

**DDS PRESERVICE IMPLEMENTATION
FOR 1A RADIO DIGITAL SYSTEM (1A-RDS)
DIGITAL TRANSMISSION TERMINALS FOR ANALOG FACILITIES
ANALOG MULTIPLEX TERMINAL EQUIPMENT**

1. GENERAL

1.01 This section provides the procedures for organizing preservice installation and testing of facilities to be used in the 1A Radio Digital System (1A-RDS) and Digital Data System (DDS) route.

1.02 This section was reissued to clarify the location of the control office and to change the location where preservice records are kept. Arrows are used to indicate significant changes. *Equipment Test Lists are not affected.*

2. COORDINATION OF PRESERVICE TESTING

2.01 Preservice testing of a DDS route is complicated by the many types of equipment used in the system and by the many Long Lines regions and operating companies that share the system responsibility. Therefore, to insure proper coordination of preservice testing, it is proposed that each Long Lines region have a regional DDS coordinator in addition to the Long Lines headquarters DDS coordinator. The region plant control office DDS coordinator will coordinate the efforts of personnel from the following areas:

- Special Services—Region Operations
- Facilities—Region Operations
- Implementation—Region Engineering
- Transmission—Region Engineering.

2.02 ♦When an intercity DDS route is proposed, the overall responsibility for implementing the preservice testing timetable will be assigned to the regions coordinator as follows:

(a) If both terminal offices are Long Lines and are in different regions, the control office will be the region which has the *westernmost* or *southernmost* office on the route.

(b) If one terminal is Long Lines and the other is an associated or independent company, the Long Lines office will control regardless of any region boundaries. In some cases the responsibility may be assigned by the Long Lines DDS coordinator. The Long Lines DDS coordinator will also be available to assist the regions with any problems that cannot be resolved by the area coordinators.

(c) The control office in (a) or (b) may be a 1A-RDS regeneration point.♦

3. TIMETABLE FOR PRESERVICE TESTING

3.01 The preservice timetable is presented in Table A. The table contains three test dates to be tracked by the circuit layout group. The dates specified are *minimum* start dates.

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TABLE A

DDS PRESERVICE TEST SCHEDULE

WEEKS PRIOR TO PROPOSED SERVICE DATE	ACTION AND RESULTS
26	Begin radio tests.
13	WECo turnover date (1A-RDS related equipment).
10*	1A-RDS plant test date — all 1A-RDS terminal equipment and radio tests completed by operating company.
5*	T1DM plant test date — all 1A-RDS system tests completed. T1DM installed and ready for end-to-end connection.
4*	Circuit plant test date — system test T1DM to T1DM completed. Ready to test customer circuits.
0	DDS service date — all customer circuits tested. Facility ready for service.

*These dates will be tracked by the circuit layout group.

3.02 Radio transmission tests are started 26 weeks prior to the DDS service date. They are performed in the following sequence:

- (1) Condition (eliminate all microphonic and/or noise producing elements) all vacuum tube radio equipment on the regular and protection channels.
- (2) Perform carrier frequency tests on the regular and protection channels.
- (3) Perform the radio fade margin test on the Data Under Voice (DUV) and protection radio channels. This test includes the new low-frequency interference test which uses a 64-kHz tone to spread the transmitted carrier. As this procedure may be modified from time to time, use of the 64-kHz procedure is not mandatory.
- (4) Perform the radio noise and tones test on the DUV and protection radio channels excluding the cochannel tone test which uses the offset transmitted carrier.

Note: If the new low-frequency interference test in (3) is not available for the radio system under consideration, perform the cochannel tone test in (4). Also, if there are presently

working DUV channels in the switching section, the test in (4) is not required.

These tests require considerable time and manpower and should be started at or before the recommended time. If the fade margin test is failed, corrective measures such as moving antennas, moving obstacles near the radio path, and adding electromagnetic interference shielding to structures near the antennas may be necessary to prepare the route for DDS service. The radio route *must* be ready for DDS (via DUV) service ten weeks prior to the DDS service date.

3.03 ♦ If a radio system has previously been conditioned and more than 26 weeks pass without DUV service on the facility, it will not be necessary to recondition the route, provided the facility meets the impulse noise test prior to the start of the 4-day test. ♦

3.04 The Western Electric turnover date is 13 weeks prior to the DDS service date. At this time all Western Electric installation and testing of the 1A-RDS related equipment will be completed, including T1 Carrier. The operating company personnel will then begin the following tests:

- (1) The 356-series tests for the 1A-RDT.

(2) The 357-series tests for digroup connectors, wire line entrance links, combiners, and access trunks.

(3) The 356-228-500 tests concerning T1 Line Selection for DDS.

3.05 Ten weeks prior to the DDS service date is the 1A-RDS plant test date. All tests required prior to 1A-RDS system testing must be completed. This time period is monitored by the circuit layout group. At this time the 1A-RDS system tests in Section 356-454-510 will be performed under the responsibility of 1A Radio Digital Terminal (1A-RDT) receiving end terminal personnel. These tests include the 4-day partial response violation (PRVed) seconds test. From the time the PRVed seconds test is started, the 1A-RDS will be treated as a facility that is in service.

3.06 Five weeks prior to the DDS service date is the T1 Digital Multiplex (T1DM) plant test date. All installation and testing required prior to testing the facility end-to-end between T1DMs (including any T1 lines) must have been completed. At this time end-to-end T1DM testing is performed. This date is monitored by the circuit layout group.

