TD-3 MICROWAVE RADIO
OVERALL SYSTEM
OPERATION
INITIAL LINEUP OF CHANNELS

1. GENERAL

1.01 This section outlines the tests which should be performed before a TD-3 radio channel is placed into regular service. The procedure is used for the initial lineup of channels of a new system, for adding channels to an existing system, and when rearranging existing facilities to establish new MURs or VURs.

1.02 This section is reissued to correct references to other sections and to make minor editorial changes.

1.03 The tests recommended in this section should be performed on each IF switching section of the channel. Overall tests of the MUR or VUR, performed from the FM terminal locations at the ends of the channel, are also outlined. If a protection channel composed of two or more IF switching sections between FM terminal locations is being tested, it is recommended that each switching section of the channel be tested as described in this section. In addition, a through connection of the protection channel should be made at each intermediate IF switching station to form a through channel between the FM terminal locations. The overall tests outlined in this section should be performed on this through channel. Spare FM terminals connected at the ends of the channel can be used to test the built-up protection channel in the same way as a regular channel.

1.04 Because fading can cause variations in the noise performance, baseband response, and delay characteristics, the channel lineup should be performed only during periods of stable radio propagation.

2. INITIAL LINEUP OF CHANNELS

STEP	PROCEDURE
1	Check that the following conditions have been met. (a) All station power plants are operating normally, and normal float voltage is being fed to the equipment under test. (b) Power has been applied to all equipment in the channel to be lined up. (c) All equipment included in the channel to be tested has met all performance requirements as specified in the appropriate sections. (d) All radio transmitters and receivers have been connected to their antenna waveguide systems. (e) All antenna and waveguide systems have been properly aligned and the cross-polarization discriminations have been checked. (See Section 402-421-208.) (f) All received carrier powers are within 2 dB of the calculated value.

<table>
<tr><th>STEP</th><th>PROCEDURE</th></tr>
<tr><td></td><td>(g) If differential absolute delay equalization (DADE) is to be used in the system, all DADE cables have been installed in the repeater station bays.

(h) In stations using indoor waveguides fed with dry air from the station dehydrator, room temperature is within the range of 75° ±20°F. At stations not being fed dry air, the temperature shall be within the range of 75° ±10°F, and the relative humidity shall be less than 50 percent.

(i) A check has been made of the alarm operations at each station to ensure that alarms from the equipment being turned up for service will operate both local and remote alarm indications.</td></tr>
<tr><td>2</td><td>At each IF switching station, line up the transmitting and receiving portions of the 100A protection switching system associated with the channel being tested. The lineup procedures are given in ◗Sections 420-610-502, 420-610-503, and 420-610-504.◖ In each switching section lock out the channel to be lined up.</td></tr>
<tr><td>3</td><td>Perform the following tests, in the order listed, on each IF switching section of the overall channel being lined up. The requirements given in each BSP section should be met before proceeding with any subsequent test.

<table><tr><th>TEST</th><th>SECTION</th></tr><tr><td>Envelope Delay Distortion</td><td>411-100-501</td></tr><tr><td>Channel Net Gain and Baseband Response</td><td>411-100-503</td></tr><tr><td>Thermal Noise and Spurious Tones</td><td>411-100-504</td></tr><tr><td>Noise Loading</td><td>411-100-505</td></tr><tr><td>Differential Absolute Delay Equalization (DADE)*</td><td>411-100-507</td></tr></table>
* Perform only if the radio channels are to be DADE equalized.</td></tr>
<tr><td>4</td><td>At each IF switching point, restore the locked-out channel to normal operation. Simulate a channel failure on a regular channel in each switching section by disconnecting cable at the output of the IF preamplifier in the radio bay at the receiving main station. Ascertain that the channel switches to a protection channel by noting that the FAIL lamp and the ( )/X or ( )/Y lamp are lighted on the receiving switch control bay. On the transmitting switch bay at the head end of the switching section, the ( )/X or ( )/Y lamp should be lighted.</td></tr>
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STEP	PROCEDURE
5	Line up the transmitting and receiving portions of the following systems in accordance with the sections listed below. If possible, use the FM terminals that will be permanently assigned to the channel being lined up.

EQUIPMENT	SECTION
3A FM Terminal Receiver	420-210-501
3A FM Terminal Transmitter	420-211-501
4A FM Terminal Transmitter	420-214-501
4A FM Terminal Receiver	420-215-501
200A FM Terminal Switching	420-630-500

STEP	PROCEDURE
6	On the 200A FM terminal switching control panel, lock out the channel associated with the FM terminals being used.
7	At the transmitting end of the channel, terminate the FM transmitter baseband input jacks. Check that the IF output of the FM transmitter is connected through the switching and patch bays to the radio transmitter in accordance with the station IF interconnection drawings, or with SD-50405-01 or SD-50405-02. Check for the correct IF level at every level point given in SD-50405-01 or SD-50405-02.
8	At the receiving end of the channel, check that the IF transmission path, through the switching and patch bays to the FM receiver, is in accordance with station interconnection drawings, with SD-50405-01, or SD-50405-02. Check for correct IF level at every level point given in SD-50405-01 or SD-50405-02.
9	Perform the following tests, in the order listed, on the overall channel from the baseband input jacks of the FM transmitter to the baseband output jacks of the FM receiver.

TEST	SECTION
Envelope Delay Distortion	411-100-501
Channel Net Gain and Baseband Response	411-100-503
Noise Loading	411-100-505
Differential Phase and Gain*	411-100-506

* Perform only if the channel under test is to be assigned as a VUR.

STEP	PROCEDURE
10	Line up the transmitting and receiving portions of the 3A wire-line entrance links in accordance with Sections 357-301-501, 357-302-501, and 357-302-502 as applicable. Connect the wire-line entrance link equipment to the FM terminal equipment.
11	At the CH ( ) MON jack on the receiving wire-line entrance link, check for the presence of the 64- or 512-kHz pilot tone at approximately −54 dBm. This tone indicates continuity from the transmitting wire-line entrance link input to the receiving wire-line entrance link output.

STEP	PROCEDURE
12	On the 200A FM terminal switching control panel, restore the channel to normal operation. If a regular channel is being tested, simulate a channel failure within the transmitting and receiving 200A FM terminal switching sections by inserting a plug in the normally through baseband jacks at the input and output of the FM terminal equipment. With a failure in the transmitting 200A switching system, the FAIL lamp and the ( )/X lamp on the transmitter key and lamp panel should light. With a failure in the receiving 200A switching system, the FAIL lamp and the ( )/X lamp on the receiver key and lamp panel should light.