Verification

A. Verification Schedule

The Verification Procedures should be performed as a result of one or more of the following conditions:

- Failure to Meet Specifications

  If, during the course of normal operation, the Test Set or any major function thereof fails to meet the performance specifications, the Verification Procedures should be performed.

  If any failure occurs during performance of the Verification Procedures, the user is instructed as to the pertinent Calibration Procedure or hardware failure associated with the failure.

- Module/Assembly Replacement

  If one or more of the Test Set assemblies are replaced, the Verification Procedures should be performed.

- Annual Verification

  Aeroflex recommends an annual Verification on the Test Set to maintain proper testing standards.

B. Precautions

The Verification Procedures are performed with the Test Set Covers in place. No internal adjustments or probing points are required.

C. Requirements

(1) Performance

It is strongly recommended that personnel thoroughly read and understand all steps of the procedures prior to performing each procedure. Knowledge of external test equipment connections and operation is also recommended.

(2) Test Equipment

Appendix A contains a list of test equipment suitable for performing the Verification Procedures. Other equipment meeting specifications listed in Appendix A may be substituted in place of the recommended models.

(3) Disassembly

No disassembly is required to perform the Verification Procedures.

(4) Environment

For best results, environmental conditions should be identical to the conditions at the normal operating location.

D. Test Record

Verification Data Sheets are provided for recording the results obtained while performing the Verification Procedures.

E. Verification

The Verification Procedures are developed for system software 2.0 and higher. If the unit being tested has system software prior to 2.0, the COMM AM Screen references in the verification steps can be performed on the VHF AM and UHF Mode Screens.

Alternate Verification Procedures (para G) are available for selected Test Set modes.

(1) Self Test

TEST EQUIPMENT: None

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to the IFR 4000 Maintenance Manual for corrective action.

STEP	PROCEDURE

1. Connect Test Set to an appropriate AC power source with the External DC Power Supply. Press POWER Key ON.
2. Press the SETUP Key to display the Setup Menu.
3. Press the H/W TOOLS Soft Key to display the Hardware Tools Screen.
4. Press the DIAGS Soft Key to display the Diagnostics Screen.
5. Press the SELFTEST Soft Key to display the Self Test Screen.
6. Press the RUN Soft Key to initiate the Self Test.

   NOTE: The Self Test cannot be performed until the Test Set has finished the warm-up cycle. If the user attempts to initiate the Self Test before the Test Set is ready, the following message is displayed:

   Instrument warming up
   Please wait xx secs

   The message counts down to zero (0) then the Self Test can be initiated.
7. Verify all tests pass.

(2) RF Accuracy

TEST EQUIPMENT: Modulation Analyzer

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to the IFR 4000 Maintenance Manual for corrective action.

STEP PROCEDURE

1. Connect the Modulation Analyzer (RF Input) to the ANT Connector.
2. Configure the Modulation Analyzer as an RF Counter.
3. Press the SETUP Key to display the Setup Menu.
4. Set the Test Set as follows:

FIELD	SETTING
PORT	***ANT***
GEN FREQ	***PRESET***

5. Press the MODE Select Key until the VOR Mode Screen.
6. Set the Test Set as follows:

FIELD	SETTING
FREQ	***108.000 MHz***
RF LVL	***-20.0 dBm***
MOD TONE	***OFF***

7. Verify 108.0 MHz (±108 Hz) on the Modulation Analyzer.
8. Press the MODE Select Key until the LOCALIZER Mode Screen.
9. Set the Test Set as follows:

FIELD	SETTING
FREQ	***108.100 MHz***
RF LVL	***-20.0 dBm***
MOD TONE	***OFF***

10. Verify 108.1 MHz (±108.1 Hz) on the Modulation Analyzer.
11. Press the MODE Select Key until the GLIDESLOPE Mode Screen.
12. Set the Test Set as follows:

FIELD	SETTING
FREQ	***334.700 MHz***
RF LVL	***-20.0 dBm***

13. Verify 334.7 MHz (±334.7 Hz) on the Modulation Analyzer.
14. Press the MODE Select Key until the MARKER BEACON Mode Screen.
15. Set the Test Set as follows:

FIELD	SETTING
FREQ	***75.000 MHz***
RF LVL	***-20.0 dBm***
MOD TONE	***OFF***

16. Verify 75.0 MHz (±75 Hz) on the Modulation Analyzer.
17. Press the MODE Select Key until the COMM AM Mode Screen is displayed.

STEP PROCEDURE

18. Set the Test Set as follows:

FIELD	SETTING
FREQ	***118.000 MHz***
RF LVL	***-20.0 dBm***
MOD TONE	***OFF***

19. If the COMM AM Mode Screen is in RECEIVING Mode, press the SWITCH GEN/RX Soft Key to switch the COMM AM Mode Screen to GENERATING Mode.
20. Verify 118.0 MHz (±118 Hz) on the Modulation Analyzer.
21. Set the FREQ Field to ***137.000 MHz***.
22. Verify 137.0 MHz (±137 Hz) on the Modulation Analyzer.
23. Set the FREQ Field to ***225.000 MHz***.
24. Verify 225.0 MHz (±225 Hz) on the Modulation Analyzer.
25. Set the FREQ Field to ***312.000 MHz***.
26. Verify 312.0 MHz (±312 Hz) on the Modulation Analyzer.
27. Set the FREQ Field to ***400.000 MHz***.
28. Verify 400.0 MHz (±400 Hz) on the Modulation Analyzer.
29. Press the SETUP Key to display the Setup Menu.
30. Set the Test Set as follows:

FIELD	SETTING
PORT	***ANT***
GEN FREQ	***VAR***

31. Press the MODE Select Key until the SELCAL Mode Screen is displayed.
32. Set the Test Set as follows:

FIELD	SETTING
FREQ	***118.001 MHz***
RF LVL	***-20.0 dBm***

33. Verify 118.001 MHz (±118.001 Hz) on the Modulation Analyzer.
34. Set the FREQ Field to ***118.002 MHz***.
35. Verify 118.002 MHz (±118.002 Hz) on the Modulation Analyzer.
36. Set the FREQ Field to ***118.003 MHz***.
37. Verify 118.003 MHz (±118.003 Hz) on the Modulation Analyzer.
38. Set the FREQ Field to ***118.004 MHz***.
39. Verify 118.004 MHz (±118.004 Hz) on the Modulation Analyzer.
40. Set the FREQ Field to ***10.000 MHz***.
41. Verify 10.000 MHz (±10 Hz) on the Modulation Analyzer.
42. Set the FREQ Field to ***30.000 MHz***.
43. Verify 30.000 MHz (±30 Hz) on the Modulation Analyzer.
44. Disconnect the Modulation Analyzer from the ANT Connector.

(3) RF Level Accuracy (ANT Connector)

TEST EQUIPMENT: Power Meter
Power Sensor
Measuring Receiver

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to the IFR 4000 Maintenance Manual for corrective action.

STEP PROCEDURE

1. Connect the Power Sensor to the Power Meter (POWER REF Connector) and zero Power Meter.
2. Disconnect the Power Sensor from the Power Meter (POWER REF Connector) and connect the Power Sensor to the ANT Connector.
3. Press the SETUP Key to display the Setup Menu.
4. Set the Test Set as follows:

FIELD	SETTING
PORT	***ANT***
FREQ	***VAR***

5. Press the MODE Select Key until the COMM AM Mode Screen is displayed.
6. Set the Test Set as follows:

FIELD	SETTING
FREQ	***10.000 MHz***
RF LVL	***-30.0 dBm***
MOD TONE	***OFF***
M MOD	***0%***

7. If the COMM AM Mode Screen is in RECEIVING Mode, press the SWITCH GEN/RX Soft Key to switch the COMM AM Mode Screen to GENERATING Mode.
8. Verify -30 dBm (±3 dB) on the Power Meter.
9. Set the FREQ Field to ***30.000 MHz***.
10. Verify -30 dBm (±3 dB) on the Power Meter.
11. Set the FREQ Field to ***75.000 MHz***.
12. Set the RF LVL Field to ***-16 dBm***.
13. Verify -16 dBm (±3 dB) on the Power Meter.
14. Set the RF LVL Field to ***-30 dBm***.
15. Verify -30 dBm (±3 dB) on the Power Meter.
16. Set the FREQ Field to ***108.000 MHz***.
17. Set the RF LVL Field to ***-16 dBm***.
18. Verify -16 dBm (±3 dB) on the Power Meter.
19. Set the RF LVL Field to ***-30 dBm***.
20. Verify -30 dBm (±3 dB) on the Power Meter.
21. Set the FREQ Field to ***108.100 MHz***.
22. Set the RF LVL Field to ***-16 dBm***.

STEP	PROCEDURE

23. Verify -16 dBm (±3 dB) on the Power Meter.
24. Set the RF LVL Field to ***-30 dBm***.
25. Verify -30 dBm (±3 dB) on the Power Meter.
26. Set the FREQ Field to ***118.000 MHz***.
27. Set the RF LVL Field to ***-16 dBm***.
28. Verify -16 dBm (±3 dB) on the Power Meter.
29. Set the RF LVL Field to ***-30 dBm***.
30. Verify -30 dBm (±3 dB) on the Power Meter.
31. Set the FREQ Field to ***137.000 MHz***.
32. Set the RF LVL Field to ***-16 dBm***.
33. Verify -16 dBm (±3 dB) on the Power Meter.
34. Set the RF LVL Field to ***-30 dBm***.
35. Verify -30 dBm (±3 dB) on the Power Meter.
36. Set the FREQ Field to ***175.000 MHz***.
37. Set the RF LVL Field to ***-16 dBm***.
38. Verify -16 dBm (±3 dB) on the Power Meter.
39. Set the RF LVL Field to ***-30 dBm***.
40. Verify -30 dBm (±3 dB) on the Power Meter.
41. Set the FREQ Field to ***225.000 MHz***.
42. Set the RF LVL Field to ***-16 dBm***.
43. Verify -16 dBm (±3 dB) on the Power Meter.
44. Set the RF LVL Field to ***-30 dBm***.
45. Verify -30 dBm (±3 dB) on the Power Meter.
46. Set the FREQ Field to ***334.700 MHz***.
47. Set the RF LVL Field to ***-16 dBm***.
48. Verify -16 dBm (±3 dB) on the Power Meter.
49. Set the RF LVL Field to ***-30 dBm***.
50. Verify -30 dBm (±3 dB) on the Power Meter.
51. Set the FREQ Field to ***400.000 MHz***.
52. Set the RF LVL Field to ***-16 dBm***.
53. Verify -16 dBm (±3 dB) on the Power Meter.
54. Set the RF LVL Field to ***-30 dBm***.
55. Verify -30 dBm (±3 dB) on the Power Meter.
56. Set the FREQ Field to ***118.000 MHz***.

STEP PROCEDURE

57. Set the RF LVL Field to the following settings and verify levels on the Power Meter:

RF LVL	LEVEL
-57 dBm	-57 dBm (±3 dB)
-47 dBm	-47 dBm (±3 dB)
-37 dBm	-37 dBm (±3 dB)
-27 dBm	-27 dBm (±3 dB)
-17 dBm	-17 dBm (±3 dB)
-7 dBm	-7 dBm (±3 dB)
+3 dBm	+3 dBm (±3 dB)
+13 dBm	+13 dBm (±3 dB)

58. Set the RF LVL Field to ***-67 dBm***.
59. Disconnect the Power Sensor from the ANT Connector and connect the Measuring Receiver to the ANT Connector.
60. Calibrate the Measuring Receiver for 118.000 MHz in Tuned RF Level Mode.
61. Verify -67 dBm (±3 dB) on the Measuring Receiver.
62. Disconnect the Measuring Receiver from the ANT Connector.

(4) RF Level Accuracy (RF I/O Connector)

TEST EQUIPMENT: Power Meter
Power Sensor
Measuring Receiver

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to the IFR 4000 Maintenance Manual for corrective action.

STEP PROCEDURE

1. Connect the Power Sensor to the Power Meter (POWER REF Connector) and zero Power Meter.
2. Disconnect the Power Sensor from the Power Meter (POWER REF Connector) and connect the Power Sensor to the RF I/O Connector.
3. Press the SETUP Key to display the Setup Menu.
4. Set the Test Set as follows:

FIELD	SETTING
PORT	***RF I/O***
FREQ	***VAR***

5. Press the MODE Select Key until the COMM AM Mode Screen is displayed.
6. Set the Test Set as follows:

FIELD	SETTING
FREQ	***10.000 MHz***
RF LVL	***-50.0 dBm***
MOD TONE	***OFF***
M MOD	***0%***

7. If the COMM AM Mode Screen is in RECEIVING Mode, press the SWITCH GEN/RX Soft Key to switch the COMM AM Mode Screen to GENERATING Mode.
8. Verify -50 dBm (±2 dB) on the Power Meter.
9. Set the FREQ Field to ***30.000 MHz***.
10. Verify -50 dBm (±2 dB) on the Power Meter.
11. Set the FREQ Field to ***75.000 MHz***.
12. Set the RF LVL Field to ***-39 dBm***.
13. Verify -39 dBm (±2.5 dB) on the Power Meter.
14. Set the RF LVL Field to ***-50 dBm***.
15. Verify -50 dBm (±2 dB) on the Power Meter.
16. Set the FREQ Field to ***108.000 MHz***.
17. Set the RF LVL Field to ***-39 dBm***.
18. Verify -39 dBm (±2.5 dB) on the Power Meter.
19. Set the RF LVL Field to ***-50 dBm***.
20. Verify -50 dBm (±2 dB) on the Power Meter.
21. Set the FREQ Field to ***108.100 MHz***.
22. Set the RF LVL Field to ***-39 dBm***.

STEP	PROCEDURE

23. Verify -39 dBm (±2.5 dB) on the Power Meter.
24. Set the RF LVL Field to ***-50 dBm***.
25. Verify -50 dBm (±2 dB) on the Power Meter.
26. Set the FREQ Field to ***118.000 MHz***.
27. Set the RF LVL Field to ***-39 dBm***.
28. Verify -39 dBm (±2.5 dB) on the Power Meter.
29. Set the RF LVL Field to ***-50 dBm***.
30. Verify -50 dBm (±2 dB) on the Power Meter.
31. Set the FREQ Field to ***137.000 MHz***.
32. Set the RF LVL Field to ***-39 dBm***.
33. Verify -39 dBm (±2.5 dB) on the Power Meter.
34. Set the RF LVL Field to ***-50 dBm***.
35. Verify -50 dBm (±2 dB) on the Power Meter.
36. Set the FREQ Field to ***175.000 MHz***.
37. Set the RF LVL Field to ***-39 dBm***.
38. Verify -39 dBm (±2.5 dB) on the Power Meter.
39. Set the RF LVL Field to ***-50 dBm***.
40. Verify -50 dBm (±2 dB) on the Power Meter.
41. Set the FREQ Field to ***225.000 MHz***.
42. Set the RF LVL Field to ***-39 dBm***.
43. Verify -39 dBm (±2.5 dB) on the Power Meter.
44. Set the RF LVL Field to ***-50 dBm***.
45. Verify -50 dBm (±2 dB) on the Power Meter.
46. Set the FREQ Field to ***334.700 MHz***.
47. Set the RF LVL Field to ***-39 dBm***.
48. Verify -39 dBm (±2.5 dB) on the Power Meter.
49. Set the RF LVL Field to ***-50 dBm***.
50. Verify -50 dBm (±2 dB) on the Power Meter.
51. Set the FREQ Field to ***400.000 MHz***.
52. Set the RF LVL Field to ***-39 dBm***.
53. Verify -39 dBm (±2.5 dB) on the Power Meter.
54. Set the RF LVL Field to ***-50 dBm***.
55. Verify -50 dBm (±2 dB) on the Power Meter.
56. Set the FREQ Field to ***118.000 MHz***.
57. Disconnect the Power Sensor from the RF I/O Connector and connect the Measuring Receiver to the RF I/O Connector.
58. Calibrate the Measuring Receiver for 118.000 MHz in Tuned RF Level Mode with a 3.8 Special entered.

STEP PROCEDURE

59. Set the RF LVL Field to the following settings and verify levels on the Measuring Receiver:

RF LVL	LEVEL
-12 dBm	-12 dBm (±2.5 dB)
-22 dBm	-22 dBm (±2.5 dB)
-32 dBm	-32 dBm (±2.5 dB)
-42 dBm	-42 dBm (±2 dB)
-52 dBm	-52 dBm (±2 dB)
-62 dBm	-62 dBm (±2 dB)
-72 dBm	-72 dBm (±2 dB)
-82 dBm	-82 dBm (±2 dB)
-92 dBm	-92 dBm (±2 dB)
-102 dBm	-102 dBm (±3 dB)
-112 dBm	-112 dBm (±3 dB)
-120 dBm	-120 dBm (±3 dB)

60. Set the FREQ Field to ***334.700 MHz***.

61. Calibrate the Measuring Receiver for 334.700 MHz in Tuned RF Level Mode with a 3.8 Special entered.

62. Set the RF LVL Field to the following settings and verify levels on the Measuring Receiver:

RF LVL	LEVEL
-12 dBm	-12 dBm (±2.5 dB)
-22 dBm	-22 dBm (±2.5 dB)
-32 dBm	-32 dBm (±2.5 dB)
-42 dBm	-42 dBm (±2 dB)
-52 dBm	-52 dBm (±2 dB)
-62 dBm	-62 dBm (±2 dB)
-72 dBm	-72 dBm (±2 dB)
-82 dBm	-82 dBm (±2 dB)
-92 dBm	-92 dBm (±2 dB)
-102 dBm	-102 dBm (±3 dB)
-112 dBm	-112 dBm (±3 dB)
-120 dBm	-120 dBm (±3 dB)

63. Disconnect the Measuring Receiver from the RF I/O Connector.

(5) Harmonic and Spurious

TEST EQUIPMENT: Spectrum Analyzer

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to the IFR 4000 Maintenance Manual for corrective action.

