

Exhibit 11. Tune-up Procedure

11.1 Equipment Required

Instrument	Manufacturer and Model
Power Supply	Astron VS-12M or RM-35M
RF Power Attenuator	Bird 100A-MFN-30
Power Meter	Agilent E4416A
Peak and Avg Power Sensor	Agilent E9321A
Vector Signal Analyzer	HP 89441A
Frequency Standard (GPS)	TrueTime Model XL-DC
Digital Voltmeter	Fluke 187
Personal Computer	Dell Inspiron 3000

11.2 Setup

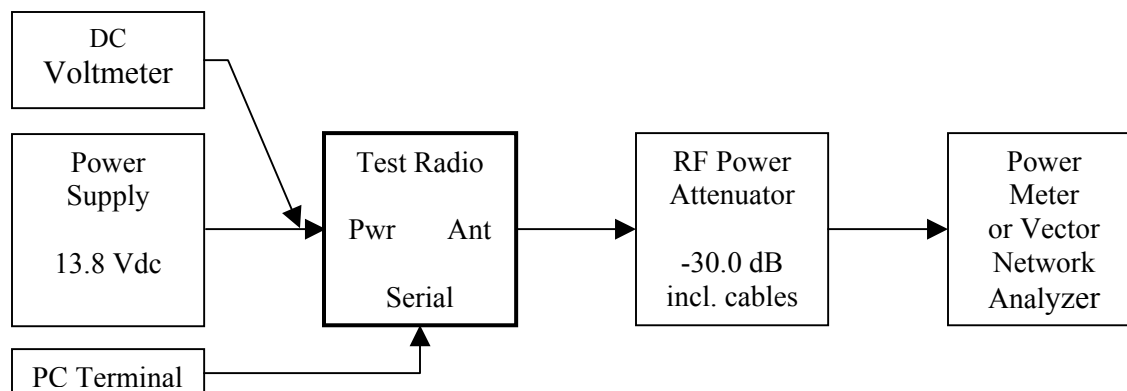


Figure 11.1 Test Setup for Tune-Up Procedure

11.3 Procedure:

11.3.1 Preliminary

The Tune-up Procedure consists of transmitter frequency and power output calibration.

Connect equipment as shown in the Test Setup diagram above using Vector Network Analyzer first. Total RF cable and RF attenuator loss should previously be verified by suitable means. Connect Frequency Standard (not shown) to Vector Network Analyzer.

1. Set computer terminal program for 9600-8-N-1 direct to com port.
2. Power radio. Wait for logon message to complete. Hit enter on pc to get menu.
3. Switch menu: Turn off auto scan and auto registration.
4. Main Menu: Select Channel 100.
5. Z Menu: Select Test modulation, QPSK
6. Z Menu: Set codec modulation level to -7 dB.
7. R Menu: Check power level value is set at 240.
8. R Menu: Set AFC to 1850 initially.
9. Adjust Vector Network Analyzer:
 - Frequency: 221.4975 MHz.
 - Set for Demodulation as follows:
 - Mode: QPSK
 - Symbol Rate: 3205.128 symbols per sec.
 - Filter: Root Raised Cosine, $\alpha = 0.25$
 - Display: Set to list show carrier frequency error and error vector magnitude.

11.3.2 Frequency Calibration

1. R Menu: Key Transmitter and measure carrier frequency error on vector analyzer.
2. R Menu: If necessary, adjust manual AFC control until carrier frequency error magnitude is 10 Hz or less on the vector network analyzer.
3. R menu: Unkey transmitter
4. Disconnect Vector Network Analyzer and connect Peak Wattmeter and its sensor in place at the output of the attenuator.

11.3.3 Power Output Calibration

1. Wattmeter: Power up and run calibration routine. Recall settings for reading peak power at 221 MHz. Verify that display offset equals the cable and attenuator loss (normally 30 dB). Set for normal trigger.
2. R Menu: Key transmitter and measure peak power. Value should be 1.0 W peak plus or minus 0.1 Watt. Unkey transmitter.
3. Z menu: If necessary, adjust codec output modulation level up or down and repeat step 2 until the power level is as specified.

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