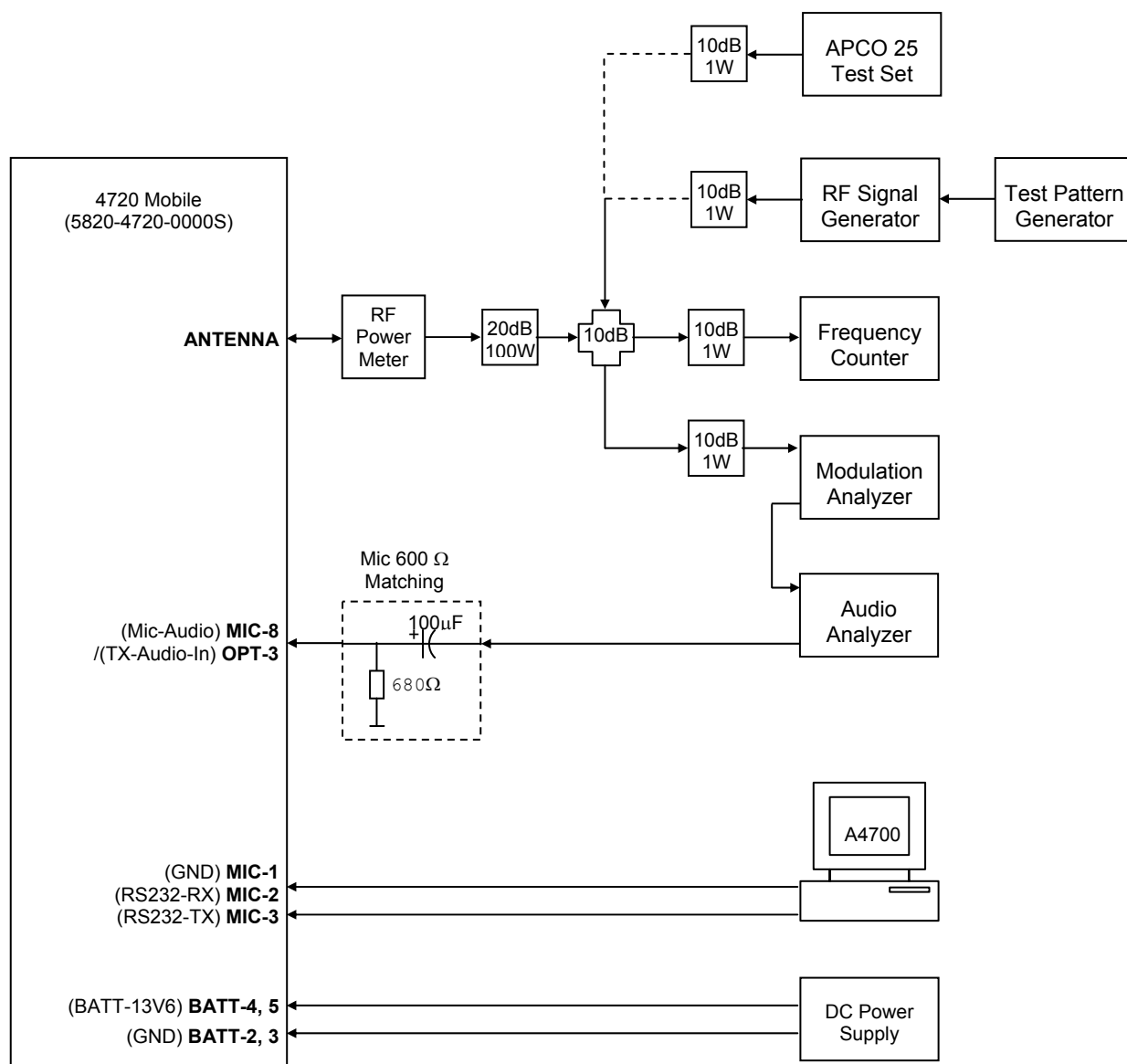


5 METHODS OF ADJUSTMENTS



4720 Mobile Radios Adjustment Set-up

- a) Connect the equipment as illustrated.
- b) Set the Power Supply output voltage to 13.6 volts and current limit to 10 amperes.
- c) Set the RF Signal Generator output to its minimum level.
- d) Set the Audio Analyzer output impedance to 600 Ω and amplitude to 0 Vrms.
- e) Set the Modulation Analyzer to measure peak deviation. Set the audio bandwidth for ≤ 5 Hz to ≥ 15 kHz. Turn the de-emphasis function off.
- f) Run A4700.exe on the PC.
- g) Click on the Read Radio icon and enter the "Radio Adj." menu.
- h) Adjustments specified in steps 5.1–5.12 should be applied consecutively.
- i) Adjustments specified in steps 5.1–5.12 should be applied to all models unless otherwise specified.
- j) If "Analog Frequency Adjustment" is changed, then "C4FM Receive Level Adjustment" has to be repeated.
- k) If "Modulation Flatness Adjustment" or "Modulation Limiting Adjustment" is changed, then the successive modulation and deviation adjustments have to be repeated.
- l) RF signal modulated with Standart Transmitter Low Deviation Pattern in step 5.12 can be obtained from IFR 2975 Apco Test Set or an RF Signal Generator connected to TDU 4700 Test Pattern Generator, which is calibrated according to the method specified in step m).
- m) Connect TDU 4700 output to RF Signal Generator EXT DC FM input. Connect RF Signal Generator output to Modulation Analyzer RF input. Run TDU4700.exe on the PC and select Standart Symbol Rate Pattern on TDU4700 window. Set RF Signal Generator output level to 10 dBm. Adjust RF Signal Generator modulation level to obtain 2800 ± 30 Hz deviation on Modulation Analyzer.