STEP PROCEDURE

1. Connect the Spectrum Analyzer (Input) to the ANT Connector.
2. Press the SETUP Key to display the Setup Menu.
3. Set the PORT Field to ***ANT***.
4. Press the MODE Select Key until the VOR Mode Screen is displayed.
5. Set the Test Set as follows:

FIELD	SETTING
FREQ	***108.000 MHz***
RF LVL	***0.0 dBm***
MOD TONE	***OFF***
M MOD	***0%***

6. Verify the harmonic is <-20 dBc and the spurious is <-35 dBc.
7. Press the MODE Select Key until the GLIDESLOPE Mode Screen is displayed.
8. Set the Test Set as follows:

FIELD	SETTING
FREQ	***334.700 MHz***
RF LVL	***0.0 dBm***
M MOD	***0%***

9. Verify the harmonic is <-20 dBc and the spurious is <-35 dBc.
10. Press the MODE Select Key until the MARKER BEACON Mode Screen is displayed.
11. Set the Test Set as follows:

FIELD	SETTING
FREQ	***75.000 MHz***
RF LVL	***0.0 dBm***
MOD TONE	***OFF***
M MOD	***0%***

12. Verify the harmonic is <-20 dBc and the spurious is <-35 dBc.
13. Press the MODE Select Key until the COMM AM Mode Screen is displayed.
14. Set the Test Set as follows:

FIELD	SETTING
FREQ	***137.000 MHz***
RF LVL	***0.0 dBm***
MOD TONE	***OFF***
M MOD	***0%***

15. If the COMM AM Mode Screen is in RECEIVING Mode, press the SWITCH GEN/RX Soft Key to switch the COMM AM Mode Screen to GENERATING Mode.
16. Verify the harmonic is <-20 dBc and the spurious is <-35 dBc.

STEP	PROCEDURE

17. Set the FREQ Field to ***400.000 MHz***.
18. Verify the harmonic is <-20 dBc and the spurious is <-35 dBc.
19. Press the SETUP Key to display the Setup Menu.
20. Set the FREQ Field to ***VAR***.
21. Press the SETUP Key to return to the COMM AM Mode Screen.
22. Set the FREQ Field to ***10.000 MHz***.
23. Verify the spurious is <-32 dBc.
24. Set the FREQ Field to ***30.000 MHz***.
25. Verify the spurious is <-32 dBc.
26. Disconnect the Spectrum Analyzer from the ANT Connector.

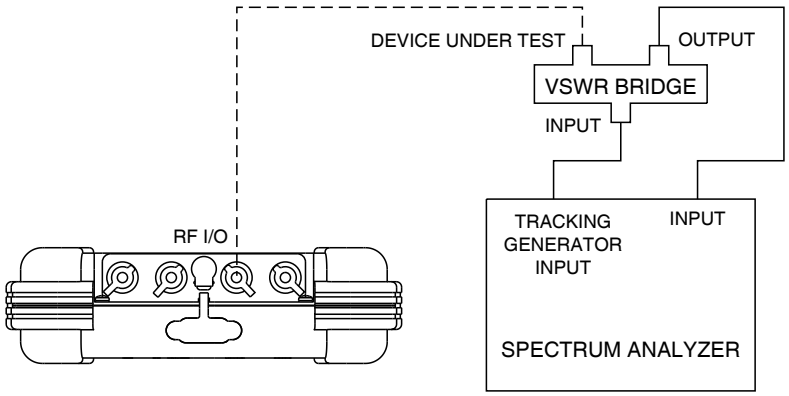
(6) VSWR (RF I/O and SWR Connectors)

TEST EQUIPMENT: Spectrum Analyzer
VSWR Bridge

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to the IFR 4000 Maintenance Manual for corrective action.

STEP	PROCEDURE

1. Connect test equipment as shown:



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RF I/O CONNECTOR

2. Set the Spectrum Analyzer Tracking Generator Level to 0 dBm.
3. Set the Spectrum Analyzer Tracking Generator Frequency to 75, 225 and 400 MHz and record the levels as reference.
4. Connect VSWR Bridge (Device Under Test Connector) to RF I/O Connector.
5. Set the Spectrum Analyzer Tracking Generator Frequency to 75, 225 and 400 MHz and record the levels.
6. Calculate the return loss for the levels recorded in Steps 3 and 5 and record. (Return Loss = Reference - Reading).
7. Verify VSWR is <1.3 for 75 MHz, <1.3 for 225 MHz and <1.35 for 400 MHz.

   $\Gamma = 10 \text{ ^ } (- RL / 20)$

   $VSWR = (1 + \Gamma) / (1 - \Gamma)$

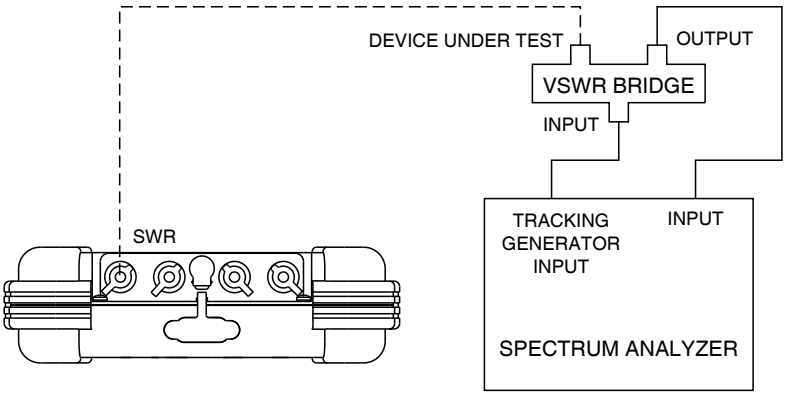
   Where Γ = Reflection Coefficient

   RL = Return Loss
8. Disconnect VSWR Bridge from RF I/O Connector.

STEP PROCEDURE

SWR CONNECTOR

9. Connect VSWR Bridge (Device Under Test Connector) to SWR Connector.



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10. Set the Spectrum Analyzer Tracking Generator Frequency to 75, 225 and 400 MHz and record the levels.
11. Calculate the return loss for the levels recorded in Steps 3 and 10 and record. (Return Loss = Reference - Reading).
12. Verify VSWR is <1.3 for 75 MHz, <1.3 for 225 MHz and <1.35 for 400 MHz.

    $\Gamma = 10 \wedge (- RL / 20)$

    $VSWR = (1 + \Gamma) / (1 - \Gamma)$

    Where Γ = Reflection Coefficient

    RL = Return Loss

13. Disconnect VSWR Bridge from SWR Connector.

(7) Marker Beacon

TEST EQUIPMENT: Modulation Analyzer

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to the IFR 4000 Maintenance Manual for corrective action.

STEP PROCEDURE

1. Connect the Modulation Analyzer (RF Input) to the ANT Connector.
2. Set the Modulation Analyzer to AM Measurement.
3. Press the SETUP Key to display the Setup Menu.
4. Set the PORT Field to ***ANT***.
5. Press the MODE Select Key until the MARKER BEACON Mode Screen is displayed.
6. Set the Test Set as follows:

FIELD	SETTING
FREQ	***75.000 MHz***
RF LVL	***10.0 dBm***
MOD TONE	***400 Hz***
M MOD	***CAL***

7. Verify 400 Hz (±0.02%) with <2.5% distortion and an AM Depth of 95% AM (±5% AM) on the Modulation Analyzer.
8. Set the MOD TONE Field to ***1300***.
9. Verify 1300 Hz (±0.02%) with <2.5% distortion and an AM Depth of 95% AM (±5% AM) on the Modulation Analyzer.
10. Set the MOD TONE Field to ***3000***.
11. Verify 3000 Hz (±0.02%) with <2.5% distortion and an AM Depth of 95% AM (±5% AM) on the Modulation Analyzer.
12. Disconnect the Modulation Analyzer from the ANT Connector.

(8) VOR

TEST EQUIPMENT: Modulation Analyzer

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to the IFR 4000 Maintenance Manual for corrective action.

STEP PROCEDURE

1. Connect the Modulation Analyzer (RF Input) to the ANT Connector.
2. Set the Modulation Analyzer to AM Measurement.
3. Press the SETUP Key to display the Setup Menu.
4. Set the PORT Field to ***ANT***.

MODULATION FREQUENCY, DISTORTION AND DEPTH ACCURACY

5. Press the MODE Select Key until the VOR Mode Screen is displayed.
6. Set the Test Set as follows:

FIELD	SETTING
FREQ	***108.000 MHz***
RF LVL	***10.0 dBm***
MOD TONE	***1020 Hz***
M MOD	***CAL***
30 Hz MOD	***0%***
9960 Hz MOD	***0%***

7. Verify 1020 Hz (±0.02%) with <2.0% distortion and an AM Depth of 30% AM (±2% AM) on the Modulation Analyzer.
8. Set the Test Set as follows:

FIELD	SETTING
MOD TONE	***OFF***
30 Hz MOD	***30%***

9. Verify 30 Hz (±0.02%) with <2.0% distortion and an AM Depth of 30% AM (±1% AM) on the Modulation Analyzer.
10. Set the Test Set as follows:

FIELD	SETTING
30 Hz MOD	***0%***
9960 Hz MOD	***30%***
TONE DEL	***REF***

11. Verify 9960 Hz (±0.02%) with <2.0% distortion and an AM Depth of 30% AM (±1% AM) on the Modulation Analyzer.
12. Set the Test Set as follows:

FIELD	SETTING
30 Hz MOD	***30%***
TONE DEL	***-***

13. Verify AM Depth of 60% AM (±2% AM) on the Modulation Analyzer.

STEP PROCEDURE

FM DEVIATION ACCURACY

14. Set the Modulation Analyzer to DEV 9.96K.
15. Verify 480 Hz (±25 Hz) on the Modulation Analyzer.

BEARING ACCURACY

16. Set the Modulation Analyzer to Phase Measurement.
17. Press the SETUP Key to display the Setup Menu.
18. Set the VOR BRG Field to ***FIXED***.
19. Press the MODE Select Key until the VOR Mode Screen is displayed.
20. Set the Test Set as follows:

FIELD	SETTING
30 Hz MOD	***30%***
9960 Hz MOD	***30%***
TO/FROM	***TO***

21. Set the BRG Field to the following settings and verify readings on the Modulation Analyzer:

BRG	READING
30	210° (±0.1°)
90	270° (±0.1°)
150	330° (±0.1°)
210	30° (±0.1°)
270	90° (±0.1°)
330	150° (±0.1°)

22. Set the TO/FROM Field to ***FROM***.
23. Set the BRG Field to the following settings and verify readings on the Modulation Analyzer:

BRG	READING
30	30° (±0.1°)
90	90° (±0.1°)
150	150° (±0.1°)
210	210° (±0.1°)
270	270° (±0.1°)
330	330° (±0.1°)

24. Press the SETUP Key to display the Setup Menu.
25. Set the VOR BRG Field to ***VAR***.
26. Press the MODE Select Key until the VOR Mode Screen is displayed.

STEP PROCEDURE

27. Set the BRG Field to the following settings and verify readings on the Modulation Analyzer:

BRG	READING
1	1° (±0.1°)
2	2° (±0.1°)
10.1	10.1° (±0.1°)
10.2	10.2° (±0.1°)

28. Disconnect the Modulation Analyzer from the ANT Connector.

(9) Localizer

TEST EQUIPMENT: Modulation Analyzer

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to the IFR 4000 Maintenance Manual for corrective action.

STEP PROCEDURE

1. Connect the Modulation Analyzer (RF Input) to the ANT Connector.
2. Set the Modulation Analyzer to AM Measurement.
3. Press the SETUP Key to display the Setup Menu.
4. Set the PORT Field to ***ANT***.

MODULATION FREQUENCY, DISTORTION AND DEPTH ACCURACY

5. Press the MODE Select Key until the LOCALIZER Mode Screen is displayed.
6. Set the Test Set as follows:

FIELD	SETTING
FREQ	***108.100 MHz***
RF LVL	***10.0 dBm***
MOD TONE	***1020 Hz***
M MOD	***CAL***
DEV STEP	***FIXED***
LOC DDM	***0.000 CENTER***
TONE DEL	***90 & 150***

7. Verify 1020 Hz (±0.02%) with <2.5% distortion and an AM Depth of 30% AM (±2% AM) on the Modulation Analyzer.
8. Set the Test Set as follows:

FIELD	SETTING
MOD TONE	***OFF***
TONE DEL	***150***

9. Verify 90 Hz (±0.02%) with <2.5% distortion and an AM Depth of 20% AM (±2% AM) on the Modulation Analyzer.
10. Set the TONE DEL Field to ***90***.
11. Verify 150 Hz (±0.02%) with <2.5% distortion and an AM Depth of 20% AM (±2% AM) on the Modulation Analyzer.

DDM ACCURACY

12. Set the Modulation Analyzer to DDM.
13. Set the Test Set as follows:

FIELD	SETTING
TONE DEL	***OFF***
90/150 Hz	***OFF***

STEP PROCEDURE

14. Set the LOC DDM Field to the following settings and verify readings on the Modulation Analyzer:

LOC DDM	READING
0.000 CENTER	0.000 (±0.0015 DDM)
0.093 LEFT	0.093 (±0.0015 DDM + ±3% of setting)
0.093 RIGHT	0.093 (±0.0015 DDM + ±3% of setting)
0.155 LEFT	0.155 (±0.0015 DDM + ±3% of setting)
0.155 RIGHT	0.155 (±0.0015 DDM + ±3% of setting)
0.200 LEFT	0.200 (±0.0015 DDM + ±3% of setting)
0.200 RIGHT	0.200 (±0.0015 DDM + ±3% of setting)

15. Set the DEV STEP Field to ***VAR***.

16. Set the LOC DDM Field to the following settings and verify readings on the Modulation Analyzer:

LOC DDM	READING
0.094	0.094 (±0.0025 DDM + ±3% of setting)
0.095	0.095 (±0.0025 DDM + ±3% of setting)
0.096	0.096 (±0.0025 DDM + ±3% of setting)
0.097	0.097 (±0.0025 DDM + ±3% of setting)

17. Set the Test Set as follows:

FIELD	SETTING
DEV STEP	***FIXED***
LOC DDM	***0.000 CENTER***

PHASE ACCURACY

18. Set the 90/150 Hz Field to the following settings and verify readings on the Modulation Analyzer:

90/150 Hz	READING
0	0° (±0.5°)
5	-5° (±0.5°)
10	-10° (±0.5°)
20	-20° (±0.5°)
40	-40° (±0.5°)
80	40° (±0.5°)
120	0° (±0.5°)

19. Set the 90/150 Hz Field to ***0***.

20. Disconnect the Modulation Analyzer from the ANT Connector.

(10) Glideslope

TEST EQUIPMENT: Modulation Analyzer

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to the IFR 4000 Maintenance Manual for corrective action.

STEP PROCEDURE

1. Connect the Modulation Analyzer (RF Input) to the ANT Connector.
2. Set the Modulation Analyzer to AM Measurement.
3. Press the SETUP Key to display the Setup Menu.
4. Set the PORT Field to ***ANT***.

MODULATION FREQUENCY, DISTORTION AND DEPTH ACCURACY

5. Press the MODE Select Key until the GLIDESLOPE Mode Screen is displayed.
6. Set the Test Set as follows:

FIELD	SETTING
FREQ	***334.700 MHz***
RF LVL	***10.0 dBm***
M MOD	***CAL***
DEV STEP	***FIXED***
90/150 Hz	***OFF***
TONE DEL	***150***

7. Verify 90 Hz (±0.02%) with <2.5% distortion and an AM Depth of 40% AM (±2% AM) on the Modulation Analyzer.
8. Set the TONE DEL Field to ***90***.
9. Verify 150 Hz (±0.02%) with <2.5% distortion and an AM Depth of 40% AM (±2% AM) on the Modulation Analyzer.

DDM ACCURACY

10. Set the Modulation Analyzer to DDM.
11. Set the TONE DEL Field to ***OFF***.
12. Set the G/S DDM Field to the following settings and verify readings on the Modulation Analyzer:

LOC DDM	READING
0.000 CENTER	0.000 (±0.003 DDM
0.091 UP	0.091 (±0.003 DDM + ±3% of setting)
0.091 DOWN	0.091 (±0.003 DDM + ±3% of setting)
0.175 UP	0.175 (±0.003 DDM + ±3% of setting)
0.175 DOWN	0.175 (±0.003 DDM + ±3% of setting)
0.400 UP	0.400 (±0.003 DDM + ±3% of setting)
0.400 DOWN	0.400 (±0.003 DDM + ±3% of setting)

13. Set the DEV STEP Field to ***VAR***.

STEP PROCEDURE

14. Set the G/S DDM Field to the following settings and verify readings on the Modulation Analyzer:

G/S DDM	READING
0.176	0.176 (±0.0048 DDM + ±3% of setting)
0.177	0.177 (±0.0048 DDM + ±3% of setting)
0.178	0.178 (±0.0048 DDM + ±3% of setting)
0.179	0.179 (±0.0048 DDM + ±3% of setting)

15. Set the Test Set as follows:

FIELD	SETTING
DEV STEP	***FIXED***
G/S DDM	***0.000 CENTER***

PHASE ACCURACY

16. Set the 90/150 Hz Field to the following settings and verify readings on the Modulation Analyzer:

90/150 Hz	READING
0	0° (±0.5°)
5	-5° (±0.5°)
10	-10° (±0.5°)
20	-20° (±0.5°)
40	-40° (±0.5°)
80	40° (±0.5°)
120	0° (±0.5°)

17. Set the 90/150 Hz Field to ***0***.
18. Disconnect the Modulation Analyzer from the ANT Connector.

(11) ILS

TEST EQUIPMENT: Modulation Analyzer
Measuring Receiver
10 dB Pad (Inline)

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to the IFR 4000 Maintenance Manual for corrective action.

STEP PROCEDURE

1. Connect the Modulation Analyzer (RF Input) and 10 dB Pad to the ANT Connector.
2. Set the Modulation Analyzer to AM Measurement.
3. Press the SETUP Key to display the Setup Menu.
4. Set the PORT Field to ***ANT***.

