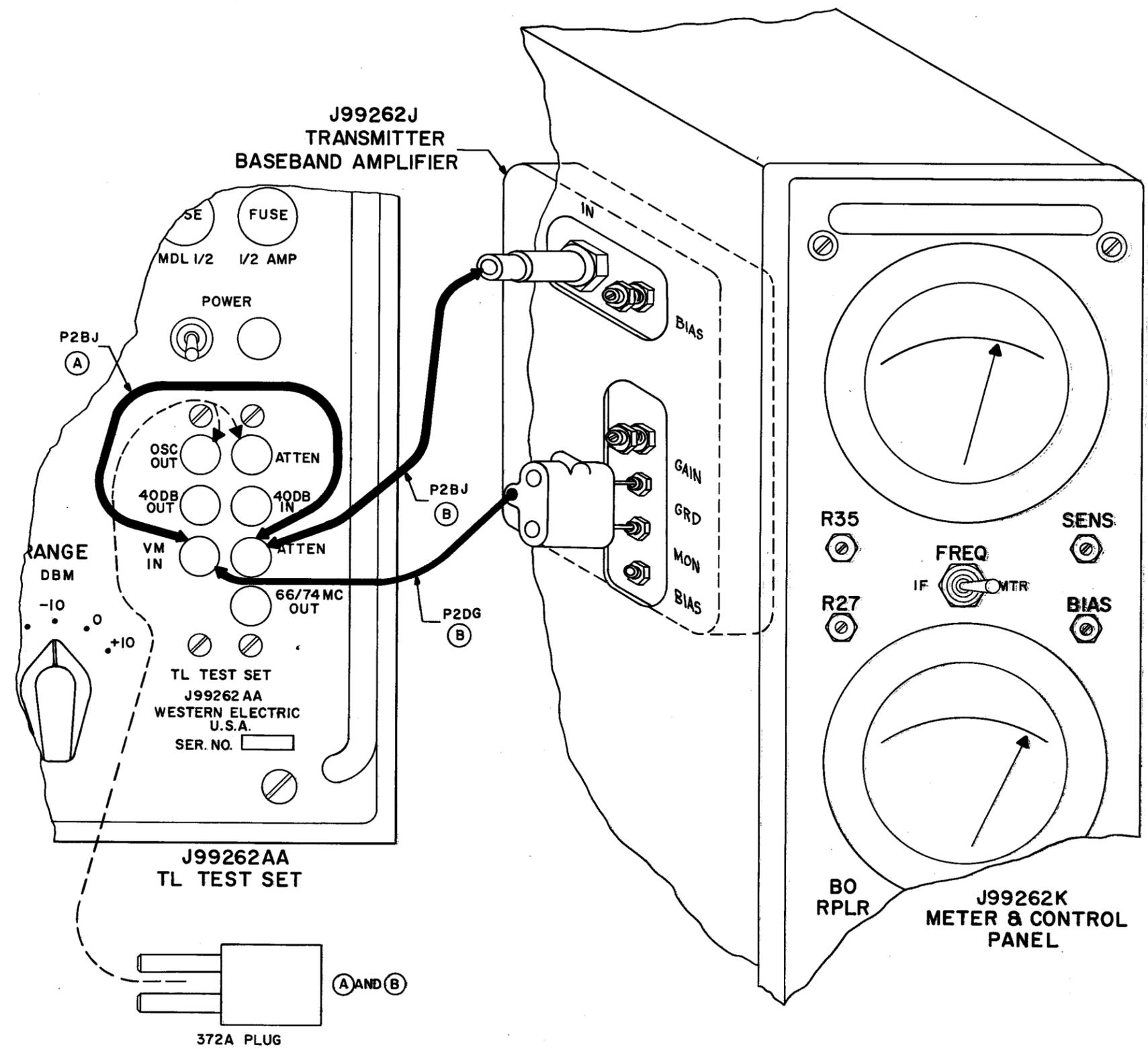


Fig. 1 - Frequency Characteristic Test Connections