NOTE: The alternative test equipments, which can be used in the adjustment set-up, should be compatible to those specified in EIA-603-B and/or TIA-102.CAAA-B standards.

5.1 RF Output Power Adjustment

- a) Enter “RF Output Power Adjustment” window and click “Transmit”.
- b) Adjust RF Output Power Parameter to obtain the measured power levels to be equal to the selected power levels for each selected frequency.

5.2 Analog Frequency Adjustment 25 kHz

- a) Enter “Analog Frequency Adjustment 25 kHz” window and click “Transmit”.
- b) Adjust Analog Frequency Parameter 25 kHz until the frequency error to be less than 10 Hz at the test frequency.

5.3 Analog Frequency Adjustment 12.5 kHz

- a) Enter “Analog Frequency Adjustment 12.5 kHz” window and click “Transmit”.
- b) Adjust Analog Frequency 12.5 kHz parameter until frequency error to be less than 10 Hz at the test frequency.

5.4 Digital Frequency Adjustment

Applicable only to digital models.

- a) Enter “Digital Frequency Adjustment” window and click “Transmit”.
- b) Adjust Digital Frequency parameter until frequency error to be less than 10 Hz at the test frequency.

5.5 Modulation Flatness Adjustment

- a) Enter “Modulation Flatness Adjustment” window, select the lower test frequency and click “Transmit”.
- b) Set the audio signal frequency to 50 Hz and adjust the audio signal level to obtain 3000 Hz deviation on Modulation Analyzer. The audio signal level should be 100 ± 20 mVrms at the OPT-3 (TX-Audio-In) input of the radio.
- c) Set the audio signal frequency to 50 Hz, click “MOD-2” and set the measured audio signal level on Audio Analyzer as 0.0 dB reference.
- d) Set the audio signal frequency to 3000 Hz, click “MOD-1” and adjust MOD-1 parameter to obtain 0.0 ± 0.05 dB audio signal level on Audio Analyzer.
- e) Repeat the steps c) and d).
- f) Select the medium test frequency.

- g) Set the audio signal frequency to 50 Hz, click “MOD-2” and adjust MOD-2 parameter to obtain 0.0 ± 0.05 dB audio signal level on Audio Analyzer.
- h) Set the audio signal frequency to 3000 Hz, click “MOD-1” and adjust MOD-1 parameter to obtain 0.0 ± 0.05 dB audio signal level on Audio Analyzer.
- i) Repeat the steps g) and h).
- j) Select the higher test frequency and repeat the steps g) and h).
- k) Repeat the step j).

5.6 Modulation Limiting Adjustment

- a) Enter “Modulation Limiting Adjustment” window and click “Transmit”.
- b) Set the audio signal frequency to 1 kHz and level to 2 times of the level in step 5.5-b).
- c) Adjust Modulation Limit parameter until deviation to be 4600 ± 50 Hz.

5.7 FM Deviation Adjustment

- a) Enter “FM Deviation Adjustment” window and click “Transmit”.
- b) Set the audio signal frequency to 1 kHz and level to 1 Vrms at MIC-8 input.
- c) Adjust FM Deviation parameter until deviation to be 4500 ± 50 Hz.
- d) Set the audio signal amplitude to 0 mVrms.

5.8 C4FM Deviation Adjustment

Applicable only to APCO25 models.

- a) Enter “C4FM Deviation Adjustment” window and click “Transmit”.
- c) Adjust C4FM Deviation parameter until deviation to be 2800 ± 30 Hz.

5.9 GMSKFM Deviation Adjustment

Applicable only to SK2/SAGE models.

- a) Enter “GMSKFM Deviation Adjustment” window and click “Transmit”.
- c) Adjust GMSKFM Deviation parameter until deviation to be 3800 ± 40 Hz.

5.10 Squelch Adjustment

- a) Enter “Squelch Adjustment” window.
- b) Set the RF signal frequency to the test frequency, modulation frequency to 1 kHz, deviation to 3 kHz and adjust the RF signal level for 10 dB SINAD. This RF level referred at the antenna input should be less than -119 dBm.
- c) Adjust the Squelch parameter from RX LED is off condition to the position where RX LED is just on or click “AUTOMATIC” for the automatic squelch adjustment.
- d) Adjust the RF signal level in 0.2 dB increments from RX LED is on condition to the position where RX LED is just off and record this level referred at the antenna input as Squelch Closing Level.
- e) Adjust the RF signal level in 0.2 dB increments from RX LED is off condition to the position where RX LED is just on and record this level referred at the antenna input as Squelch Opening Level.
- f) Squelch Opening Level should be less than -119 dBm, the difference between Squelch Opening Level and Squelch Closing Level should be 2.5 ± 1.0 dB and SINAD at Squelch Opening Level should be 10 ± 2 dB. Otherwise repeat the steps b) to f).

5.11 RSSI Adjustment

- a) Enter “RSSI Adjustment” window.
- b) Set the RF signal frequency to the test frequency without modulation.
- c) Set the RF signal level at the antenna input to the selected levels on RSSI Adjustment window and click “READ RSSI”.

5.12 C4FM Receive Level Adjustment

Applicable only to APCO25 models.

- a) Enter “C4FM Receive Level Adjustment” window.
- b) Apply -47 dBm RF signal modulated with Standard Transmitter Low Deviation Pattern to the antenna input and click “READ RECEIVE LEVEL”.
- c) Displayed DC voltage level should be 1.0 ± 0.1 Vdc and AC voltage level should be 150 ± 15 mVpp. Otherwise repeat the steps b) to c).