MARKER BEACON

5. Press the MODE Select Key until the ILS Mode Screen is displayed.
6. Set the Test Set as follows:

FIELD	SETTING
FREQ	***108.100 MHz***
RF LVL	***-30.0 dBm***
MOD TONE	***400 Hz (Marker ON)***
M MOD	***CAL***

7. Verify 75 MHz (±75 Hz) and tone frequency of 400 Hz (±0.02%) with <5% distortion and an AM Depth of 95% AM (±5% AM) on the Modulation Analyzer.
8. Set the MOD TONE Field to ***1300 Hz***.
9. Verify 1300 Hz (±0.02%) with <3.75% distortion and an AM Depth of 95% AM (±3.75% AM) on the Modulation Analyzer.
10. Set the MOD TONE Field to ***3000 Hz***.
11. Verify 3000 Hz (±0.02%) with <3.75% distortion and an AM Depth of 95% AM (±3.75% AM) on the Modulation Analyzer.

LOCALIZER

12. Set the Test Set as follows:

FIELD	SETTING
MOD TONE	***1020 Hz***
TONE DEL	***90 & 150***

13. Verify 108.100 MHz (±108.100 Hz) and tone frequency of 1020 Hz (±0.02%) at -10 dBm (±2.5 dB) with <2.5% distortion and an AM Depth of 30% AM (±2% AM) on the Modulation Analyzer.
14. Set the Test Set as follows:

FIELD	SETTING
MOD TONE	***OFF***
TONE DEL	***150***

STEP PROCEDURE

15. Verify 90 Hz (±0.02%) with <2.5% distortion and an AM Depth of 20% AM (±2% AM) on the Modulation Analyzer.

16. Set the TONE DEL Field to ***90***.

17. Verify 150 Hz (±0.02%) with <2.5% distortion and an AM Depth of 20% AM (±2% AM) on the Modulation Analyzer.

18. Set the Modulation Analyzer to DDM.

19. Set the Test Set as follows:

FIELD	SETTING
DEV STEP	***FIXED***
TONE DEL	***OFF***
90/150 Hz	***OFF***

20. Set the LOC DDM Field to the following settings and verify readings on the Modulation Analyzer:

LOC DDM	READING
0.000 CENTER	0.000 (±0.0015 DDM)
0.093 LEFT	0.093 (±0.0015 DDM + ±3% of setting)
0.093 RIGHT	0.093 (±0.0015 DDM + ±3% of setting)
0.155 LEFT	0.155 (±0.0015 DDM + ±3% of setting)
0.155 RIGHT	0.155 (±0.0015 DDM + ±3% of setting)
0.200 LEFT	0.200 (±0.0015 DDM + ±3% of setting)
0.200 RIGHT	0.200 (±0.0015 DDM + ±3% of setting)

21. Set the DEV STEP Field to ***VAR***.

22. Set the LOC DDM Field to the following settings and verify readings on the Modulation Analyzer:

LOC DDM	READING
0.094	0.094 (±0.0025 DDM + ±3% of setting)
0.095	0.095 (±0.0025 DDM + ±3% of setting)
0.096	0.096 (±0.0025 DDM + ±3% of setting)
0.097	0.097 (±0.0025 DDM + ±3% of setting)

23. Set the Test Set as follows:

FIELD	SETTING
DEV STEP	***FIXED***
LOC DDM	***0.000 CENTER***

PHASE ACCURACY

24. Set the 90/150 Hz Field to the following settings and verify readings on the Modulation Analyzer:

90/150 Hz	READING
0	0° (±0.5°)
5	-5° (±0.5°)
10	-10° (±0.5°)
20	-20° (±0.5°)
40	-40° (±0.5°)
80	40° (±0.5°)
120	0° (±0.5°)

25. Set the 90/150 Hz Field to ***0***.

GLIDESLOPE

26. Disconnect the Modulation Analyzer and 10 dB Pad from the ANT Connector and connect the Measuring Receiver to the ANT Connector.
27. Calibrate the Measuring Receiver for 334.700 MHz in Tuned RF Level Mode.
28. Set the RF LVL Field to ***-30 dBm***.
29. Verify -30 dBm (±3 dB) on the Measuring Receiver.
30. Set the RF LVL Field to ***-10 dBm***.
31. Verify -10 dBm (±3 dB) on the Measuring Receiver.
32. Disconnect the Measuring Receiver from the ANT Connector.

(12) COMM AM

TEST EQUIPMENT: Modulation Analyzer

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to the IFR 4000 Maintenance Manual for corrective action.

STEP PROCEDURE

1. Connect the Modulation Analyzer (RF Input) to the ANT Connector.
2. Set the Modulation Analyzer to AM Measurement.
3. Press the SETUP Key to display the Setup Menu.
4. Set the PORT Field to ***ANT***.
5. Press the MODE Select Key until the COMM AM Mode Screen is displayed.
6. Set the Test Set as follows:

FIELD	SETTING
FREQ	***137.000 MHz***
RF LVL	***10.0 dBm***
MOD TONE	***1020 Hz***
M MOD	***CAL***

7. If the COMM AM Mode Screen is in RECEIVING Mode, press the SWITCH GEN/RX Soft Key to switch the COMM AM Mode Screen to GENERATING Mode.
8. Verify 1020 Hz (±0.02%) with <2.5% distortion and an AM Depth of 30% AM (±2% AM) on the Modulation Analyzer.
9. Set the FREQ Field to ***312.000 MHz***.
10. Verify 1020 Hz (±0.02%) with <2.5% distortion and an AM Depth of 30% AM (±2% AM) on the Modulation Analyzer.
11. Disconnect the Modulation Analyzer from the ANT Connector.

(13) COMM FM

TEST EQUIPMENT: Modulation Analyzer

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to the IFR 4000 Maintenance Manual for corrective action.

STEP PROCEDURE

1. Connect the Modulation Analyzer (RF Input) to the ANT Connector.
2. Set the Modulation Analyzer to FM Measurement.
3. Press the SETUP Key to display the Setup Menu.
4. Set the PORT Field to ***ANT***.
5. Press the MODE Select Key until the COMM FM Mode Screen is displayed.
6. Set the Test Set as follows:

FIELD	SETTING
FREQ	***156.000 MHz***
RF LVL	***10.0 dBm***
MOD TONE	***1000 Hz***
M MOD	***CAL***
M DEV	***CAL: 5 kHz***

7. If the COMM FM Mode Screen is in RECEIVING Mode, press the SWITCH GEN/RX Soft Key to switch the COMM FM Mode Screen to GENERATING Mode.
8. Verify 1000 Hz (±0.02%) with <5% distortion and a FM Deviation of 5 kHz (±500 Hz) on the Modulation Analyzer.
9. Disconnect the Modulation Analyzer from the ANT Connector.

(14) SELCOM

TEST EQUIPMENT: Modulation Analyzer

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to the IFR 4000 Maintenance Manual for corrective action.

STEP PROCEDURE

1. Connect the Modulation Analyzer (RF Input) to the ANT Connector.
2. Set the Modulation Analyzer to AM Measurement.
3. Press the SETUP Key to display the Setup Menu.
4. Set the PORT Field to ***ANT***.
5. Press the MODE Select Key until the SELCAL Mode Screen is displayed.
6. Set the Test Set as follows:

FIELD	SETTING
FREQ	***118.000 MHz***
RF LVL	***10.0 dBm***
SELCAL TONE	***AA-AA***
M MOD	***CAL(80%)***
TX MODE	***CONTINUOUS***

7. Press the START Soft Key
8. Verify 312.6 Hz (±0.02%) Audio tone frequency and an AM Depth of 80% AM (±4% AM) on the Modulation Analyzer.
9. Set the SELCAL TONE Field to ***SS-SS***.
10. Verify 1479.1 Hz (±0.02%) Audio tone frequency and an AM Depth of 80% AM (±4% AM) on the Modulation Analyzer.
11. Disconnect the Modulation Analyzer from the ANT Connector.

(15) Frequency Counter

TEST EQUIPMENT: RF Signal Generator
Function Generator

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to the IFR 4000 Maintenance Manual for corrective action.

STEP PROCEDURE

1. Press the SETUP Key to display the Setup Menu.
2. Set the PORT Field to ***ANT***.
3. Press the MODE Select Key until the COMM AM Mode Screen is displayed.
4. If the COMM AM Mode Screen is in GENERATING Mode, press the SWITCH GEN/RX Soft Key to switch the COMM AM Mode Screen to RECEIVING Mode.
5. Connect the RF Signal Generator (Output) to the ANT Connector.
6. Set the RF Signal Generator to -35 dBm.
7. Set the RF Signal Generator to the following settings and verify readings on the Test Set:

FREQUENCY	READING
10 MHz	10 MHz (±10 Hz + ±1 count)
10.001 MHz	10.001 MHz (±10.001 Hz + ±1 count)
100.101 MHz	100.101 MHz (±100.101 Hz + ±1 count)
399.999 MHz	399.999 MHz (±399.999 Hz + ±1 count)

8. Press the SETUP Key to display the Setup Menu.
9. Set the PORT Field to ***RF I/O***.
10. Press the MODE Select Key until the COMM FM Mode Screen is displayed.
11. Disconnect the RF Signal Generator from the ANT Connector and connect the RF Signal Generator (Output) to the RF I/O Connector.
12. Set the RF Signal Generator to 0 dBm.
13. Set the RF Signal Generator to the following settings and verify readings on the Test Set:

FREQUENCY	READING
10 MHz	10 MHz (±10 Hz + ±1 count)
10.001 MHz	10.001 MHz (±10.001 Hz + ±1 count)
100.101 MHz	100.101 MHz (±100.101 Hz + ±1 count)
399.999 MHz	399.999 MHz (±399.999 Hz + ±1 count)

14. Press the MODE Key until the FREQUENCY COUNTER Mode Screen is displayed.
15. Set the RESOLUTION Field to ***1 Hz***.
16. Connect the Function Generator (Output) to the AUX I/O Connector.

STEP PROCEDURE

17. Set the Function Generator as follows:

CONTROL	SETTING
Level	1 Vp-p
Frequency	1 MHz Sinewave
Output Impedance	50 Ω

18. Verify 1 MHz (±1 Hz + ±1 count) on the Test Set.
19. Set Function Generator Frequency to 1.00001 MHz.
20. Verify 1.00001 MHz (±1.00001 Hz + ±1 count) on the Test Set.
21. Set Function Generator Frequency to 3.00000 MHz.
22. Verify 3.00000 MHz (±3.00000 Hz + ±1 count) on the Test Set.
23. Set Function Generator Frequency to 5.10001 MHz.
24. Verify 5.10001 MHz (±5.10001 Hz + ±1 count) on the Test Set.
25. Set Function Generator Frequency to 9.99999 MHz.
26. Verify 9.99999 MHz (±9.99999 Hz + ±1 count) on the Test Set.
27. Disconnect the Function Generator from the AUX I/O Connector.
28. Disconnect the RF Signal Generator from the RF I/O Connector.

(16) AM Meter

TEST EQUIPMENT: RF Signal Generator
Measuring Receiver
Power Sensor

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to the IFR 4000 Maintenance Manual for corrective action.

STEP PROCEDURE

1. Connect the Power Sensor to the RF Signal Generator (Output).
2. Set the RF Signal Generator Frequency to 400 MHz.
3. Set the RF Signal Generator Level and AM Depth as follows and record the AM readings:

LEVEL	AM DEPTH	AM READINGS
-20 dBm	10%	Record as X1
-20 dBm	50%	Record as X2
-20 dBm	90%	Record as X3
-10 dBm	10%	Record as X4
-10 dBm	50%	Record as X5
-10 dBm	90%	Record as X6

4. Press the SETUP Key to display the Setup Menu.
5. Set the PORT Field to ***ANT***.
6. Press the MODE Select Key until the COMM AM Mode Screen is displayed.
7. If the COMM AM Mode Screen is in GENERATING Mode, press the SWITCH GEN/RX Soft Key to switch the COMM AM Mode Screen to RECEIVING Mode.
8. Disconnect the Power Sensor from the RF Signal Generator and connect the RF Signal Generator (Output) to the ANT Connector.
9. Set the RF Signal Generator Level and AM Depth as follows and verify the AM readings:

LEVEL	AM DEPTH	AM READINGS
-20 dBm	10%	(X1 ÷ 1.1) < Reading < (X1 ÷ 0.9)
-20 dBm	50%	(X2 ÷ 1.1) < Reading < (X2 ÷ 0.9)
-20 dBm	90%	(X3 ÷ 1.1) < Reading < (X3 ÷ 0.9)
-10 dBm	10%	(X4 ÷ 1.1) < Reading < (X4 ÷ 0.9)
-10 dBm	50%	(X5 ÷ 1.1) < Reading < (X5 ÷ 0.9)
-10 dBm	90%	(X6 ÷ 1.1) < Reading < (X6 ÷ 0.9)

10. Disconnect the RF Signal Generator from the ANT Connector.

(17) FM Meter

TEST EQUIPMENT: RF Signal Generator
Measuring Receiver
Power Sensor

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to the IFR 4000 Maintenance Manual for corrective action.

STEP PROCEDURE

1. Connect the Power Sensor to the RF Signal Generator (Output).
2. Set the RF Signal Generator as follows:

CONTROL	SETTING
Frequency	165 MHz
Level	-20 dBm

3. Set the RF Signal Generator Tone and FM Deviation as follows and record the FM readings:

TONE	FM DEVIATION	FM READINGS
400 Hz	15 kHz	Record as X1
400 Hz	10 kHz	Record as X2
400 Hz	1 kHz	Record as X3
1000 Hz	15 kHz	Record as X4
1000 Hz	10 kHz	Record as X5
1000 Hz	1 kHz	Record as X6

4. Press the SETUP Key to display the Setup Menu.
5. Set the PORT Field to ***ANT***.
6. Press the MODE Select Key until the COMM FM Mode Screen is displayed.
7. Set the FREQ Field to ***165.000 MHz***.
8. Disconnect the Power Sensor from the RF Signal Generator and connect the RF Signal Generator (Output) to the ANT Connector.
9. Set the RF Signal Generator Tone and FM Deviation as follows and verify the FM readings:

TONE	FM DEVIATION	FM READINGS
400 Hz	15 kHz	[(X1 - 0.4) ÷ 1.08] < Reading < [(X1 + 0.4) ÷ 0.92]
400 Hz	10 kHz	[(X2 - 0.4) ÷ 1.08] < Reading < [(X2 + 0.4) ÷ 0.92]
400 Hz	1 kHz	[(X3 - 0.4) ÷ 1.08] < Reading < [(X3 + 0.4) ÷ 0.92]
1000 Hz	15 kHz	[(X4 - 0.4) ÷ 1.08] < Reading < [(X4 + 0.4) ÷ 0.92]
1000 Hz	10 kHz	[(X5 - 0.4) ÷ 1.08] < Reading < [(X5 + 0.4) ÷ 0.92]
1000 Hz	1 kHz	[(X6 - 0.4) ÷ 1.08] < Reading < [(X6 + 0.4) ÷ 0.92]

10. Press the SETUP Key to display the Setup Menu.
11. Set the PORT Field to ***RF I/O***.
12. Set the RF Signal Generator Level to 0 dBm.

STEP PROCEDURE

13. Disconnect the RF Signal Generator from the ANT Connector and connect the RF Signal Generator (Output) to the RF I/O Connector.

14. Set the RF Signal Generator Tone and FM Deviation as follows and verify the FM readings:

TONE	FM DEVIATION	FM READINGS
1000 Hz	15 kHz	[(X4 - 0.4) ÷ 1.08] < Reading < [(X4 + 0.4) ÷ 0.92]
1000 Hz	10 kHz	[(X5 - 0.4) ÷ 1.08] < Reading < [(X5 + 0.4) ÷ 0.92]
1000 Hz	1 kHz	[(X6 - 0.4) ÷ 1.08] < Reading < [(X6 + 0.4) ÷ 0.92]

15. Disconnect the RF Signal Generator from the RF I/O Connector.

(18) SWR Meter

TEST EQUIPMENT: 50 Ω Load
75 Ω Load
100 Ω Load
150 Ω Load

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to the IFR 4000 Maintenance Manual for corrective action.

