TYPE N3 CARRIER TELEPHONE SYSTEM
TERMINAL EQUIPMENT
INITIAL LINEUP AND MAINTENANCE TESTS

1. GENERAL

1.01 This section covers the operating instructions for initial lineup and maintenance tests on the terminal equipment of the N3 Carrier Telephone System.

1.02 This section is reissued to make minor corrections and to revise Tables A and B. Arrows indicate changes in text, and shading indicates changes in Tables A and B.

1.03 The information in this section is intended to be used after the terminal equipment has been installed and the terminal equipment and associated high-frequency line facilities are ready for test and adjustment preparatory to placing the complete carrier system in service. The information also applies to the operation and maintenance of the terminals while they are in service.

1.04 It is necessary to follow closely the operating procedures, thereby reducing to a minimum the number of circuit interruptions and irregularities which affect the operation of the circuits. Applying test and operating procedures without omitting any steps is important in order to avoid irregularities which are likely to result from the use of abbreviated or unauthorized procedures.

1.05 All trunks and special service circuits assigned to carrier channels should be made busy or patched out before tests and adjustments which may cause service interruptions are attempted. Note especially that the trunk release and make-busy circuit automatically makes the circuits busy during a carrier failure. Since it can interrupt service on all channels, care must be taken to avoid false operation of the trunk release and make-busy circuit.

Caution: All work operations on an in-service basis should be performed carefully to avoid hits or service interruptions. The trunks or special service circuits associated with the carrier system may be carrying DATA-PHONE®, SAGE, voice-frequency telegraph, or other data service.

1.06 Testing and switching apparatus should be calibrated and maintained in accordance with standard instructions as outlined in Bell System Practices. The calibration of testing apparatus is very important, since failure to meet test requirements may be caused by improper alignment of the testing apparatus.

Caution: When installing plug-in units in the terminal mounting, the power supply unit must be inserted last to avoid the possibility of malfunctions caused by insufficient load on the power supply.

1.07 Since dummy power load units are not provided, the following minimum complement of plug-in units should be installed in a terminal before −21 volt power is applied.

1—Group Transmitter

1—Group Receiver

1—Frequency Correction

2—Channel Group Modems

2—Double Channel Regulators

3—Channel Modems*

3—Compandors*

1—Combining and Switching Unit

*Channels 1 and 2 must be equipped for carrier alarm operation. Partially equipped systems (less than 24 channels) should have all unused channel modem slots filled with channel modem load units to maintain the proper ▶load to the secondary carrier-frequency supply.◀

2. INITIAL LINEUP TESTS

2.01 The tests indicated in the sections listed in Table A must be performed on both terminals, in the order shown, before a system is placed in service.

3. MAINTENANCE TESTS

3.01 The tests listed in Table B are made on a periodic basis and, where practicable, in the order shown. The purpose of the tests is to detect apparatus which has developed trouble or has deviated from normal to the extent that, if left in service, service impairment might result. In addition, some of the terminal tests will indicate variations in the high-frequency line which require corrective measures.

3.02 The tests listed in Table C should be made in the order shown when the indicated plug-in units are replaced. ▶Caution should be observed to avoid tests which involve forced carrier failure.

> ***Note:*** When either carrier or power or both are removed from an N carrier line and subsequently reapplied, large transients are generated causing excessive system overloads. These high level transients will crosstalk into other systems in the same cable and may cause short term noise levels as high as 70 dBrnc0.◀

