OPERATION AND MAINTENANCE
REGENERATOR STATION
1×N FREQUENCY DIVERSITY
DR 6/11-135A AND 135EC
ANNUAL FCC TESTS

CONTENTS PAGE

1. Introduction

This practice lists the annual tests that are *required* for the DR 6/11-135 regenerator equipment to comply with Federal Communications Commission (FCC) rules for microwave radio transmitters operating in the 6- and 11-GHz common carrier bands. This practice also lists additional tests that are *recommended* during these annual visits. These recommended tests are used to check the performance of the regenerator equipment, the radio hop, and the upstream transmitting equipment.

The *required* FCC compliance tests, shown in Table A, are used to check the radio transmitter parameters regulated by FCC rules. These parameters include the power, frequency, and spectrum (FCC mask) of the Radio Frequency (RF) output signal. The *recommended* performance tests are listed in Table B.

Since the DR 6/11-135 Digital Radio systems operate on a demand maintenance basis, the recommended tests are not required for successful operation of the system. However, when the recommended tests are done *with* the annual FCC tests, they are a cost-effective way to check the performance of the equipment and radio hop associated with the station under test. The recommended tests identify "silent failures" and any units that have degraded to a marginal operating point. (A silent failure is one that may have escaped detection by the built-in monitoring circuits.) The recommended tests are especially useful for checking the adaptive circuits that counteract propagation distortion. Marginal or silent failures can be difficult to troubleshoot and will often only show up as performance alarms during such distortion. The recommended tests are also helpful in showing if any new fade-limiting disturbances or other distortions have affected the associated radio hop.

1.1 Update Information

This practice is reissued to move the following tests from Table B, *Recommended Annual Performance Tests*, to Table A, *Required Annual FCC Tests*. This practice is revised to improve overall system performance and to ensure FCC compliance.

- Radio Receiver Microwave Generator Frequency Check and Adjustment
- Radio Transmitter ALC Voltage Check
- IF Combiner Performance Check (Space-Diversity Receiver)

This practice is used in binders 421-103-001, 421-103-080, 421-103-090, and 421-103-100.

2. Scheduling Tests

Many of the tests must be done with the radio channel under test removed from service. Therefore, manual protection switching action is required to protect the payload during these tests. To avoid outages, the tests should be scheduled for periods when propagation conditions are expected to be stable. System operation and maintenance supervisors should consult with their technical support group to determine the best time to schedule these tests.

3. Testing Sequence and Procedural Details

Follow Figure 1 when doing the tests in Tables A and B on each channel, including the protection channel. Follow this flowchart to ensure proper completion of the tests.

The procedure for each test is either given in the table or referenced (that is, a tab in a manual). The circled letter codes in Figure 1 are provided to help identify the proper reentry point to the flowchart.

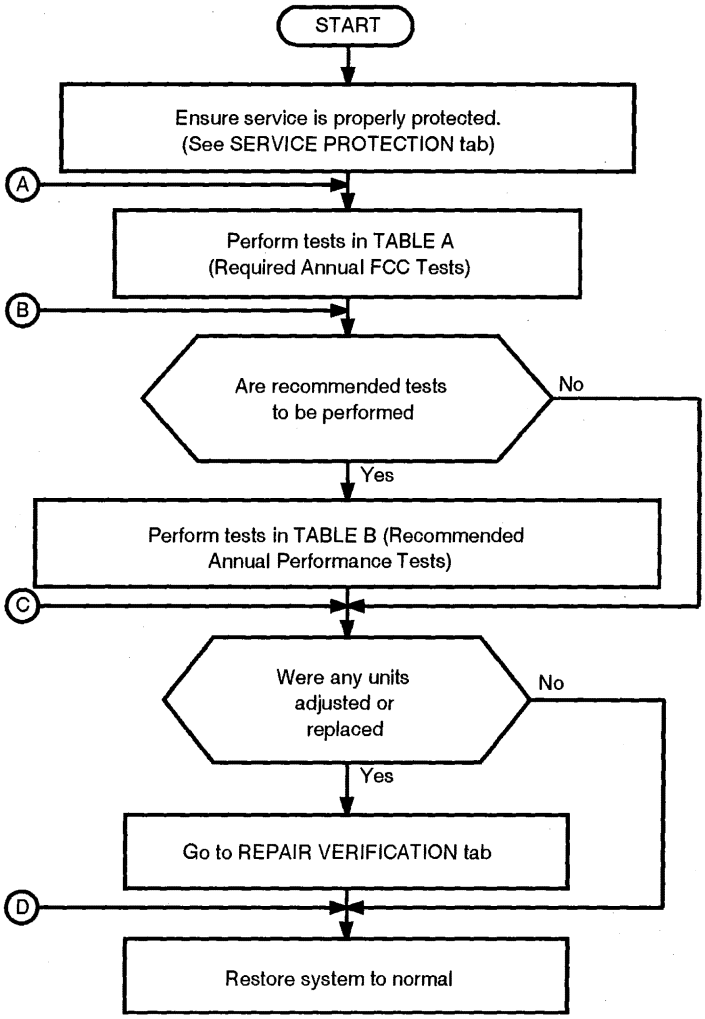

Figure 1–Steps for Performing Annual Tests

TABLE A
REQUIRED ANNUAL FCC TESTS

TEST	*IN-SERVICE TEST*	*FCC-RELATED PARAMETER*
MWV GEN Frequency Check and Adjustment (Part 3.2) (RADIO TRANSMITTER PROCEDURES tab)	YES-CHK NO-ADJMT	Transmitter Frequency
Regenerator Frame Resupply Clock Frequency Check (REGENERATOR PROCEDURES tab)	YES	Transmitter Frequency
Regenerator Modulator Carrier Frequency Check (REGENERATOR PROCEDURES tab)	YES	Transmitter Frequency & Spectrum (Mask Check)
Transmitter RF Output Power Check and Amplifier Transmitter Linearization Adjustment (RADIO TRANSMITTER PROCEDURES tab)	YES NO	Transmitter RF Output Power
Over-the-Air S/I Stress Check (STATION PROCEDURES tab)	NO	Transmitter Spectrum (Mask Check)*
MWV GEN Frequency Check and Adjustment (Part 3.2) (RADIO RECEIVER PROCEDURES tab)	YES-CHK NO-ADJMT	Receiver Frequency Check
Radio Transmitter ALC Voltage Check (Set selector switch on ALARM AND METER unit to the ALC V position, or measure the voltage at the ALC V test points.) ***Requirement:*** 0.00 ±0.12 volts	YES	Overall Transmitter Gain Check
IF Combiner Performance Check (Space-diversity receiver) (Part 9) (RADIO RECEIVER PROCEDURES tab)	NO	Check Ability of Combiner to Switch Without Errors

* Per agreement with FCC, an annual check of S/I = 10^{-8} BER over a hop is a satisfactory means of checking compliance with the FCC MASK REQUIREMENTS.

TABLE B
RECOMMENDED ANNUAL PERFORMANCE TESTS

TEST	*IN-SERVICE TEST*	*GENERAL FUNCTION OF TEST*
If TWT Power Amplifier is equipped: TWT Helix Current (Ih) Check and Beam Current (Ik) Adjustment (Part 5) (RADIO TRANSMITTER PROCEDURES tab)	YES YES-CHK NO-ADJMT	TWT Status Check
Over-the-Air Propagation Distortion Performance Check (STATION PROCEDURES tab)	NO	Check Ability of Receiver to Compensate for Propagation Distortion