STEP PROCEDURE

1. Press the SETUP Key to display the Setup Menu.
2. Set the GEN FREQ Field to ***VAR***.
3. Press the MODE Select Key until the SWR Mode Screen is displayed.
4. Connect the 50 Ω Load to the SWR Connector.
5. Set the FREQ Field as follows and verify readings on the Test Set:

FREQ	READINGS
75	1.000 (±0.2 + ±20% of reading)
137	1.000 (±0.2 + ±20% of reading)
225	1.000 (±0.2 + ±20% of reading)
312	1.000 (±0.2 + ±20% of reading)
400	1.000 (±0.2 + ±20% of reading)

6. Disconnect the 50 Ω Load from the SWR Connector and connect the 75 Ω Load to the SWR Connector.
7. Set the FREQ Field as follows and verify readings on the Test Set:

FREQ	READINGS
75	1.500 (±0.2 + ±20% of reading)
137	1.500 (±0.2 + ±20% of reading)
225	1.500 (±0.2 + ±20% of reading)
312	1.500 (±0.2 + ±20% of reading)
400	1.500 (±0.2 + ±20% of reading)

8. Disconnect the 75 Ω Load from the SWR Connector and connect the 100 Ω Load to the SWR Connector.
9. Set the FREQ Field as follows and verify readings on the Test Set:

FREQ	READINGS
75	2.000 (±0.2 + ±20% of reading)
137	2.000 (±0.2 + ±20% of reading)
225	2.000 (±0.2 + ±20% of reading)
312	2.000 (±0.2 + ±20% of reading)
400	2.000 (±0.2 + ±20% of reading)

10. Disconnect the 100 Ω Load from the SWR Connector and connect the 150 Ω Load to the SWR Connector.

STEP PROCEDURE

11. Set the FREQ Field as follows and verify readings on the Test Set:

FREQ	READINGS
75	3.000 (±0.3 + ±20% of reading)
137	3.000 (±0.3 + ±20% of reading)
225	3.000 (±0.3 + ±20% of reading)
312	3.000 (±0.3 + ±20% of reading)
400	3.000 (±0.3 + ±20% of reading)

12. Disconnect the 150 Ω Load from the SWR Connector.

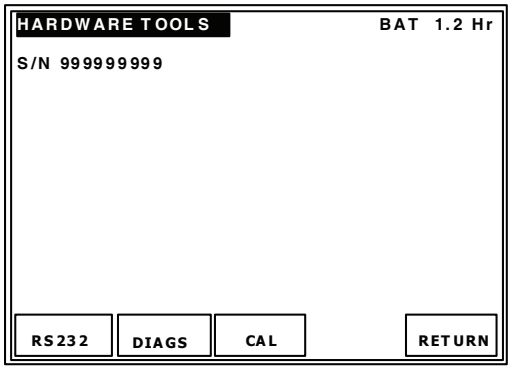
(19) Power Meter

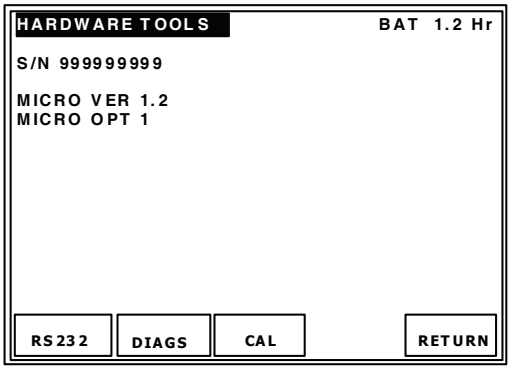
TEST EQUIPMENT:

RF Signal Generator
RF Power Amplifier
Power Meter
Directional Coupler
3 dB Attenuator
20 dB Attenuator
15 MHz Low-Pass Filter
45 MHz Low-Pass Filter
150 MHz Low-Pass Filter
450 MHz Low-Pass Filter

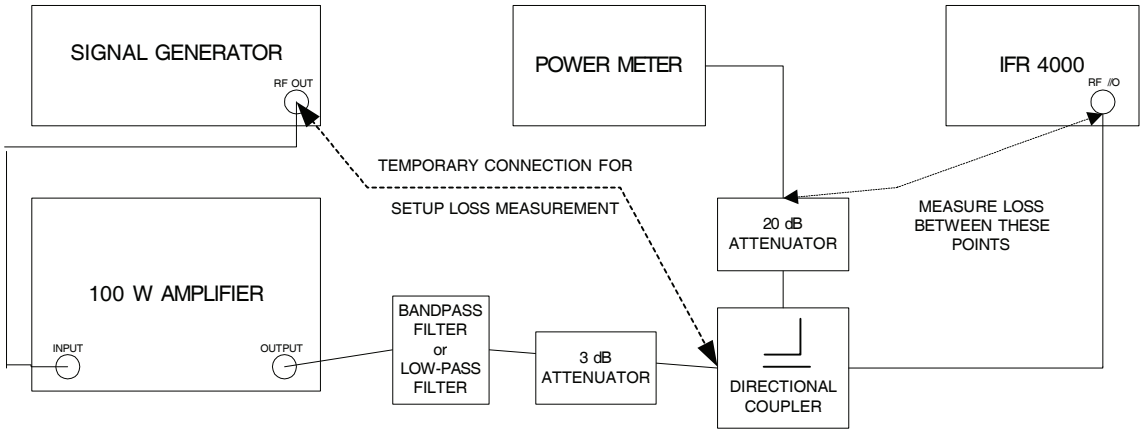
VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to the IFR 4000 Maintenance Manual for corrective action.

1. Press the SETUP Key to display the Setup Menu.
2. Set the PORT Field to ***RF I/O***.
3. Press the H/W TOOLS Soft Key to display the Hardware Tools Screen:





4. If "MICRO VER 1.2 and MICRO OPT 1" are displayed on the Hardware Tools Screen, perform Steps 26 through 47; otherwise, perform Steps 6 through 25.
5. Press the RETURN Soft Key to display the Setup Menu.
6. Connect test equipment as shown.



STEP PROCEDURE

7. Characterize and record the offset of the Power Meter Setup:
   - Measure the loss (at 10, 30, 100 and 300 MHz) between the Signal Generator and the 20 dB attenuator on the coupled port of the directional coupler. Record as A.
   - Measure the loss (at 10, 30, 100 and 300 MHz) between the Signal Generator and the end of the coaxial cable going to the RF I/O Connector. Record as B.
   - Calculate the offset at each frequency by subtracting Loss (B) from Loss (A) and record.
8. Press the SETUP Key to display the Setup Menu.
9. Set the PORT Field to ***RF I/O***.
10. Press the MODE Select Key until the COMM AM Mode Screen is displayed.
11. If the COMM AM Mode Screen is in GENERATING Mode, press the SWITCH GEN/RX Soft Key to switch the COMM AM Mode Screen to RECEIVING Mode.
12. Connect the 15 MHz Low-Pass filter into the test setup.
13. Set the Power Meter to measure Watts and the frequency to 10 MHz.
14. Set the Power Meter offset for 10 MHz calculated in Step 7.
15. Set the RF Signal Generator Frequency to 10 MHz and the RF Power Amplifier Level to the following settings and verify the readings on the Test Set:

    CAUTION: USE CAUTION WHEN PERFORMING THE >10 W TESTS AS THE TEST SET IS NOT RATED FOR CONTINUOUS INPUT AT THESE LEVELS. COMPLETE THESE STEPS AS QUICKLY AS POSSIBLE, AND REDUCE THE INPUT POWER AS SOON AS POSSIBLE. (INPUT POWER MAY NEED TO BE REDUCED BETWEEN HIGHER LEVEL SETTINGS TO ALLOW THE POWER TERMINATION TO COOL.)

FREQUENCY	POWER	READING
10 MHz	0.1 W	0.1 W (±12% of reading + ±1 count)
10 MHz	1.0 W	1.0 W (±12% of reading + ±1 count)
10 MHz	5.0 W	5.0 W (±12% of reading + ±1 count)
10 MHz	10.0 W	10.0 W (±12% of reading + ±1 count)
10 MHz	20.0 W	20.0 W (±12% of reading + ±1 count)
10 MHz	25.0 W	25.0 W (±12% of reading + ±1 count)

16. Remove the 15 MHz Low-Pass filter and connect the 45 MHz Low-Pass filter into the test setup.
17. Set the Power Meter frequency to 30 MHz and the offset to 30 MHz (calculated in Step 7) into the Power Meter.

STEP PROCEDURE

18. Set the RF Signal Generator Frequency to 30 MHz and the RF Power Amplifier Level to the following settings and verify the readings on the Test Set:

FREQUENCY	POWER	READING
30 MHz	0.1 W	0.1 W (±12% of reading + ±1 count)
30 MHz	1.0 W	1.0 W (±12% of reading + ±1 count)
30 MHz	5.0 W	5.0 W (±12% of reading + ±1 count)
30 MHz	10.0 W	10.0 W (±12% of reading + ±1 count)
30 MHz	20.0 W	20.0 W (±12% of reading + ±1 count)
30 MHz	25.0 W	25.0 W (±12% of reading + ±1 count)

19. Remove the 45 MHz Low-Pass filter and connect the 150 MHz Low-Pass filter into the test setup.

20. Set the Power Meter frequency to 100 MHz and the offset to 100 MHz (calculated in Step 7) into the Power Meter.

21. Set the RF Signal Generator Frequency to 100 MHz and the RF Power Amplifier Level to the following settings and verify the readings on the Test Set:

FREQUENCY	POWER	READING
100 MHz	0.1 W	0.1 W (±8% of reading + ±1 count)
100 MHz	1.0 W	1.0 W (±8% of reading + ±1 count)
100 MHz	5.0 W	5.0 W (±8% of reading + ±1 count)
100 MHz	10.0 W	10.0 W (±8% of reading + ±1 count)
100 MHz	20.0 W	20.0 W (±8% of reading + ±1 count)
100 MHz	25.0 W	25.0 W (±8% of reading + ±1 count)

22. Remove the 150 MHz Low-Pass filter and connect the 450 MHz Low-Pass filter into the test setup.

23. Set the Power Meter frequency to 300 MHz and the offset to 300 MHz (calculated in Step 7) into the Power Meter.

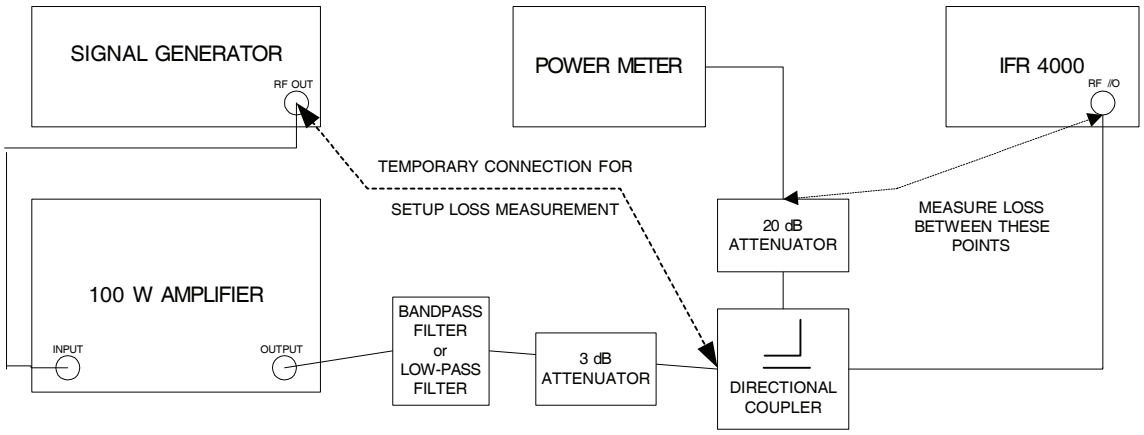
24. Set the RF Signal Generator Frequency to 300 MHz and the RF Power Amplifier Level to the following settings and verify the readings on the Test Set:

FREQUENCY	POWER	READING
300 MHz	0.1 W	0.1 W (±8% of reading + ±1 count)
300 MHz	1.0 W	1.0 W (±8% of reading + ±1 count)
300 MHz	5.0 W	5.0 W (±8% of reading + ±1 count)
300 MHz	10.0 W	10.0 W (±8% of reading + ±1 count)
300 MHz	20.0 W	20.0 W (±8% of reading + ±1 count)
300 MHz	25.0 W	25.0 W (±8% of reading + ±1 count)

25. Disconnect the RF Signal Generator and the RF Power Amplifier from the RF I/O Connector. Procedure is completed.

STEP PROCEDURE

26. Connect test equipment as shown.



27. Characterize and record the offset of the Power Meter Setup:
    - Measure the loss (at 10, 30, 100, 300 and 400 MHz) between the Signal Generator and the 20 dB attenuator on the coupled port of the directional coupler. Record as A.
    - Measure the loss (at 10, 30, 100, 300 and 400 MHz) between the Signal Generator and the end of the coaxial cable going to the RF I/O Connector. Record as B.
    - Calculate the offset at each frequency by subtracting Loss (B) from Loss (A) and record.
28. Press the SETUP Key to display the Setup Menu.
29. Set the PORT Field to ***RF I/O***.
30. Press the MODE Select Key until the COMM AM Mode Screen is displayed.
31. If the COMM AM Mode Screen is in GENERATING Mode, press the SWITCH GEN/RX Soft Key to switch the COMM AM Mode Screen to RECEIVING Mode.
32. Connect the 15 MHz Low-Pass filter into the test setup.
33. Set the Power Meter to measure Watts and the frequency to 10 MHz.
34. Set the Power Meter offset for 10 MHz calculated in Step 26.

STEP PROCEDURE

35. Set the RF Signal Generator Frequency to 10 MHz and the RF Power Amplifier Level to the following settings and verify the readings on the Test Set:

    CAUTION: USE CAUTION WHEN PERFORMING THE >10 W TESTS AS THE TEST SET IS NOT RATED FOR CONTINUOUS INPUT AT THESE LEVELS. COMPLETE THESE STEPS AS QUICKLY AS POSSIBLE, AND REDUCE THE INPUT POWER AS SOON AS POSSIBLE. (INPUT POWER MAY NEED TO BE REDUCED BETWEEN HIGHER LEVEL SETTINGS TO ALLOW THE POWER TERMINATION TO COOL.)

FREQUENCY	POWER	READING
10 MHz	0.1 W	0.1 W (±12% of reading + ±1 count)
10 MHz	1.0 W	1.0 W (±12% of reading + ±1 count)
10 MHz	5.0 W	5.0 W (±12% of reading + ±1 count)
10 MHz	10.0 W	10.0 W (±12% of reading + ±1 count)
10 MHz	20.0 W	20.0 W (±12% of reading + ±1 count)
10 MHz	25.0 W	25.0 W (±12% of reading + ±1 count)

36. Remove the 15 MHz Low-Pass filter and connect the 45 MHz Low-Pass filter into the test setup.

37. Set the Power Meter frequency to 30 MHz and the offset to 30 MHz (calculated in Step 26) into the Power Meter.

38. Set the RF Signal Generator Frequency to 30 MHz and the RF Power Amplifier Level to the following settings and verify the readings on the Test Set:

FREQUENCY	POWER	READING
30 MHz	0.1 W	0.1 W (±12% of reading + ±1 count)
30 MHz	1.0 W	1.0 W (±12% of reading + ±1 count)
30 MHz	5.0 W	5.0 W (±12% of reading + ±1 count)
30 MHz	10.0 W	10.0 W (±12% of reading + ±1 count)
30 MHz	20.0 W	20.0 W (±12% of reading + ±1 count)
30 MHz	25.0 W	25.0 W (±12% of reading + ±1 count)

39. Remove the 45 MHz Low-Pass filter and connect the 150 MHz Low-Pass filter into the test setup.

40. Set the Power Meter frequency to 100 MHz and the offset to 100 MHz (calculated in Step 26) into the Power Meter.

41. Set the RF Signal Generator Frequency to 100 MHz and the RF Power Amplifier Level to the following settings and verify the readings on the Test Set:

FREQUENCY	POWER	READING
100 MHz	0.1 W	0.1 W (±8% of reading + ±1 count)
100 MHz	1.0 W	1.0 W (±8% of reading + ±1 count)
100 MHz	5.0 W	5.0 W (±8% of reading + ±1 count)
100 MHz	10.0 W	10.0 W (±8% of reading + ±1 count)
100 MHz	20.0 W	20.0 W (±8% of reading + ±1 count)
100 MHz	25.0 W	25.0 W (±8% of reading + ±1 count)

42. Remove the 150 MHz Low-Pass filter and connect the 450 MHz Low-Pass filter into the test setup.

STEP PROCEDURE

43. Set the Power Meter frequency to 300 MHz and the offset to 300 MHz (calculated in Step 26) into the Power Meter.

44. Set the RF Signal Generator Frequency to 300 MHz and the RF Power Amplifier Level to the following settings and verify the readings on the Test Set:

FREQUENCY	POWER	READING
300 MHz	0.1 W	0.1 W (±8% of reading + ±1 count)
300 MHz	1.0 W	1.0 W (±8% of reading + ±1 count)
300 MHz	5.0 W	5.0 W (±8% of reading + ±1 count)
300 MHz	10.0 W	10.0 W (±8% of reading + ±1 count)
300 MHz	20.0 W	20.0 W (±8% of reading + ±1 count)
300 MHz	25.0 W	25.0 W (±8% of reading + ±1 count)

45. Set the Power Meter frequency to 400 MHz and the offset to 400 MHz (calculated in Step 26) into the Power Meter.

46. Set the RF Signal Generator Frequency to 400 MHz and the RF Power Amplifier Level to the following settings and verify the readings on the Test Set:

FREQUENCY	POWER	READING
400 MHz	0.1 W	0.1 W (±8% of reading + ±1 count)
400 MHz	1.0 W	1.0 W (±8% of reading + ±1 count)
400 MHz	5.0 W	5.0 W (±8% of reading + ±1 count)
400 MHz	10.0 W	10.0 W (±8% of reading + ±1 count)
400 MHz	20.0 W	20.0 W (±8% of reading + ±1 count)
400 MHz	25.0 W	25.0 W (±8% of reading + ±1 count)

47. Disconnect the RF Signal Generator and the RF Power Amplifier from the RF I/O Connector.

(20) AM Audio – AUX Connector

TEST EQUIPMENT: RF Signal Generator
Audio Analyzer

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to the IFR 4000 Maintenance Manual for corrective action.

STEP PROCEDURE

1. Press the SETUP Key to display the Setup Menu.
2. Set the Test Set as follows:

FIELD	SETTING
PORT	***ANT***
AUDIO	***ON***

3. Press the MODE Select Key until the COMM AM Mode Screen is displayed.
4. Set the FREQ Field to ***156.000 MHz***.
5. If the COMM AM Mode Screen is in GENERATING Mode, press the SWITCH GEN/RX Soft Key to switch the COMM AM Mode Screen to RECEIVING Mode.
6. Connect the RF Signal Generator (Output) to the ANT Connector.
7. Set the RF Signal Generator as follows:

CONTROL	SETTING
Frequency	156 MHz
Level	0 dBm
Modulation	AM
% Modulation	80%
Modulation Rate	1 kHz

8. Connect the Audio Analyzer (High Z Input) to the AUX I/O Connector.
9. Verify the signal level is >0.75 Vrms.
10. Disconnect the Audio Analyzer from the AUX I/O Connector.
11. Disconnect the RF Signal Generator from the ANT Connector.

(21) 121.5/243.0 MHz Beacon

TEST EQUIPMENT: RF Signal Generator
Arbitrary Waveform Generator

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to the IFR 4000 Maintenance Manual for corrective action.