3.07 Four weeks prior to the DDS service date is the circuit plant test date. The facility must be operating end-to-end between T1DMs, and installation of the required subrate equipment must be complete. Subrate equipment and customer circuits are tested end-to-end during this period. This date is monitored by the circuit layout group. At the completion of these tests, the complete DDS facility is ready for service.

4. RECORDS OF PRESERVICE TESTING

4.01 ♦The ability of the system to meet error performance objectives requires that an accurate record of the test results on each DDS route be kept. These records will be stored at the office making the test and should be made available to the Long Lines region headquarters or Long Lines headquarters upon request. The office making these tests should forward a copy of each of the forms to the control office for their records. These records should include the following information:

(1) Receiving digital processor noise margin (stress) test results for the regular and protection 1A-RDTs.

(2) The PRVed seconds test results in Section 356-454-510.

(3) The number of PRVs caused by each baseband and IF switch in each regenerative span.

(4) Results from (1), (2), and (3) should be recorded on Form BS 1238. The results of the radio fade margin test on each radio hop in each regenerative span should be recorded per Section 422-300-903. ♦

5. TEST REFERENCES

5.01 The Bell System Practices containing the various tests to be conducted are listed below. The test requirements must be satisfactorily met before proceeding with other tests. The latest numerical index should be consulted to determine the issue number of the referenced Bell System Practices.

Radio System Tests

5.02 The following Bell System Practices contain tests to determine if the noise and tones on the channel are within requirements:

410-100-504	TD-2 Microwave Radio—Overall System Tests—Noise and Tones
411-100-504	TD-3 Microwave Radio—Thermal Noise and Spurious Tones
412-100-503	TH-1 Microwave Radio—Fluctuation Noise and Spurious Tones
412-450-503	TH-1 Microwave Radio—Cochannel Tones and XPD
413-100-504	TH-3 Microwave Radio—Overall System Tests—Thermal Noise and Spurious Tones

5.03 The following Bell System Practices contain tests to eliminate microphonic sources:

410-410-511	TD-2 Microwave Radio—Impulse Noise Troubleshooting
411-402-511	TD-3 Microwave Radio—Impulse Noise Troubleshooting
411-502-511	TD-3A Microwave Radio—Impulse Noise Troubleshooting
415-410-511	TD-3D Microwave Radio—Impulse Noise Troubleshooting

SECTION 356-454-010

412-450-501 TH-1 Microwave Radio—Impulse Noise Troubleshooting

413-400-511 TH-3 Microwave Radio—Impulse Noise Troubleshooting

5.04 The following Bell System Practices contain the fade margin tests:

410-410-512 TD-2 Microwave Radio—Fade Margin Tests

411-402-512 TD-3 Microwave Radio—Fade Margin Tests

411-502-512 TD-3A Microwave Radio—Fade Margin Tests

415-410-512 TD-3D Microwave Radio—Fade Margin Tests

412-450-502 TH-1 Microwave Radio—Fade Margin Tests

413-400-512 TH-3 Microwave Radio—Fade Margin Tests

5.05 The following Bell System Practices contain the frequency tests:

410-100-506 TD-2 Microwave Radio—Carrier Frequency Measurements

411-100-509 TD-3 Microwave Radio—Carrier Frequency Measurements

415-100-509 TD-3D Microwave Radio—Carrier Frequency Measurements

412-240-502 TH-1 Microwave Radio—IF and Oscillator Restoration Frequencies

420-210-502 Microwave Radio—Common Equipment—IF and Oscillator Restoration Frequencies

420-214-502 Microwave Radio—Common Equipment—Restoration Frequency, Output Level, and Deviation Sensitivity

413-100-509 TH-3 Microwave Radio—Carrier Frequency Measurements

1A-RDT Tests

5.06 The following Bell System Practices contain tests pertaining to the 1A-RDT:

356-454-504 Digital Transmission Terminals—DC/DC Converter Tests

356-454-501 Digital Transmission Terminals—1A-RDT Transmitter Tests

356-454-502 Digital Transmission Terminals—1A-RDT Receiver Tests

356-454-503 Digital Transmission Terminals—Switch Status and Control Panel Tests

Wire Line Entrance Link Tests

5.07 The following Bell System Practices contain tests pertaining to the Wire Line Entrance Link Components:

357-300-507 3A Wire Line Entrance Link—Combiner Alignment and Switch Tests

357-301-501 3A Wire Line Entrance Link—Equalization and Gain-Frequency Tests

357-302-501 3A Wire Line Entrance Link—Equalization and Gain-Frequency Tests

357-303-501 3A Wire Line Entrance Link—Initial Checks and Adjustments

357-303-503 3A Wire Line Entrance Link—3A MCL for Use with TH-1 Radio

357-313-501 1A-RDS Digroup Connector—Initial Alignment of Intermediate Digroup Connector

357-313-502 1A-RDS Digroup Connector—Access Trunk Alignment

357-304-500 3A Wire Line Entrance Link—Initial Lineup and Maintenance

1A-RDS System Tests

5.08 The following Bell System Practice contains the initial end-to-end transmission tests:

356-454-510 **Digital Transmission Terminals—
Initial Tests for Placing the 1A-
RDS in Service**

**1A-RDS will be ready to place in service. The
T1DM and the customer circuits should now be test-
ed.**

5.09 **After completing the tests in this section, the**