TABLE A
INITIAL LINEUP TESTS

TEST	SECTION REFERENCE
Secondary carrier distribution tests	362-915-501 362-915-502
Filter installation and equalizer adjustment — channel modem units	362-910-501
Check of pick-off filter installation — double channel regulator units	362-909-501
Check of local cabling, span pads, and slope equalizers — line terminating unit	362-904-501
Power supply unit tests and adjustments	362-903-501
Adjustment of repeater power supply and sealing current over cable — line terminating unit	362-904-502
Check of line current	362-904-503
Check of alarm operation — fuse and unit failures, power supply deviation, and unit removal alarms	362-908-501
Transistor emitter current test — group units	362-905-505
Transistor emitter current test — channel group modem units	362-906-501
Transistor emitter current test — frequency correction units	362-907-501
Transmitted carrier power — channel group modem units	362-906-501
Total carrier power output — transmitting	362-905-501
Individual carrier power outputs — transmitting	362-905-502
Total carrier power output — receiving	362-905-503
Individual carrier power outputs — receiving	362-905-504
Carrier output — frequency correction units	362-907-501
Received carrier power — channel group modem units	362-906-501
Double-channel regulator unit tests	362-909-502
Voice- and carrier-frequency input and output tests — channel modem units	362-910-502
Overall channel gain — compandor and channel net gain	362-900-505
Channel noise measurement	362-900-506
Oscillator output level and load transfer potentiometer adjustment — 2600-cycle supply circuit	179-305-501
Check of alarm operation — carrier failure — check of trunk release, make-busy, and automatic restoral circuits	362-908-501

→TABLE B←
MAINTENANCE TESTS

UNIT	TEST	SECTION REFERENCE
Group	Emitter current	362-905-505
	Total carrier power output — transmitting (bridged)	362-905-501
	Total carrier power output — receiving (bridged)	362-905-503
	Individual carrier power output — transmitting (bridged)	362-905-502
	Individual carrier power output — receiving (bridged)	362-905-504
Modem	Transmitting circuit test	362-910-502
	Receiving circuit test	
Compandor	Channel net gain	362-900-505
	Channel noise (except impulse noise)	362-900-506
Channel Group Modem	Transmitted carrier power	362-906-501
	Received carrier power	
	Emitter current	
Frequency Correction	Demodulating carrier output	362-907-501
	Emitter current	
	Phase jitter measurement	362-900-507
Alarm	Check of alarm operation	362-908-501
Double-Channel Regulator	Thermistor bias	362-909-502
	Regulator output	
	Carrier output	
Test Equipment	N3 switching set bridging amplifier gain	103-483-501
Test Equipment	N3 terminal test stand, channel modem looping, amplifier gain and dc tests, and carrier oscillator frequency and amplitude adjustment	103-484-501
Power Supply	In-service voltage test and adjustment	362-903-501
	In-service output ripple voltage test	
Secondary Carrier Distribution Panel	Pad adjustments and carrier-frequency voltage tests	362-915-501
	Regulating amplifier output voltage tests	362-915-502

TABLE C
TESTS TO BE MADE WHEN UNITS ARE REPLACED

UNIT REPLACED	TEST TO BE MADE	SECTION REFERENCE
Compandor	Modem — voice-frequency input	362-910-502
	Channel net gain*	362-900-505
	Channel noise (except impulse noise)*	362-900-506
Modem	Check of channel filters and equalizer adjustment	362-910-501
	Voice-frequency input and output*	362-910-502
	Channel net gain*	362-900-505
	Channel noise*	362-900-506
Channel Group Modem	Transmitted carrier power	362-906-501
	Total carrier power output — transmitting (bridged)	362-905-501
	Received carrier power*	362-906-501
	Emitter current	
Group Transmitter	Check of slope equalizer†	362-904-501
	Emitter current	362-905-505
	Total carrier power output — transmitting (bridged)	362-905-501
Group Receiver	Check of slope equalizer†	362-904-501
	Emitter current	362-905-505
	Total carrier power output — receiving (bridged)	362-905-503
Frequency Correction	Demodulating carrier output	362-907-501
	Emitter current	
Double-Channel Regulator	Check of pick-off filters	362-909-501
	Thermistor bias	362-909-502
	Regulator output	
	Channel net gain (two associated channels)	362-900-505
Line Terminating	Check of span pads†	362-904-501
	Adjustment of repeater power supply and sealing current over cable	362-904-502
	Check of line current	362-904-503
Alarm	Check of alarm operation‡	362-908-501
Power Supply	Power supply tests and adjustments†	362-903-501

* Test should be performed at both terminals.
† These visual checks shall be made before the unit is inserted in the terminal mounting.
‡ If system is in service, avoid tests which involve forced carrier failure.