STEP PROCEDURE

1. Press the SETUP Key to display the Setup Menu.
2. Set the PORT Field to ***ANT***.
3. Press the MODE Select Key until the 121.5/243.0 Beacon Mode Screen is displayed.
4. Set the FREQ Field to **121*.500 MHz***.
5. Set the Arbitrary Waveform Generator as follows:

CONTROL	SETTING
Output Z	Max (10 kΩ)
Function Shape	Square Wave
Hi Voltage	5 V
Low Voltage	0 V
Duty Cycle	33%
Sweep State	On
Start Frequency	1600 Hz
Stop Frequency	300 Hz
Sweep Time	33.3 ms
Sweep Type	Linear

6. Connect the ARB output to the RF Signal Generator pulse input. Enable ARB Output.
7. Connect the RF Signal Generator (Output) to the ANT Connector.
8. Set the RF Signal Generator as follows:

CONTROL	SETTING
Frequency	121.5 MHz
Level	-30 dBm
Modulation	Pulse

9. Verify the Test Set displays the following:

Frequency:	121.5 MHz (±121 Hz)
AM Depth:	>95%
Beacon Start Frequency:	1600 Hz (±128 Hz)
Beacon Stop Frequency:	300 Hz (±24 Hz)

10. Set the RF Signal Generator Frequency to 243.0 MHz.
11. Set the UUT FREQ Field to **243*.000 MHz***..
12. Verify the Test Set displays the following:

Frequency:	243.0 MHz (±243 Hz)
AM Depth:	>95%
Beacon Start Frequency:	1600 Hz (±128 Hz)
Beacon Stop Frequency:	300 Hz (±24 Hz)

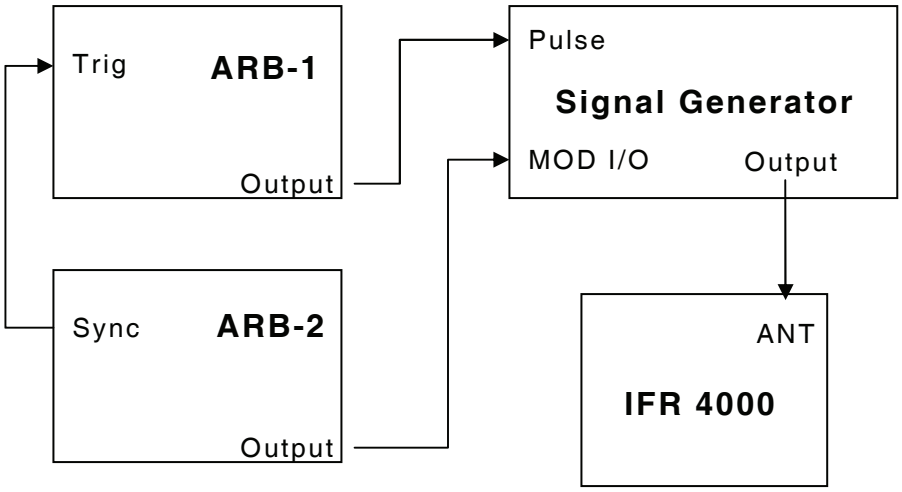
(22) 406 MHz Beacon

TEST EQUIPMENT: RF Signal Generator
Arbitrary Waveform Generator (2)
PC with Intuilink Software

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to the IFR 4000 Maintenance Manual for corrective action.

STEP PROCEDURE

1. Connect test equipment as shown:



2. Set Arbitrary Waveform Generator 1 (ARB-1) as follows:

CONTROL	SETTING
Function	Pulse
Period	5 Sec.
Hi Level	5.0 V
LO Level	0.0 V
Width	521 ms
Output Load	High Z
Burst	ON
Burst Mode	Gated
Output	Enabled

3 Load Arbitrary Waveform Generator 2 (ARB-2) with Waveform (waveform.csv) from IFR 4000 Maintenance Manual CD using Intuilink Software.

4. Set Arbitrary Waveform Generator 2 (ARB-2) as follows:

CONTROL	SETTING
Function	Arb
Frequency	1 Hz.
Hi Level	+1.0 V
LO Level	-1.0 V
Output Load	High Z
Sync	ON
Output	Enabled

STEP PROCEDURE

5. Set the RF Signal Generator as follows:

CONTROL	SETTING
Frequency	406.025 MHz.
Level	-30 dBm
Modulation Modes	Phase, Pulse
Modulation Coupling	AC
Phase Mod Deviation	2.2 Radian
Pulse Modulation	ON
Modulation	Enabled

6. Press the SETUP Key to display the Setup Menu.
7. Set the PORT Field to ***ANT***.
8. Press the MODE Select Key until the 406 BCN Mode Screen is displayed
9. Verify the following decoded beacon message:

DDD6AF7252000C8C236CA570017151

(23) SSB Receive

TEST EQUIPMENT: RF Signal Generator

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to the IFR 4000 Maintenance Manual for corrective action.

STEP PROCEDURE

1. Press the SETUP Key to display the Setup Menu.
2. Set the PORT Field to ***ANT***.
3. Press the MODE Select Key until the COMM SSB Mode Screen is displayed.
4. If the COMM SSB Mode Screen is in GENERATING Mode, press the SWITCH GEN/RX Soft Key to switch the COMM SSB Mode Screen to RECEIVING Mode.
5. Connect the RF Signal Generator (Output) to the ANT Connector.
6. Set the RF Signal Generator as follows:

CONTROL	SETTING
Frequency	25.001 MHz
Level	-10 dBm

7. Set the FREQ Field to ***25.000 MHz***.
8. Verify the AUDIO FREQ reading is 1000 Hz (±100 Hz).
9. Set the RF Signal Generator Frequency to 24.999 MHz.
10. Verify the AUDIO FREQ reading is 1000 Hz (±100 Hz).

(24) SSB Transmit

TEST EQUIPMENT: Frequency Counter

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to the IFR 4000 Maintenance Manual for corrective action.

STEP PROCEDURE

1. Press the SETUP Key to display the Setup Menu.
2. Set the PORT Field to ***ANT***.
3. Press the MODE Select Key until the COMM SSB Mode Screen is displayed.
4. If the COMM SSB Mode Screen is in RECEIVING Mode, press the SWITCH GEN/RX Soft Key to switch the COMM SSB Mode Screen to GENERATING Mode.
5. Connect the Frequency Counter (Input) to the ANT Connector.
6. Set the Test Set as follows:

FIELD	SETTING
FREQ	***20.000 MHz***
RF LVL	***-17.0 dBm***
SIDE BAND	***UPPER***
M TONE	***1000 Hz***

7. Verify 20.001 MHz (±6.5 Hz) on the Frequency Counter.
8. Set the SIDE BAND Field to ***LOWER***.
9. Verify 19.999 MHz (±6.5 Hz) on the Frequency Counter.

E. Verification Data Sheet

Test Set S/N: _____ DATE: _____

TECHNICIAN: _____

STEP	DATA	RESULT
(1) Self Test		
7.	Verify all tests pass	_____ (✓)
(2) RF Accuracy		
7.	Verify 108.0 MHz (±108 Hz)	_____
10.	Verify 108.1 MHz (±108.1 Hz)	_____
13.	Verify 334.7 MHz (±334.7 Hz)	_____
16.	Verify 75.0 MHz (±75 Hz)	_____
20.	Verify 118.0 MHz (±118 Hz)	_____
22.	Verify 137.0 MHz (±137 Hz)	_____
24.	Verify 225.0 MHz (±225 Hz)	_____
26.	Verify 312.0 MHz (±312 Hz)	_____
28.	Verify 400.0 MHz (±400 Hz)	_____
33.	Verify 118.001 MHz (±118.001 Hz)	_____
35.	Verify 118.002 MHz (±118.002 Hz)	_____
37.	Verify 118.003 MHz (±118.003 Hz)	_____
39.	Verify 118.004 MHz (±118.004 Hz)	_____
41.	Verify 10.000 MHz (±10 Hz)	_____
43.	Verify 30.000 MHz (±30 Hz)	_____

STEP	DATA	RESULT

(3) RF Level Accuracy (ANT Connector)

8.	Verify -30 dBm (±3 dB) at 10.000 MHz	_____
10.	Verify -30 dBm (±3 dB) at 30.000 MHz	_____
13.	Verify -16 dBm (±3 dB) at 75.000 MHz	_____
15.	Verify -30 dBm (±3 dB) at 75.000 MHz	_____
18.	Verify -16 dBm (±3 dB) at 108.000 MHz	_____
20.	Verify -30 dBm (±3 dB) at 108.000 MHz	_____
23.	Verify -16 dBm (±3 dB) at 108.100 MHz	_____
25.	Verify -30 dBm (±3 dB) at 108.100 MHz	_____
28.	Verify -16 dBm (±3 dB) at 118.000 MHz	_____
30.	Verify -30 dBm (±3 dB) at 118.000 MHz	_____
33.	Verify -16 dBm (±3 dB) at 137.000 MHz	_____
35.	Verify -30 dBm (±3 dB) at 137.000 MHz	_____
38.	Verify -16 dBm (±3 dB) at 175.000 MHz	_____
40.	Verify -30 dBm (±3 dB) at 175.000 MHz	_____
43.	Verify -16 dBm (±3 dB) at 225.000 MHz	_____
45.	Verify -30 dBm (±3 dB) at 225.000 MHz	_____
48.	Verify -16 dBm (±3 dB) at 334.700 MHz	_____
50.	Verify -30 dBm (±3 dB) at 334.700 MHz	_____
53.	Verify -16 dBm (±3 dB) at 400.000 MHz	_____
55.	Verify -30 dBm (±3 dB) at 400.000 MHz	_____
57.	Verify levels:	
	-57 dBm -57 dBm (±3 dB) at 118.000 MHz	_____
	-47 dBm -47 dBm (±3 dB) at 118.000 MHz	_____
	-37 dBm -37 dBm (±3 dB) at 118.000 MHz	_____
	-27 dBm -27 dBm (±3 dB) at 118.000 MHz	_____
	-17 dBm -17 dBm (±3 dB) at 118.000 MHz	_____
	-7 dBm -7 dBm (±3 dB) at 118.000 MHz	_____
	+3 dBm +3 dBm (±3 dB) at 118.000 MHz	_____
	+13 dBm +13 dBm (±3 dB) at 118.000 MHz	_____
61.	Verify -67 dBm (±3 dB) at 118.000 MHz	_____

STEP	DATA	RESULT
(4)	**RF Level Accuracy (RF I/O Connector)**	
8.	Verify -50 dBm (±2 dB) at 10.000 MHz	_____
10.	Verify -50 dBm (±2 dB) at 30.000 MHz	_____
13.	Verify -39 dBm (±2.5 dB) at 75.000 MHz	_____
15.	Verify -50 dBm (±2 dB) at 75.000 MHz	_____
18.	Verify -39 dBm (±2.5 dB) at 108.000 MHz	_____
20.	Verify -50 dBm (±2 dB) at 108.000 MHz	_____
23.	Verify -39 dBm (±2.5 dB) at 108.100 MHz	_____
25.	Verify -50 dBm (±2 dB) at 108.100 MHz	_____
28.	Verify -39 dBm (±2.5 dB) at 118.000 MHz	_____
30.	Verify -50 dBm (±2 dB) at 118.000 MHz	_____
33.	Verify -39 dBm (±2.5 dB) at 137.000 MHz	_____
35.	Verify -50 dBm (±2 dB) at 137.000 MHz	_____
38.	Verify -39 dBm (±2.5 dB) at 175.000 MHz	_____
40.	Verify -50 dBm (±2 dB) at 175.000 MHz	_____
43.	Verify -39 dBm (±2.5 dB) at 225.000 MHz	_____
45.	Verify -50 dBm (±2 dB) at 225.000 MHz	_____
48.	Verify -39 dBm (±2.5 dB) at 334.700 MHz	_____
50.	Verify -50 dBm (±2 dB) at 334.700 MHz	_____
53.	Verify -39 dBm (±2.5 dB) at 400.000 MHz	_____
55.	Verify -50 dBm (±2 dB) at 400.000 MHz	_____
59.	Verify levels:	
	-12 dBm -12 dBm (±2.5 dB)	_____
	-22 dBm -22 dBm (±2.5 dB)	_____
	-32 dBm -32 dBm (±2.5 dB)	_____
	-42 dBm -42 dBm (±2 dB)	_____
	-52 dBm -52 dBm (±2 dB)	_____
	-62 dBm -62 dBm (±2 dB)	_____
	-72 dBm -72 dBm (±2 dB)	_____
	-82 dBm -82 dBm (±2 dB)	_____
	-92 dBm -92 dBm (±2 dB)	_____
	-102 dBm -102 dBm (±3 dB)	_____
	-112 dBm -112 dBm (±3 dB)	_____
	-120 dBm -120 dBm (±3 dB)	_____

STEP	DATA	RESULT

(4) RF Level Accuracy (RF I/O Connector) (cont)

62. Verify levels:

-12 dBm	-12 dBm (±2.5 dB)	_____
-22 dBm	-22 dBm (±2.5 dB)	_____
-32 dBm	-32 dBm (±2.5 dB)	_____
-42 dBm	-42 dBm (±2 dB)	_____
-52 dBm	-52 dBm (±2 dB)	_____
-62 dBm	-62 dBm (±2 dB)	_____
-72 dBm	-72 dBm (±2 dB)	_____
-82 dBm	-82 dBm (±2 dB)	_____
-92 dBm	-92 dBm (±2 dB)	_____
-102 dBm	-102 dBm (±3 dB)	_____
-112 dBm	-112 dBm (±3 dB)	_____
-120 dBm	-120 dBm (±3 dB)	_____

STEP	DATA	RESULT
(5) Harmonic and Spurious		
6. Verify:		
Harmonic is <-20 dBc		_____
Spurious is <-35 dBc		_____
9. Verify:		
Harmonic is <-20 dBc		_____
Spurious is <-35 dBc		_____
12. Verify:		
Harmonic is <-20 dBc		_____
Spurious is <-35 dBc		_____
16. Verify:		
Harmonic is <-20 dBc		_____
Spurious is <-35 dBc		_____
18. Verify:		
Harmonic is <-20 dBc		_____
Spurious is <-35 dBc		_____
23. Verify:		
Spurious is <-32 dBc		_____
25. Verify:		
Spurious is <-32 dBc		_____

STEP	DATA	RESULT

(6) VSWR (RF I/O and SWR Connectors)

RF I/O CONNECTOR

3. Record levels (Reference):

75 MHz		_____
225 MHz		_____
400 MHz		_____

5. Record levels:

75 MHz		_____
225 MHz		_____
400 MHz		_____

6. Calculate return loss for Steps 3 and 5 and record. _____

10 MHz		_____
30 MHz		_____
75 MHz		_____
225 MHz		_____
400 MHz		_____

7. Verify VSWR:

75 MHz	<1.3	_____
225 MHz	<1.3	_____
400 MHz	<1.35	_____

SWR CONNECTOR

10. Record levels:

75 MHz		_____
225 MHz		_____
400 MHz		_____

11. Calculate return loss for Steps 3 and 10 and record. _____

10 MHz		_____
30 MHz		_____
75 MHz		_____
225 MHz		_____
400 MHz		_____

12. Verify VSWR:

75 MHz	<1.3	_____
225 MHz	<1.3	_____
400 MHz	<1.35	_____

STEP	DATA	RESULT

(7) Marker Beacon

7. Verify 400 Hz (±0.02%) with <2.5% distortion and AM Depth of 95% AM (±5% AM) _____

9. Verify 1300 Hz (±0.02%) with <2.5% distortion and AM Depth of 95% AM (±5% AM) _____

11. Verify 3000 MHz (±0.02%) with <2.5% distortion and AM Depth of 95% AM (±5% AM) _____

(8) VOR

MODULATION FREQUENCY, DISTORTION AND DEPTH ACCURACY

7. Verify 1020 Hz (±0.02%) with <2.0% distortion and AM Depth of 30% AM (±2% AM) _____

9. Verify 30 Hz (±0.02%) with <2.0% distortion and AM Depth of 30% AM (±1% AM) _____

11. Verify 9960 Hz (±0.02%) with <2.0% distortion and AM Depth of 30% AM (±1% AM) _____

13. Verify AM Depth of 60% AM (±2% AM) _____

FM DEVIATION ACCURACY

15. Verify 480 Hz (±25 Hz) _____

BEARING ACCURACY

21. Verify readings:

30	210° (±0.1°)	_____
90	270° (±0.1°)	_____
150	330° (±0.1°)	_____
210	30° (±0.1°)	_____
270	90° (±0.1°)	_____
330	150° (±0.1°)	_____

23. Verify readings:

30	30° (±0.1°)	_____
90	90° (±0.1°)	_____
150	150° (±0.1°)	_____
210	210° (±0.1°)	_____
270	270° (±0.1°)	_____
330	330° (±0.1°)	_____

27. Verify readings:

1	1° (±0.1°)	_____
2	2° (±0.1°)	_____
10.1	10.1° (±0.1°)	_____
10.2	10.2° (±0.1°)	_____

STEP	DATA	RESULT

(9) Localizer

MODULATION FREQUENCY, DISTORTION AND DEPTH ACCURACY

7. Verify 1020 Hz (±0.02%) with <2.5% distortion and AM Depth of 30% AM (±2% AM) _____

9. Verify 90 Hz (±0.02%) with <2.5% distortion and AM Depth of 20% AM (±2% AM) _____

11. Verify 150 Hz (±0.02%) with <2.5% distortion and AM Depth of 20% AM (±2% AM) _____

DDM ACCURACY

14. Verify readings:

0.000 CENTER	0.000 (±0.0015 DDM	_____
0.093 LEFT	0.093 (±0.0015 DDM + ±3% of setting)	_____
0.093 RIGHT	0.093 (±0.0015 DDM + ±3% of setting)	_____
0.155 LEFT	0.155 (±0.0015 DDM + ±3% of setting)	_____
0.155 RIGHT	0.155 (±0.0015 DDM + ±3% of setting)	_____
0.200 LEFT	0.200 (±0.0015 DDM + ±3% of setting)	_____
0.200 RIGHT	0.200 (±0.0015 DDM + ±3% of setting)	_____

16. Verify readings:

0.094	0.094 (±0.0025 DDM + ±3% of setting)	_____
0.095	0.095 (±0.0025 DDM + ±3% of setting)	_____
0.096	0.096 (±0.0025 DDM + ±3% of setting)	_____
0.097	0.097 (±0.0025 DDM + ±3% of setting)	_____

PHASE ACCURACY

18. Verify readings:

0	0° (±0.5°)	_____
5	-5° (±0.5°)	_____
10	-10° (±0.5°)	_____
20	-20° (±0.5°)	_____
40	-40° (±0.5°)	_____
80	40° (±0.5°)	_____
120	0° (±0.5°)	_____

