

**Table 5-2 Test Equipment Required**

| Nomenclature                          | Manufacturer    | Model        |
|---------------------------------------|-----------------|--------------|
| Signal Generator                      | RDL             | IMD-801D-03A |
| 30 dB Attenuator, 500 Watt            | Weinschel Corp. | 53-30-34     |
| 20 dB Attenuator, 20 Watt<br>(2 each) | Tenuline        |              |
| Spectrum Analyzer                     | H.P.            | 8560E        |
| Coax Directional Coupler              | H.P.            | 778D         |
| Power Meter/Sensor                    | H.P.            | 437B/8481A   |
| Network Analyzer                      | H.P.            | 8753C        |
| Current Probe                         |                 |              |

## 5-4 Cleaning Air Inlets/Outlets

The air inlets and outlets should be cleaned every 30 days. If the equipment is operated in a severe dust environment, they should be cleaned more often as necessary. Turn off DC power source before removing fans. If dust and dirt are allowed to accumulate, the cooling efficiency may be diminished. Using either compressed air or a brush with soft bristles, loosen and remove accumulated dust and dirt from the air inlet panels.

## 5-5 Performance Test

Performance testing should be conducted every 12 months to ensure that the amplifier system meets the operational specifications listed in table 5-3. Also verify system performance after any amplifier module is replaced in the field. The test equipment required to perform the testing is listed in table 5-2, and the test setup is shown in figure 5-1.

### NOTE

*The frequencies used in this test are typical for an amplifier with a 25 MHz band from 869 MHz to 894 MHz. Select evenly spaced F1, F2, F3, and F4 frequencies that cover the instantaneous bandwidth of your system.*

### 5-5.1 Amplifier System Performance Test

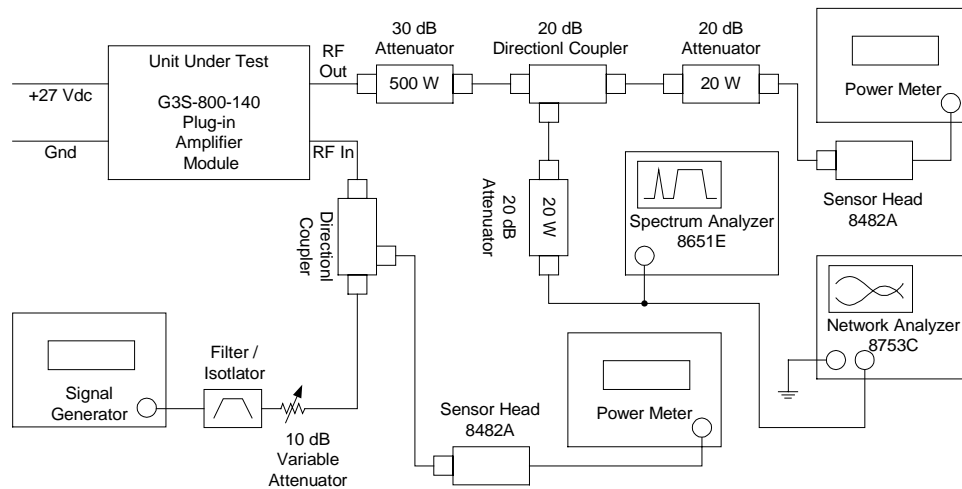
This test is applicable to the G3S-800-140 amplifier modules. To perform the test, proceed as follows:

1. Connect test equipment to the amplifier as shown in figure 5-1.

### NOTE

*Do not apply any RF signals at this time.*

Turn on signal generator and set frequency F1 to 880 MHz, F2 to 883 MHz, F3 to 886 MHz, and F4 to 889 MHz. Adjust each signal generator output so that the sum power output from all four signal generators equals -6 dBm at the input.



*Figure 5-1 Amplifier System Test Setup Diagram*

### 5-5.2 Amplifier IMD Test And Current Test

2. Adjust attenuator for an input signal at -10 dBm. Turn on the amplifier by setting RF ON switch of amplifier. Adjust variable attenuator to set amplifier power output on power meter to 140 watts. Measure IMD on spectrum analyzer. IMD should be -60 dBc max. Record test data in table 5-3. Set RF ON switch to OFF.
3. With the amplifier module set at 140 watts power output, use the current probe (magnetic field type) and measure the dc current flow from the +27 Vdc power source. Current should be 70 amps maximum. Record test data in table 5-3.

### 5-5.3 Gain Test

4. Disconnect spectrum analyzer from test setup, and connect the network analyzer.
5. Set network analyzer as follows:
  - Power output to -10 dBm.
  - Frequency start to 869 MHz.
  - Frequency stop to 894 MHz.
  - Normalize the network analyzer for gain and return loss.
6. Check the gain across the band from 869 MHz to 894 MHz. Gain should be between 58 dB. Record test data in table 5-3.

### 5-5.4 Harmonics Test

7. 10. With the power set at 140 watts power output, use the spectrum analyzer and check the frequency band from 869 MHz to 894 MHz for harmonics. Harmonics should be 5 dBm maximum. Record test data in table 5-3.

#### ***5-5.5 Spurious Test***

8. With the power amplifier set at 140 watts power output, use the spectrum analyzer and check the frequency band from 869 MHz to 894 MHz for spurious signals. Spurious signals should be -60 dBc maximum. Record test data in table 5-3.

#### ***5-5.6 Input Return Loss Test***

9. Reset and turn on amplifier module. Read and record the  $S_{11}$  return loss measurement on network analyzer. Input return loss should be -16 dB maximum. Record test data in table 5-3.

**Table 5-3 Multicarrier Cellular Amplifier Test Data Sheet**

DATE \_\_\_\_\_

AMPLIFIER S/N \_\_\_\_\_

**TEST CONDITIONS:**

Load and Source Impedance: 50 Ohms

VSWR: &lt; 1.2:1

Supply Voltage: +27 Vdc  $\pm$ 1.0 Vdc

| TEST              | SPECIFICATION   | MIN     | MAX     | DAT<br>A |
|-------------------|---|---------|---------|----------|
| 4-TONE IMD        | Vcc = 27 Vdc<br>PO = 140 W<br>Freq.: 880, 883, 886, and 889 MHz |         | -60 dBc |          |
| RF Gain           | Vcc = 27 Vdc<br>PO = 140 W<br>Freq. = 880 MHz                   | 57.5 dB | 58.5 dB |          |
| Gain Flatness     | Vcc = 27 Vdc $\pm$ 1 Vdc<br>PO = 140 W<br>869-894 MHz Band      | -0.5 dB | +0.5 dB |          |
| Harmonics         | Vcc = 27 Vdc<br>PO = 140 W<br>869-894 MHz Band                  |         | 5 dBm   |          |
| Spurious          | Vcc = 27 Vdc<br>PO = 140 W<br>869-894 MHz Band                  |         | -60 dBc |          |
| Input Return Loss | Vcc = 27 Vdc<br>PO = 140 W<br>869-894 MHz Band                  |         | -16 dB  |          |
| DC Power          | Vcc = 27 Vdc<br>PO = 140 W<br>4 Tones                           |         | 70 Amps |          |

PASS \_\_\_\_\_ FAIL \_\_\_\_\_

Tested by \_\_\_\_\_