STEP	DATA	RESULT

(10) Glideslope

MODULATION FREQUENCY, DISTORTION AND DEPTH ACCURACY

7. Verify 90 Hz (±0.02%) with <2.5% distortion and AM Depth of 40% AM (±2% AM) _____

9. Verify 150 Hz (±0.02%) with <2.5% distortion and AM Depth of 40% AM (±2% AM) _____

DDM ACCURACY

12. Verify readings:

0.000 CENTER	0.000 (±0.003 DDM	_____
0.091 UP	0.091 (±0.003 DDM + ±3% of setting)	_____
0.091 DOWN	0.091 (±0.003 DDM + ±3% of setting)	_____
0.175 UP	0.175 (±0.003 DDM + ±3% of setting)	_____
0.175 DOWN	0.175 (±0.003 DDM + ±3% of setting)	_____
0.400 UP	0.400 (±0.003 DDM + ±3% of setting)	_____
0.400 DOWN	0.400 (±0.003 DDM + ±3% of setting)	_____

14. Verify readings:

0.176	0.176 (±0.0048 DDM + ±3% of setting)	_____
0.177	0.177 (±0.0048 DDM + ±3% of setting)	_____
0.178	0.178 (±0.0048 DDM + ±3% of setting)	_____
0.179	0.179 (±0.0048 DDM + ±3% of setting)	_____

PHASE ACCURACY

16. Verify readings:

0	0° (±0.5°)	_____
5	-5° (±0.5°)	_____
10	-10° (±0.5°)	_____
20	-20° (±0.5°)	_____
40	-40° (±0.5°)	_____
80	40° (±0.5°)	_____
120	0° (±0.5°)	_____

STEP	DATA	RESULT

(11) ILS

MARKER BEACON

7. Verify 75 MHz (±75 Hz) and tone frequency of 400 Hz (±0.02%) with <5% distortion and AM Depth of 95% AM (±5% AM) _____

9. Verify 1300 Hz (±0.02%) with <3.75% distortion and AM Depth of 95% AM (±3.75% AM) _____

11. Verify 3000 Hz (±0.02%) with <3.75% distortion and AM Depth of 95% AM (±3.75% AM) _____

LOCALIZER

13. Verify 108.100 MHz (±108.001 Hz) and tone frequency of 1020 Hz (±0.02%) at -10 dBm (±2.5 dB) with <2.5% distortion and AM Depth of 30% AM (±2% AM) _____

15. Verify 90 Hz (±0.02%) with <2.5% distortion and AM Depth of 20% AM (±2% AM) _____

17. Verify 150 Hz (±0.02%) with <2.5% distortion and AM Depth of 20% AM (±2% AM) _____

20. Verify readings:

0.000 CENTER	0.000 (±0.0015 DDM + ±3% of setting)	_____
0.093 LEFT	0.093 (±0.0015 DDM + ±3% of setting)	_____
0.093 RIGHT	0.093 (±0.0015 DDM + ±3% of setting)	_____
0.155 LEFT	0.155 (±0.0015 DDM + ±3% of setting)	_____
0.155 RIGHT	0.155 (±0.0015 DDM + ±3% of setting)	_____
0.200 LEFT	0.200 (±0.0015 DDM + ±3% of setting)	_____
0.200 RIGHT	0.200 (±0.0015 DDM + ±3% of setting)	_____

22. Verify readings:

0.094	0.094 (±0.0025 DDM + ±3% of setting)	_____
0.095	0.095 (±0.0025 DDM + ±3% of setting)	_____
0.096	0.096 (±0.0025 DDM + ±3% of setting)	_____
0.097	0.097 (±0.0025 DDM + ±3% of setting)	_____

PHASE ACCURACY

24. Verify readings:

0	0° (±0.5°)	_____
5	-5° (±0.5°)	_____
10	-10° (±0.5°)	_____
20	-20° (±0.5°)	_____
40	-40° (±0.5°)	_____
80	40° (±0.5°)	_____
120	0° (±0.5°)	_____

STEP	DATA	RESULT

(11) ILS (cont)

GLIDESLOPE

29. Verify -30 dBm (±3 dB) _____

31. Verify -10 dBm (±3 dB) _____

(12) COMM AM

8. Verify 1020 Hz (±0.02%) with <2.5% distortion and AM Depth of 30% AM (±2% AM) _____

10. Verify 1020 Hz (±0.02%) with <2.5% distortion and AM Depth of 30% AM (±2% AM) _____

(13) COMM FM

8. Verify 1000 Hz (±0.02%) with <5% distortion and FM Deviation of 5 kHz (±500 Hz) _____

(14) SELCOM

8. Verify 312.6 Hz (±0.02%) Audio tone frequency and AM Depth of 80% AM (±4% AM) _____

10. Verify 1479.1 Hz (±0.02%) Audio tone frequency and AM Depth of 80% AM (±4% AM) _____

(15) Frequency Counter

7. Verify readings:

10 MHz	10 MHz (±10 Hz + ±1 count)	_____
10.001 MHz	10.001 MHz (±10.001 Hz + ±1 count)	_____
100.101 MHz	100.101 MHz (±100.101 Hz + ±1 count)	_____
399.999 MHz	399.999 MHz (±399.999 Hz + ±1 count)	_____

13. Verify readings:

10 MHz	10 MHz (±10 Hz + ±1 count)	_____
10.001 MHz	10.001 MHz (±10.001 Hz + ±1 count)	_____
100.101 MHz	100.101 MHz (±100.101 Hz + ±1 count)	_____
399.999 MHz	399.999 MHz (±399.999 Hz + ±1 count)	_____

18. Verify 1 MHz (±1 Hz + ±1 count) _____

20. Verify 1.00001 MHz (±1.00001 Hz + ±1 count) _____

22. Verify 3.00000 MHz (±3.00000 Hz + ±1 count) _____

24. Verify 5.10001 MHz (±5.10001 Hz + ±1 count) _____

26. Verify 9.99999 MHz (±9.99999 Hz + ±1 count) _____

STEP	DATA	RESULT

(16) AM Meter

3. Record AM readings:

X1	_____
X2	_____
X3	_____
X4	_____
X5	_____
X6	_____

9. Verify AM readings:

(X1 ÷ 1.1) < Reading < (X1 ÷ 0.9)	_____ (✓)
(X2 ÷ 1.1) < Reading < (X2 ÷ 0.9)	_____ (✓)
(X3 ÷ 1.1) < Reading < (X3 ÷ 0.9)	_____ (✓)
(X4 ÷ 1.1) < Reading < (X4 ÷ 0.9)	_____ (✓)
(X5 ÷ 1.1) < Reading < (X5 ÷ 0.9)	_____ (✓)
(X6 ÷ 1.1) < Reading < (X6 ÷ 0.9)	_____ (✓)

(17) FM Meter

3. Record FM readings:

X1	_____
X2	_____
X3	_____
X4	_____
X5	_____
X6	_____

9. Verify FM readings:

[(X1 - 0.4) ÷ 1.08] < Reading < [(X1 + 0.4) ÷ 0.92]	_____ (✓)
[(X2 - 0.4) ÷ 1.08] < Reading < [(X2 + 0.4) ÷ 0.92]	_____ (✓)
[(X3 - 0.4) ÷ 1.08] < Reading < [(X3 + 0.4) ÷ 0.92]	_____ (✓)
[(X4 - 0.4) ÷ 1.08] < Reading < [(X4 + 0.4) ÷ 0.92]	_____ (✓)
[(X5 - 0.4) ÷ 1.08] < Reading < [(X5 + 0.4) ÷ 0.92]	_____ (✓)
[(X6 - 0.4) ÷ 1.08] < Reading < [(X6 + 0.4) ÷ 0.92]	_____ (✓)

14. Verify FM readings:

[(X4 - 0.4) ÷ 1.08] < Reading < [(X4 + 0.4) ÷ 0.92]	_____ (✓)
[(X5 - 0.4) ÷ 1.08] < Reading < [(X5 + 0.4) ÷ 0.92]	_____ (✓)
[(X6 - 0.4) ÷ 1.08] < Reading < [(X6 + 0.4) ÷ 0.92]	_____ (✓)

STEP	DATA	RESULT
(18) SWR Meter		
5. Verify readings:		
75	1.000 (±0.2 + ±20% of reading)	_____
137	1.000 (±0.2 + ±20% of reading)	_____
225	1.000 (±0.2 + ±20% of reading)	_____
312	1.000 (±0.2 + ±20% of reading)	_____
400	1.000 (±0.2 + ±20% of reading)	_____
7. Verify readings:		
75	1.500 (±0.2 + ±20% of reading)	_____
137	1.500 (±0.2 + ±20% of reading)	_____
225	1.500 (±0.2 + ±20% of reading)	_____
312	1.500 (±0.2 + ±20% of reading)	_____
400	1.500 (±0.2 + ±20% of reading)	_____
9. Verify readings:		
75	2.000 (±0.2 + ±20% of reading)	_____
137	2.000 (±0.2 + ±20% of reading)	_____
225	2.000 (±0.2 + ±20% of reading)	_____
312	2.000 (±0.2 + ±20% of reading)	_____
400	2.000 (±0.2 + ±20% of reading)	_____
11. Verify readings:		
75	3.000 (±0.3 + ±20% of reading)	_____
137	3.000 (±0.3 + ±20% of reading)	_____
225	3.000 (±0.3 + ±20% of reading)	_____
312	3.000 (±0.3 + ±20% of reading)	_____
400	3.000 (±0.3 + ±20% of reading)	_____

STEP	DATA	RESULT

(19) Power Meter

7. Characterize Test Setup:

FREQ	A	B	OFFSET
10 MHz	_____	_____	_____
30 MHz	_____	_____	_____
100 MHz	_____	_____	_____
300 MHz	_____	_____	_____

15. Verify readings:

10 MHz	0.1 W	0.1 W (±12% of reading + ±1 count)	_____
10 MHz	1.0 W	1.0 W (±12% of reading + ±1 count)	_____
10 MHz	5.0 W	5.0 W (±12% of reading + ±1 count)	_____
10 MHz	10.0 W	10.0 W (±12% of reading + ±1 count)	_____
10 MHz	20.0 W	20.0 W (±12% of reading + ±1 count)	_____
10 MHz	25.0 W	25.0 W (±12% of reading + ±1 count)	_____

18. Verify readings:

30 MHz	0.1 W	0.1 W (±12% of reading + ±1 count)	_____
30 MHz	1.0 W	1.0 W (±12% of reading + ±1 count)	_____
30 MHz	5.0 W	5.0 W (±12% of reading + ±1 count)	_____
30 MHz	10.0 W	10.0 W (±12% of reading + ±1 count)	_____
30 MHz	20.0 W	20.0 W (±12% of reading + ±1 count)	_____
30 MHz	25.0 W	25.0 W (±12% of reading + ±1 count)	_____

21. Verify readings:

100 MHz	0.1 W	0.1 W (±8% of reading + ±1 count)	_____
100 MHz	1.0 W	1.0 W (±8% of reading + ±1 count)	_____
100 MHz	5.0 W	5.0 W (±8% of reading + ±1 count)	_____
100 MHz	10.0 W	10.0 W (±8% of reading + ±1 count)	_____
100 MHz	20.0 W	20.0 W (±8% of reading + ±1 count)	_____
100 MHz	25.0 W	25.0 W (±8% of reading + ±1 count)	_____

24. Verify readings:

300 MHz	0.1 W	0.1 W (±8% of reading + ±1 count)	_____
300 MHz	1.0 W	1.0 W (±8% of reading + ±1 count)	_____
300 MHz	5.0 W	5.0 W (±8% of reading + ±1 count)	_____
300 MHz	10.0 W	10.0 W (±8% of reading + ±1 count)	_____
300 MHz	20.0 W	20.0 W (±8% of reading + ±1 count)	_____
300 MHz	25.0 W	25.0 W (±8% of reading + ±1 count)	_____

STEP	DATA	RESULT

(19) Power Meter (cont)

27. Characterize Test Setup:

FREQ	A	B	OFFSET
10 MHz	_____	_____	_____
30 MHz	_____	_____	_____
100 MHz	_____	_____	_____
300 MHz	_____	_____	_____
400 MHz	_____	_____	_____

35. Verify readings:

10 MHz	0.1 W	0.1 W (±12% of reading + ±1 count)	_____
10 MHz	1.0 W	1.0 W (±12% of reading + ±1 count)	_____
10 MHz	5.0 W	5.0 W (±12% of reading + ±1 count)	_____
10 MHz	10.0 W	10.0 W (±12% of reading + ±1 count)	_____
10 MHz	20.0 W	20.0 W (±12% of reading + ±1 count)	_____
10 MHz	25.0 W	25.0 W (±12% of reading + ±1 count)	_____

38. Verify readings:

30 MHz	0.1 W	0.1 W (±12% of reading + ±1 count)	_____
30 MHz	1.0 W	1.0 W (±12% of reading + ±1 count)	_____
30 MHz	5.0 W	5.0 W (±12% of reading + ±1 count)	_____
30 MHz	10.0 W	10.0 W (±12% of reading + ±1 count)	_____
30 MHz	20.0 W	20.0 W (±12% of reading + ±1 count)	_____
30 MHz	25.0 W	25.0 W (±12% of reading + ±1 count)	_____

41. Verify readings:

100 MHz	0.1 W	0.1 W (±8% of reading + ±1 count)	_____
100 MHz	1.0 W	1.0 W (±8% of reading + ±1 count)	_____
100 MHz	5.0 W	5.0 W (±8% of reading + ±1 count)	_____
100 MHz	10.0 W	10.0 W (±8% of reading + ±1 count)	_____
100 MHz	20.0 W	20.0 W (±8% of reading + ±1 count)	_____
100 MHz	25.0 W	25.0 W (±8% of reading + ±1 count)	_____

STEP	DATA	RESULT

(19) Power Meter (cont)

44. Verify readings:

300 MHz	0.1 W	0.1 W (±8% of reading + ±1 count)	_____
300 MHz	1.0 W	1.0 W (±8% of reading + ±1 count)	_____
300 MHz	5.0 W	5.0 W (±8% of reading + ±1 count)	_____
300 MHz	10.0 W	10.0 W (±8% of reading + ±1 count)	_____
300 MHz	20.0 W	20.0 W (±8% of reading + ±1 count)	_____
300 MHz	25.0 W	25.0 W (±8% of reading + ±1 count)	_____

46. Verify readings:

400 MHz	0.1 W	0.1 W (±8% of reading + ±1 count)	_____
400 MHz	1.0 W	1.0 W (±8% of reading + ±1 count)	_____
400 MHz	5.0 W	5.0 W (±8% of reading + ±1 count)	_____
400 MHz	10.0 W	10.0 W (±8% of reading + ±1 count)	_____
400 MHz	20.0 W	20.0 W (±8% of reading + ±1 count)	_____
400 MHz	25.0 W	25.0 W (±8% of reading + ±1 count)	_____

(20) AM Audio - AUX Connector

9. Verify signal level is >0.75 Vrms _____

(21) 121.5/243.0 MHz Beacon

9. Verify readings:

Frequency:	121.5 MHz (±121 Hz)	_____
AM Depth:	>95%	_____
Beacon Start Frequency:	1600 Hz (±128 Hz)	_____
Beacon Stop Frequency:	300 Hz (±24 Hz)	_____

12. Verify readings:

Frequency:	243.0 MHz (±243 Hz)	_____
AM Depth:	>95%	_____
Beacon Start Frequency:	1600 Hz (±128 Hz)	_____
Beacon Stop Frequency:	300 Hz (±24 Hz)	_____

(22) 406 MHz Beacon

11. Verify decoded message:

DDD6AF7252000C8C236CA570017151 _____

(23) SSB Receive

8. Verify AUDIO FREQ reading is 1000 Hz (±100 Hz) _____

10. Verify AUDIO FREQ reading is 1000 Hz (±100 Hz) _____

STEP	DATA	RESULT
(24) SSB Transmit		
7. Verify 20.001 MHz (±6.5 Hz)		_____
9. Verify 19.999 MHz (±6.5 Hz)		_____

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F. Alternate Verification Procedures

(1) RF Accuracy

TEST EQUIPMENT: Measuring Receiver

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to the IFR 4000 Maintenance Manual for corrective action.

STEP PROCEDURE

1. Connect the Measuring Receiver (RF Input) to the ANT Connector.
2. Set the Measuring Receiver to Auto Tune, Frequency measurement and Special Function 7.4 for 1 Hz resolution.
3. Press the SETUP Key to display the Setup Menu.
4. Set the Test Set as follows:

FIELD	SETTING
PORT	***ANT***
GEN FREQ	***PRESET***

5. Press the MODE Select Key until the VOR Mode Screen.
6. Set the Test Set as follows:

FIELD	SETTING
FREQ	***108.000 MHz***
RF LVL	***0.0 dBm***
M MOD	***0%***

7. Verify 108.0 MHz (±108 Hz) on the Modulation Analyzer.
8. Press the MODE Select Key until the LOCALIZER Mode Screen.
9. Set the Test Set as follows:

FIELD	SETTING
FREQ	***108.100 MHz***
RF LVL	***0.0 dBm***
M MOD	***0%***

10. Verify 108.1 MHz (±108.1 Hz) on the Modulation Analyzer.
11. Press the MODE Select Key until the GLIDESLOPE Mode Screen.
12. Set the Test Set as follows:

FIELD	SETTING
FREQ	***334.700 MHz***
RF LVL	***0.0 dBm***
M MOD	***0%***

13. Verify 334.7 MHz (±334.7 Hz) on the Modulation Analyzer.
14. Press the MODE Select Key until the MARKER BEACON Mode Screen.

STEP PROCEDURE

15. Set the Test Set as follows:

FIELD	SETTING
FREQ	***75.000 MHz***
RF LVL	***0.0 dBm***
MOD TONE	***OFF***
M MOD	***0%***

16. Verify 75.0 MHz (±75 Hz) on the Modulation Analyzer.
17. Press the MODE Select Key until the COMM AM Mode Screen is displayed.
18. Set the Test Set as follows:

FIELD	SETTING
FREQ	***118.000 MHz***
RF LVL	***0.0 dBm***
MOD TONE	***OFF***

19. If the COMM AM Mode Screen is in RECEIVING Mode, press the SWITCH GEN/RX Soft Key to switch the COMM AM Mode Screen to GENERATING Mode.
20. Verify 118.0 MHz (±118 Hz) on the Modulation Analyzer.
21. Set the FREQ Field to ***137.000 MHz***.
22. Verify 137.0 MHz (±137 Hz) on the Modulation Analyzer.
23. Set the FREQ Field to ***225.000 MHz***.
24. Verify 225.0 MHz (±225 Hz) on the Modulation Analyzer.
25. Set the FREQ Field to ***312.000 MHz***.
26. Verify 312.0 MHz (±312 Hz) on the Modulation Analyzer.
27. Set the FREQ Field to ***400.000 MHz***.
28. Verify 400.0 MHz (±400 Hz) on the Modulation Analyzer.
29. Press the SETUP Key to display the Setup Menu.
30. Set the Test Set as follows:

FIELD	SETTING
PORT	***ANT***
GEN FREQ	***VAR***

31. Press the MODE Select Key until the SELCAL Mode Screen is displayed.
32. Set the Test Set as follows:

FIELD	SETTING
FREQ	***118.001 MHz***
RF LVL	***0.0 dBm***

33. Verify 118.001 MHz (±118.001 Hz) on the Modulation Analyzer.
34. Set the FREQ Field to ***118.002 MHz***.
35. Verify 118.002 MHz (±118.002 Hz) on the Modulation Analyzer.
36. Set the FREQ Field to ***118.003 MHz***.
37. Verify 118.003 MHz (±118.003 Hz) on the Modulation Analyzer.
38. Set the FREQ Field to ***118.004 MHz***.

STEP	PROCEDURE

39. Verify 118.004 MHz (±118.004 Hz) on the Modulation Analyzer.
40. Set the FREQ Field to ***10.000 MHz***.
41. Verify 10.000 MHz (±10 Hz) on the Modulation Analyzer.
42. Set the FREQ Field to ***30.000 MHz***.
43. Verify 30.000 MHz (±30 Hz) on the Modulation Analyzer.
44. Disconnect the Modulation Analyzer from the ANT Connector.

(2) Marker Beacon

TEST EQUIPMENT: Measuring Receiver
Audio Analyzer

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to the IFR 4000 Maintenance Manual for corrective action.

STEP PROCEDURE

1. Connect the Measuring Receiver (RF Input) to the ANT Connector, and the Measuring Receiver Modulation Output to the Input on the Audio Analyzer.
2. Set the Measuring Receiver to AM Measurement, and the Audio Analyzer to Distortion.
3. Press the SETUP Key to display the Setup Menu.
4. Set the PORT Field to ***ANT***.
5. Press the MODE Select Key until the MARKER BEACON Mode Screen is displayed.
6. Set the Test Set as follows:

FIELD	SETTING
FREQ	***75.000 MHz***
RF LVL	***10.0 dBm***
MOD TONE	***400 Hz***
M MOD	***CAL***

7. Verify 400 Hz (±0.02%) with <2.5% distortion and an AM Depth of 95% AM (±5% AM) on the Measuring Receiver and Audio Analyzer.
8. Set the MOD TONE Field to ***1300***.
9. Verify 1300 Hz (±0.02%) with <2.5% distortion and an AM Depth of 95% AM (±5% AM) on the Measuring Receiver and Audio Analyzer.
10. Set the MOD TONE Field to ***3000***.
11. Verify 3000 Hz (±0.02%) with <2.5% distortion and an AM Depth of 95% AM (±5% AM) on the Measuring Receiver and Audio Analyzer.
12. Disconnect the Measuring Receiver from the ANT Connector.

(3) VOR

TEST EQUIPMENT: Measuring Receiver
Audio Analyzer
Frequency Counter
Oscilloscope
RF Detector/Amplifier
VOR Radial Standard

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to the IFR 4000 Maintenance Manual for corrective action.

STEP PROCEDURE

1. Connect the Measuring Receiver (RF Input) to the ANT Connector, and the Modulation output to the input on the Audio Analyzer.
2. Set the Measuring Receiver to AM Measurement, and the Audio Analyzer to Distortion Measurement.
3. Press the SETUP Key to display the Setup Menu.
4. Set the PORT Field to ***ANT***.

MODULATION FREQUENCY, DISTORTION AND DEPTH ACCURACY

5. Press the MODE Select Key until the VOR Mode Screen is displayed.
6. Set the Test Set as follows:

FIELD	SETTING
FREQ	***108.000 MHz***
RF LVL	***0.0 dBm***
MOD TONE	***1020 Hz***
M MOD	***CAL***
30 Hz MOD	***0%***
9960 Hz MOD	***0%***

7. Verify 1020 Hz (±0.02%) with <2.0% distortion and an AM Depth of 30% AM (±2% AM) on the Measuring Receiver and Audio Analyzer.
8. Set the Test Set as follows:

FIELD	SETTING
MOD TONE	***OFF***
30 Hz MOD	***30%***

9. Verify <2.0% distortion and an AM Depth of 30% AM (±2% AM) on the Measuring Receiver and Audio Analyzer.
10. Connect Measuring Receiver Modulation Output to Frequency Counter and verify 30 Hz (±0.02%).
11. Reconnect Measuring Receiver Modulation Output to Audio Analyzer.
12. Set the Test Set as follows:

FIELD	SETTING
30 Hz MOD	***0%***
9960 Hz MOD	***30%***
TONE DEL	***REF***

STEP PROCEDURE

13. Verify 9960 Hz (±0.02%) with <2.0% distortion and an AM Depth of 30% AM (±2% AM) on the Measuring Receiver and Audio Analyzer.

14. Set the Test Set as follows:

FIELD	SETTING
30 Hz MOD	***30%***
TONE DEL	***OFF***

15. Verify AM Depth of 60% AM (±4% AM) on the Measuring Receiver.

FM DEVIATION ACCURACY

16. Set the Test Set as follows:

FIELD	SETTING
30 Hz MOD	***0%***
9960 Hz MOD	***30%***

17. Connect the Measuring Receiver Modulation output to the Oscilloscope input.

18. Set Oscilloscope to 100 µs/div and adjust vertical scaling for full scale deflection of audio signal.

19. Set Oscilloscope trigger to positive edge trigger and adjust for a stable display with the first zero crossing occurring on the major horizontal axis.

20. Select X10 horizontal magnifier or delay time for a 5 µs/div display.

21. Adjust delay and/or horizontal position to center the sixth positive zero crossing on the display. (Nearly a full screen of zero crossings can be seen due to the FM modulation on the 9960 audio tone.)

22. Measure the time from the first zero crossing to the last zero crossing on the current display and verify the measurement is 48.5 µs (±2.5 µs).

BEARING ACCURACY

23. Connect the RF Detector/Amplifier (RF Input) to the ANT Connector.

24. Connect the RF Detector/Amplifier (Audio Output) to the VOR Comp Input on the VOR Radial Standard.

25. Press the SETUP Key to display the Setup Menu.

26. Set the VOR BRG Field to ***FIXED***.

27. Press the MODE Select Key until the VOR Mode Screen is displayed.

28. Set the Test Set as follows:

FIELD	SETTING
RF LVL	***5.0 dBm***
30 Hz MOD	***30%***
9960 Hz MOD	***30%***
TO/FROM	***TO***

STEP PROCEDURE

29. Set the BRG Field to the following settings and verify readings on the VOR Radial Standard:

BRG	READING
30	210° (±0.1°)
90	270° (±0.1°)
150	330° (±0.1°)
210	30° (±0.1°)
270	90° (±0.1°)
330	150° (±0.1°)

30. Set the TO/FROM Field to ***FROM***.

31. Set the BRG Field to the following settings and verify readings on the VOR Radial Standard:

BRG	READING
30	30° (±0.1°)
90	90° (±0.1°)
150	150° (±0.1°)
210	210° (±0.1°)
270	270° (±0.1°)
330	330° (±0.1°)

32. Press the SETUP Key to display the Setup Menu.

33. Set the VOR BRG Field to ***VAR***.

34. Press the MODE Select Key until the VOR Mode Screen is displayed.

35. Set the BRG Field to the following settings and verify readings on the VOR Radial Standard:

BRG	READING
1	1° (±0.1°)
2	2° (±0.1°)
10.1	10.1° (±0.1°)
10.2	10.2° (±0.1°)

36. Disconnect the RF Detector/Amplifier from the ANT Connector.

(4) Localizer

TEST EQUIPMENT: Measuring Receiver
Audio Analyzer
Frequency Counter
Digital Multimeter

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to the IFR 4000 Maintenance Manual for corrective action.

STEP PROCEDURE

1. Connect the Measuring Receiver (RF Input) to the ANT Connector, and the Measuring Receiver Modulation Output to the input on the Audio Analyzer.
2. Set the Measuring Receiver to AM Measurement and the Audio Analyzer to distortion.
3. Press the SETUP Key to display the Setup Menu.
4. Set the PORT Field to ***ANT***.

MODULATION FREQUENCY, DISTORTION AND DEPTH ACCURACY

5. Press the MODE Select Key until the LOCALIZER Mode Screen is displayed.
6. Set the Test Set as follows:

FIELD	SETTING
FREQ	***108.100 MHz***
RF LVL	***0.0 dBm***
MOD TONE	***1020 Hz***
M MOD	***CAL***
DEV STEP	***FIXED***
LOC DDM	***0.000 CENTER***
TONE DEL	***90 & 150***

7. Verify 1020 Hz (±0.02%) with <2.5% distortion and an AM Depth of 30% AM (±2% AM) on the Measuring Receiver and Audio Analyzer.
8. Set the Test Set as follows:

FIELD	SETTING
MOD TONE	***OFF***
TONE DEL	***150***

9. Verify <2.5% distortion and an AM Depth of 20% AM (±2% AM) on the Measuring Receiver and Audio Analyzer.
10. Connect Measuring Receiver Modulation Output to Frequency Counter and verify 90 Hz (±0.02%).
11. Set the TONE DEL Field to ***90***.
12. Verify 150 Hz (±0.02%) on the Frequency Counter.
13. Reconnect Measuring Receiver Modulation Output to Audio Analyzer.
14. Verify <2.5% distortion and an AM Depth of 20% AM (±2% AM) on the Measuring Receiver and Audio Analyzer. Record AM Depth measurement for DDM Accuracy calculations.

STEP PROCEDURE

DDM ACCURACY

15. Disconnect the Modulation Output of the Measuring Receiver from the Audio Analyzer and connect the Modulation Output of the Measuring Receiver to the Digital Multimeter.

16. Set the LOC DDM Field to the following settings and record the AC Voltage reading from the Digital Multimeter:

LOC DDM
0.000 CENTER
0.093 LEFT
0.093 RIGHT
0.155 LEFT
0.155 RIGHT
0.200 LEFT
0.200 RIGHT

17. Set the TONE DEL Field to ***150***.

18. Set the LOC DDM Field to the following settings and record the AC Voltage reading from the Digital Multimeter:

LOC DDM
0.000 CENTER
0.093 LEFT
0.093 RIGHT
0.155 LEFT
0.155 RIGHT
0.200 LEFT
0.200 RIGHT

19. Set the DEV STEP Field to ***VAR***.

20. Set the LOC DDM Field to the following settings and record the AC Voltage reading from the Digital Multimeter:

LOC DDM
0.094 RIGHT
0.095 RIGHT
0.096 RIGHT
0.097 RIGHT

21. Set the TONE DEL Field to ***90***.

22. Set the LOC DDM Field to the following settings and record the AC Voltage reading from the Digital Multimeter:

LOC DDM
0.094 RIGHT
0.095 RIGHT
0.096 RIGHT
0.097 RIGHT

STEP PROCEDURE

23. Perform the calculations in the data sheet and verify all DDM readings are within tolerance.

24. Select Range Hold on Measuring Receiver.

25. Set the Test Set as follows:

FIELD	SETTING
TONE DEL	***OFF***
DEV STEP	***FIXED***
LOC DDM	***0.000 CENTER***

PHASE ACCURACY

26. Connect the Modulation Output of the Measuring Receiver to the Oscilloscope input and adjust for a stable display.

27. Set the 90/150 Hz Field to the following settings and monitor the displayed signal on the Oscilloscope:

NOTE: Change in Reading column indicates there is a change in the waveform. Using this verification procedure, this specification cannot be verified to the published specification and can only be tested for functionality.

90/150 Hz	READING
0	Reference waveform
5	Change
10	Change
20	Change
40	Change
60	Peak waveform
120	Matches reference waveform

28. Set the 90/150 Hz Field to ***0***.

29. Disconnect the Measuring Receiver from the ANT Connector and clear Range Hold on Measuring Receiver.

(5) Glideslope

TEST EQUIPMENT: Measuring Receiver
Audio Analyzer
Frequency Counter
Digital Multimeter

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to the IFR 4000 Maintenance Manual for corrective action.

STEP PROCEDURE

1. Connect the Measuring Receiver (RF Input) to the ANT Connector, and the Measuring Receiver Modulation Output to the input on the Audio Analyzer.
2. Set the Measuring Receiver to AM Measurement and the Audio Analyzer to distortion.
3. Press the SETUP Key to display the Setup Menu.
4. Set the PORT Field to ***ANT***.

MODULATION FREQUENCY, DISTORTION AND DEPTH ACCURACY

5. Press the MODE Select Key until the GLIDESLOPE Mode Screen is displayed.
6. Set the Test Set as follows:

FIELD	SETTING
FREQ	***334.250 MHz***
RF LVL	***0.0 dBm***
M MOD	***CAL***
DEV STEP	***FIXED***
90/150 Hz	***OFF***
TONE DEL	***150***

7. Verify <2.5% distortion and an AM Depth of 40% AM (±2% AM) on the Measuring Receiver and Audio Analyzer.
8. Connect Measuring Receiver Modulation Output to Frequency Counter and verify 90 Hz (±0.02%).
9. Set the TONE DEL Field to ***90***.
10. Verify 150 Hz (±0.02%) on the Frequency Counter.
11. Reconnect Measuring Receiver Modulation Output to Audio Analyzer.
12. Verify <2.5% distortion and an AM Depth of 40% AM (±2% AM) on the Measuring Receiver and Audio Analyzer and record AM Depth measurement for DDM Accuracy calculations.

DDM ACCURACY

13. Disconnect the Modulation Output of the Measuring Receiver from the Audio Analyzer and connect the Modulation Output of the Measuring Receiver to the Digital Multimeter.
14. Set the TONE DEL Field to ***OFF*** and select Range Hold on Measuring Receiver.
15. Set the TONE DEL Field to ***90***.

STEP PROCEDURE

16. Set the G/S DDM Field to the following settings and record the AC Voltage reading from the Digital Multimeter:

G/S DDM
0.000 CENTER
0.091 UP
0.091 DOWN
0.175 UP
0.175 DOWN
0.400 UP
0.400 DOWN

17. Set the TONE DEL Field to ***150***.

18. Set the G/S DDM Field to the following settings and record the AC Voltage reading from the Digital Multimeter:

G/S DDM
0.000 CENTER
0.091 UP
0.091 DOWN
0.175 UP
0.175 DOWN
0.400 UP
0.400 DOWN

19. Set the DEV STEP Field to ***VAR***.

20. Set the G/S DDM Field to the following settings and record the AC Voltage reading from the Digital Multimeter:

G/S DDM
0.176 UP
0.177 UP
0.178 UP
0.179 UP

21. Set the TONE DEL Field to ***90***.

22. Set the G/S DDM Field to the following settings and record the AC Voltage reading from the voltmeter:

G/S DDM
0.176 UP
0.177 UP
0.178 UP
0.179 UP

23. Perform the calculations in the data sheet and verify all DDM readings are within tolerance.

STEP PROCEDURE

24. Set the Test Set as follows:

FIELD	SETTING
DEV STEP	***FIXED***
G/S DDM	***0.000 CENTER***
TONE DEL	***OFF***

PHASE ACCURACY

25. Connect the Modulation Output of the Measuring receiver to the Oscilloscope input and adjust for a stable display.

26. Set the 90/150 Hz Field to the following settings and monitor the displayed signal on the Oscilloscope:

    NOTE: Change in Reading column indicates there is a change in the waveform. Using this verification procedure, this specification cannot be verified to the published specification and can only be tested for functionality.

90/150 Hz	READING
0	Reference waveform
5	Change
10	Change
20	Change
40	Change
60	Peak waveform
120	Matches reference waveform

27. Set the 90/150 Hz Field to ***0***.

28. Disconnect the Measuring Receiver from the ANT Connector and clear Range Hold on Measuring Receiver.

(6) ILS

TEST EQUIPMENT: Measuring Receiver
Audio Analyzer
Frequency Counter
Digital Multimeter
10 dB Pad (Inline)

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to the IFR 4000 Maintenance Manual for corrective action.

STEP PROCEDURE

1. Connect the Measuring Receiver (RF Input) and 10 dB Pad to the ANT Connector.
2. Set the Measuring Receiver to AM Measurement.
3. Press the SETUP Key to display the Setup Menu.
4. Set the PORT Field to ***ANT***.

MARKER BEACON

5. Press the MODE Select Key until the ILS Mode Screen is displayed.
6. Set the Test Set as follows:

FIELD	SETTING
FREQ	***108.100 MHz***
RF LVL	***-60.0 dBm***
MOD TONE	***400 Hz (Marker ON)***
M MOD	***CAL***

7. Verify 75 MHz (±75 Hz) and tone frequency of 400 Hz (±0.02%) with <5% distortion and an AM Depth of 95% AM (±5% AM) on the Measuring Receiver and Audio Analyzer.
8. Set the MOD TONE Field to ***1300 Hz***.
9. Verify 1300 Hz (±0.02%) with <3.75% distortion and an AM Depth of 95% AM (±3.75% AM) on the Measuring Receiver and Audio Analyzer.
10. Set the MOD TONE Field to ***3000 Hz***.
11. Verify 3000 Hz (±0.02%) with <3.75% distortion and an AM Depth of 95% AM (±3.75% AM) on the Measuring Receiver and Audio Analyzer.

LOCALIZER

12. Set the Test Set as follows:

FIELD	SETTING
MOD TONE	***1020 Hz***
TONE DEL	***90 & 150***

13. Verify 108.100 MHz (±108.100 Hz) and tone frequency of 1020 Hz (±0.02%) at -10 dBm (±2.5 dB) with <2.5% distortion and an AM Depth of 30% AM (±2% AM) on the Measuring Receiver and Audio Analyzer.

STEP PROCEDURE

14. Set the Test Set as follows:

FIELD	SETTING
MOD TONE	***OFF***
TONE DEL	***150***

15. Verify <2.5% distortion and an AM Depth of 20% AM (±2% AM) on the Measuring Receiver and Audio Analyzer.
16. Connect Measuring Receiver Modulation Output to Frequency Counter and verify 90 Hz (±0.02%).
17. Set the TONE DEL Field to ***90***.
18. Verify 150 Hz (±0.02%) on the Frequency Counter.
19. Reconnect Measuring Receiver Modulation Output to Audio Analyzer.
20. Verify <2.5% distortion and an AM Depth of 20% AM (±2% AM) on the Measuring Receiver and Audio Analyzer. Record AM Depth measurement for DDM Accuracy calculations.

DDM ACCURACY

21. Disconnect the Modulation Output of the Measuring Receiver from the Audio Analyzer and connect the Modulation Output of the Measuring Receiver to the Digital Multimeter.
22. Set the LOC DDM Field to the following settings and record the AC Voltage reading from the Digital Multimeter:

LOC DDM
0.000 CENTER
0.093 LEFT
0.093 RIGHT
0.155 LEFT
0.155 RIGHT
0.200 LEFT
0.200 RIGHT

23. Set the TONE DEL Field to ***150***.
24. Set the LOC DDM Field to the following settings and record the AC Voltage reading from the Digital Multimeter:

LOC DDM
0.000 CENTER
0.093 LEFT
0.093 RIGHT
0.155 LEFT
0.155 RIGHT
0.200 LEFT
0.200 RIGHT

25. Set the DEV STEP Field to ***VAR***.

STEP PROCEDURE

26. Set the LOC DDM Field to the following settings and record the AC Voltage reading from the Digital Multimeter:

LOC DDM
0.094 RIGHT
0.095 RIGHT
0.096 RIGHT
0.097 RIGHT

27. Set the TONE DEL Field to ***90***.

28. Set the LOC DDM Field to the following settings and record the AC Voltage reading from the Digital Multimeter:

LOC DDM
0.094 RIGHT
0.095 RIGHT
0.096 RIGHT
0.097 RIGHT

29. Perform the calculations in the data sheet and verify all DDM readings are within tolerance.

30. Select Range Hold on the Measuring Receiver.

31. Set the Test Set as follows:

FIELD	SETTING
TONE DEL	***OFF***
DEV STEP	***FIXED***
LOC DDM	***0.000 CENTER***

PHASE ACCURACY

32. Connect the Modulation Output of the Measuring receiver to the Oscilloscope input and adjust for a stable display.

33. Set the 90/150 Hz Field to the following settings and monitor the displayed signal on the Oscilloscope:

NOTE: Change in Reading column indicates there is a change in the waveform. Using this verification procedure, this specification cannot be verified to the published specification and can only be tested for functionality.

90/150 Hz	READING
0	Reference waveform
5	Change
10	Change
20	Change
40	Change
60	Peak waveform
120	Matches reference waveform

34. Set the 90/150 Hz Field to ***0***.

STEP	PROCEDURE

GLIDESLOPE

35. Disconnect the Modulation Analyzer and 10 dB Pad from the ANT Connector and connect the Measuring Receiver to the ANT Connector.
36. Clear Range Hold on the Measuring Receiver and calibrate the Measuring Receiver for 334.700 MHz in Tuned RF Level Mode.
37. Set the RF LVL Field to ***-30 dBm***.
38. Verify -30 dBm (±3 dB) on the Measuring Receiver.
39. Set the RF LVL Field to ***-10 dBm***.
40. Verify -10 dBm (±3 dB) on the Measuring Receiver.
41. Disconnect the Measuring Receiver from the ANT Connector.

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G. Alternate Verification Procedures Data Sheet

Test Set S/N: _____ DATE: _____

TECHNICIAN: _____

STEP	DATA	RESULT
(1) RF Accuracy		
7.	Verify 108.0 MHz (±108 Hz)	_____
10.	Verify 108.1 MHz (±108.1 Hz)	_____
13.	Verify 334.7 MHz (±334.7 Hz)	_____
16.	Verify 75.0 MHz (±75 Hz)	_____
20.	Verify 118.0 MHz (±118 Hz)	_____
22.	Verify 137.0 MHz (±137 Hz)	_____
24.	Verify 225.0 MHz (±225 Hz)	_____
26.	Verify 312.0 MHz (±312 Hz)	_____
28.	Verify 400.0 MHz (±400 Hz)	_____
33.	Verify 118.001 MHz (±118.001 Hz)	_____
35.	Verify 118.002 MHz (±118.002 Hz)	_____
37.	Verify 118.003 MHz (±118.003 Hz)	_____
39.	Verify 118.004 MHz (±118.004 Hz)	_____
41.	Verify 10.000 MHz (±10 Hz)	_____
43.	Verify 30.000 MHz (±30 Hz)	_____
(2) Marker Beacon		
7.	Verify 400 Hz (±0.02%) with <2.5% distortion and AM Depth of 95% AM (±5% AM)	_____
9.	Verify 1300 Hz (±0.02%) with <2.5% distortion and AM Depth of 95% AM (±5% AM)	_____
11.	Verify 3000 MHz (±0.02%) with <2.5% distortion and AM Depth of 95% AM (±5% AM)	_____

STEP	DATA	RESULT

(3) VOR

MODULATION FREQUENCY, DISTORTION AND DEPTH ACCURACY

7. Verify 1020 Hz (±0.02%) with <2.0% distortion and AM Depth of 30% AM (±2% AM) _____

9. Verify 30 Hz (±0.02%) with <2.0% distortion and AM Depth of 30% AM (±2% AM) _____

10. Verify 30 Hz (±0.02. _____

13. Verify 9960 Hz (±0.02%) with <2.0% distortion and AM Depth of 30% AM (±2% AM) _____

15. Verify AM Depth of 60% AM (±4% AM) _____

FM DEVIATION ACCURACY

22. Verify 48.5 µs (±2.5 µs) _____

BEARING ACCURACY

28. Verify readings:

30	210° (±0.1°)	_____
90	270° (±0.1°)	_____
150	330° (±0.1°)	_____
210	30° (±0.1°)	_____
270	90° (±0.1°)	_____
330	150° (±0.1°)	_____

30. Verify readings:

30	30° (±0.1°)	_____
90	90° (±0.1°)	_____
150	150° (±0.1°)	_____
210	210° (±0.1°)	_____
270	270° (±0.1°)	_____
330	330° (±0.1°)	_____

34. Verify readings:

1	1° (±0.1°)	_____
2	2° (±0.1°)	_____
10.1	10.1° (±0.1°)	_____
10.2	10.2° (±0.1°)	_____

STEP	DATA	RESULT

(4) Localizer

MODULATION FREQUENCY, DISTORTION AND DEPTH ACCURACY

7. Verify 1020 Hz (±0.02%) with <2.5% distortion and AM Depth of 30% AM (±2% AM) _____

9. Verify <2.5% distortion and AM Depth of 20% AM (±2% AM) _____

10. Verify 90 Hz (±0.02%) _____

12. Verify 150 Hz (±0.02%) _____

14. Verify <2.5% distortion and AM Depth of 20% AM (±2% AM) _____

Record AM Depth Measurement (% Mod) _____

DDM ACCURACY

16. Record 150 Hz Voltage readings:

0.000 CENTER	_____
0.093 LEFT	_____
0.093 RIGHT	_____
0.155 LEFT	_____
0.155 RIGHT	_____
0.200 LEFT	_____
0.200 RIGHT	_____

18. Record 90 Hz Voltage readings:

0.000 CENTER	_____
0.093 LEFT	_____
0.093 RIGHT	_____
0.155 LEFT	_____
0.155 RIGHT	_____
0.200 LEFT	_____
0.200 RIGHT	_____

Calculate DDM Ratio by the following equation:

DR = (% mod from Step 14)/(Center voltage from Step 16 * 100) _____

Calculate DDM by the following equation:

DDM = DR * (value from Step 18 – value from Step 16)

0.000 CENTER	0.000 (±0.0015 DDM)	_____
0.093 LEFT	-0.093 (±0.0043 DDM)	_____
0.093 RIGHT	0.093 (±0.0043 DDM)	_____
0.155 LEFT	-0.155 (±0.0062 DDM)	_____
0.155 RIGHT	0.155 (±0.0062 DDM)	_____
0.200 LEFT	-0.200 (±0.0075 DDM)	_____
0.200 RIGHT	0.200 (±0.0075 DDM)	_____

STEP	DATA	RESULT

(4) Localizer (cont)

20. Record 90 Hz Voltage readings:

0.094 Right	_____
0.095 Right	_____
0.096 Right	_____
0.097 Right	_____

22. Record 150 Hz Voltage readings:

0.094 Right	_____
0.095 Right	_____
0.096 Right	_____
0.097 Right	_____

Calculate DDM by the following equation (using DR from Step 18):

DDM = DR * (value from Step 20 – value from Step 22)

0.094 Right	0.094 (±0.0053 DDM)	_____
0.095 Right	0.095 (±0.0054 DDM)	_____
0.096 Right	0.096 (±0.0054 DDM)	_____
0.097 Right	0.097 (±0.0054 DDM)	_____

PHASE ACCURACY

27. Verify readings:

0	Reference	_____ (✓)
5	Change	_____ (✓)
10	Change	_____ (✓)
20	Change	_____ (✓)
40	Change	_____ (✓)
60	Peak waveform	_____ (✓)
120	Matches reference waveform	_____ (✓)

STEP	DATA	RESULT

(5) Glideslope

MODULATION FREQUENCY, DISTORTION AND DEPTH ACCURACY

7. Verify <2.5% distortion and AM Depth of 40% AM (±2% AM) _____

8. Verify 90 Hz (±0.02%) _____

10. Verify 150 Hz (±0.02%) _____

12. Verify <2.5% distortion and AM Depth of 40% AM (±2% AM) _____

Record AM Depth Measurement (% Mod) _____

DDM ACCURACY

16. Record 150 Hz Voltage readings:

0.000 CENTER	_____
0.091 UP	_____
0.091 DOWN	_____
0.175 UP	_____
0.175 DOWN	_____
0.400 UP	_____
0.400 DOWN	_____

18. Record 90 Hz Voltage readings:

0.000 CENTER	_____
0.091 UP	_____
0.091 DOWN	_____
0.175 UP	_____
0.175 DOWN	_____
0.400 UP	_____
0.400 DOWN	_____

Calculate DDM Ratio by the following equation:

DR = (% mod from Step 12)/(Center voltage from Step 16 * 100) _____

Calculate DDM by the following equation:

DDM = DR * (value from Step 16 – value from Step 18)

0.000 CENTER	0.000 (±0.003 DDM	_____
0.091 UP	0.091 (±0.0057 DDM)	_____
0.091 DOWN	-0.091 (±0.0057 DDM)	_____
0.175 UP	0.175 (±0.0083 DDM)	_____
0.175 DOWN	-0.175 (±0.0083 DDM)	_____
0.400 UP	0.400 (±0.0150 DDM)	_____
0.400 DOWN	-0.400 (±0.0150 DDM)	_____

STEP	DATA	RESULT

(5) Glideslope (cont)

20. Record 90 Hz Voltage readings:

0.176 UP	_____
0.177 UP	_____
0.178 UP	_____
0.179 UP	_____

22. Record 150 Hz Voltage readings:

0.176 UP	_____
0.177 UP	_____
0.178 UP	_____
0.179 UP	_____

Calculate DDM by the following equation (using DR from Step 18):

DDM = DR * (value from Step 22 – value from Step 20)

0.176 UP	0.176 (±0.0101 DDM)	_____
0.177 UP	0.177 (±0.0101 DDM)	_____
0.178 UP	0.178 (±0.0101 DDM)	_____
0.179 UP	0.179 (±0.0101 DDM)	_____

PHASE ACCURACY

26. Verify readings:

0	Reference	_____ (✓)
5	Change	_____ (✓)
10	Change	_____ (✓)
20	Change	_____ (✓)
40	Change	_____ (✓)
60	Peak waveform	_____ (✓)
120	Matches reference waveform	_____ (✓)

STEP	DATA	RESULT

(6) ILS

MARKER BEACON

7. Verify 75 MHz (±75 Hz) and tone frequency of 400 Hz (±0.02%) with <5% distortion and AM Depth of 95% AM (±5% AM) _____

9. Verify 1300 Hz (±0.02%) with <3.75% distortion and AM Depth of 95% AM (±3.75% AM) _____

11. Verify 3000 Hz (±0.02%) with <3.75% distortion and AM Depth of 95% AM (±3.75% AM) _____

LOCALIZER

13. Verify 108.100 MHz (±108.1 Hz) and tone frequency of 1020 Hz (±0.02%) at -10 dBm (±2.5 dB) with <2.5% distortion and AM Depth of 30% AM (±2% AM) _____

15. Verify <2.5% distortion and AM Depth of 20% AM (±2% AM) _____

16. Verify 90 Hz (±0.02%) _____

18. Verify 150 Hz (±0.02%) _____

20. Verify <2.5% distortion and AM Depth of 20% AM (±2% AM) _____

Record AM Depth Measurement (% Mod) _____

DDM ACCURACY

22. Record 150 Hz Voltage readings:

    0.000 CENTER _____

    0.093 LEFT _____

    0.093 RIGHT _____

    0.155 LEFT _____

    0.155 RIGHT _____

    0.200 LEFT _____

    0.200 RIGHT _____

24. Record 90 Hz Voltage readings:

    0.000 CENTER _____

    0.093 LEFT _____

    0.093 RIGHT _____

    0.155 LEFT _____

    0.155 RIGHT _____

    0.200 LEFT _____

    0.200 RIGHT _____

STEP	DATA	RESULT

(6) ILS (cont)

Calculate DDM Ratio by the following equation:

DR = (% mod from Step 20)/(Center voltage from Step 22 * 100) _____

Calculate DDM by the following equation:

DDM = DR * (value from Step 24 – value from Step 22)

0.000 CENTER	0.000 (±0.0015 DDM)	_____
0.093 LEFT	-0.093 (±0.0043 DDM)	_____
0.093 RIGHT	0.093 (±0.0043 DDM)	_____
0.155 LEFT	-0.155 (±0.0062 DDM)	_____
0.155 RIGHT	0.155 (±0.0062 DDM)	_____
0.200 LEFT	-0.200 (±0.0075 DDM)	_____
0.200 RIGHT	0.200 (±0.0075 DDM)	_____

26. Record 90 Hz Voltage readings:

0.094 Right	_____
0.095 Right	_____
0.096 Right	_____
0.097 Right	_____

28. Record 150 Hz Voltage readings:

0.094 Right	_____
0.095 Right	_____
0.096 Right	_____
0.097 Right	_____

Calculate DDM by the following equation (using DR from Step 24 above):

DDM = DR * (value from Step 26 – value from Step 28)

0.094 Right	0.094 (±0.0053 DDM)	_____
0.095 Right	0.095 (±0.0054 DDM)	_____
0.096 Right	0.096 (±0.0054 DDM)	_____
0.097 Right	0.097 (±0.0054 DDM)	_____

STEP	DATA	RESULT

(6) ILS (cont)

PHASE ACCURACY

33. Verify readings:

0	Reference	_____ (✓)
5	Change	_____ (✓)
10	Change	_____ (✓)
20	Change	_____ (✓)
40	Change	_____ (✓)
60	Peak waveform	_____ (✓)
120	Matches reference waveform	_____ (✓)

GLIDESLOPE

38. Verify -30 dBm (±3 dB) _____

40. Verify -10 dBm (±3 dB) _____

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APPENDIX A - TEST EQUIPMENT REQUIREMENTS

This Appendix contains a list of test equipment suitable for performing the Verification Procedures. Other equipment meeting the specifications of the equipment listed in this Appendix may be substituted in place of the recommended models.

TYPE	MODEL
Adapter, TNC (M) to N-Type (F)	N/A
Arbitrary Waveform Generator	Agilent 33220A or Equivalent
Attenuator, 3 dB, 100 W (N-Type)	N/A
Attenuator, 10 dB (BNC)	N/A
Attenuator, N-Connector 20 dB	N/A
Audio Analyzer	HP-8903A or Equivalent
Digital Multimeter	Agilent 34401A or Equivalent
Directional Coupler, 20 dB (N-Type)	N/A
Frequency Counter	Agilent 53131A or Equivalent
Function Generator	Agilent 33120A or Equivalent
Load, 50 Ω	N/A
Load, 75 Ω	N/A
Load, 100 Ω	N/A
Load, 150 Ω	N/A
Low-Pass Filter, 15 MHz (N-Type)	N/A
Low-Pass Filter, 45 MHz (N-Type)	N/A
Low-Pass Filter, 150 MHz (N-Type)	N/A
Low-Pass Filter, 450 MHz (N-Type)	N/A
Measuring Receiver	HP-8902A or Equivalent
Measuring Receiver Sensor Module	HP-11722A or Equivalent
Modulation Analyzer	R&S FMAV or Equivalent
Power Meter	HP-E4418B or Equivalent
Power Sensor	HP-E4412A or Equivalent
RF Amplifier (100 W)	N/A
Signal Generator	Aeroflex 2023B or Equivalent
Spectrum Analyzer	AN-920 or Equivalent
VSWR Bridge	Wiltron 62NF50 or Equivalent

TEST EQUIPMENT FOR ALTERNATE VERIFICATION PROCEDURES ONLY

TYPE	MODEL
Adapter, TNC (M) to BNC (F)	N/A
RF Detector/Amplifier	Aeroflex JPN 01-0817-00 or Equivalent
Oscilloscope	Tektronix 2445A or Equivalent
VOR Radial Standard	CPN 622-3701-001 (78-3 Zifor III)