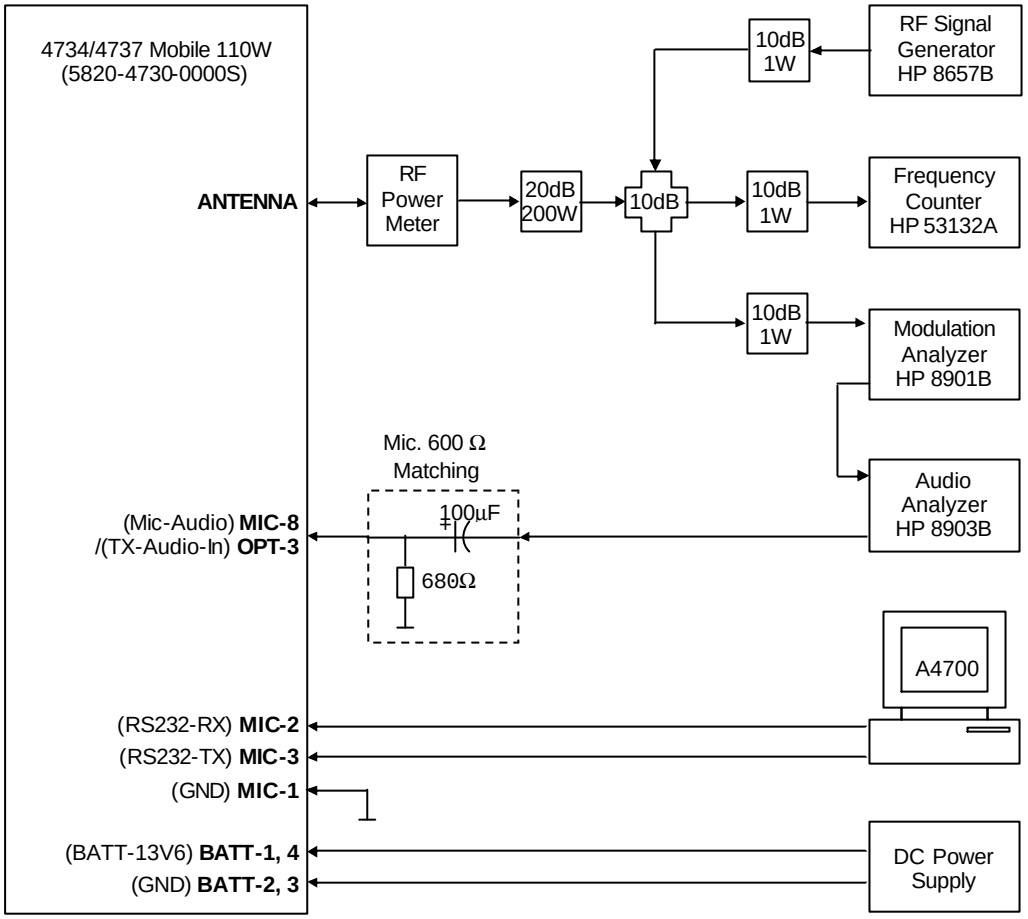
5 METHODS OF ADJUSTMENTS



a) Connect the equipment as illustrated.

b) Set the Power Supply output voltage to 13.6 volts and current limit to 20 amperes.

c) Set the RF Signal Generator output to its minimum level.

d) Set the Audio Analyzer output impedance to 600 O and amplitude to 0 Vrms.

e) Set the Modulation Analyzer to measure +/-peak deviation. Turn the de-emphasis function off. Set the audio bandwith for ≤ 5 Hz to ≥ 15 kHz.

f) Run MRA.exe, click on the "Read Radio" icon and enter the "Radio Adj." menu.

g) Adjustments in steps 5.1–5.12 should be applied consecutively and should be applied to all models unless otherwise specified.

h) If "Analog Frequency Adjustment" is changed, then "C4FM Receive Level Adjustment" has to be repeated.

i) If "Modulation Flatness Adjustment" or "Modulation Limiting Adjustment" is changed, then the successive modulation and deviation adjustments have to be repeated.

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

a) Enter "Analog Frequency Adjustment 25 kHz" window and click "Transmit".

b) Adjust parameter until the frequency error to be less than 10 Hz at the test frequency.

5.3 Digital Frequency Adjustment

Applicable only to digital models.

a) Enter "Digital Frequency Adjustment" window and click "Transmit".

b) Adjust parameter until frequency error to be less than 10 Hz at the test frequency.

5.4 Modulation Flatness Adjustment

a) Enter "Modulation Flatness Adjustment" window, select the lower test frequency and click "Transmit".

b) Set the audio signal frequency to 20 Hz and adjust the audio signal level to obtain 3000±50 Hz deviation on Modulation Analyzer. The audio signal level should be 500±100 mVrms at the OPT-3 (TX-Audio-In) input of the radio.

c) Set the audio signal frequency to 20 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 2000 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 20 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 2000 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).

5.5 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-b) at the OPT-3 input.

c) Adjust Modulation Limit parameter until deviation to be ±4600±50 Hz.

5.6 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 ±4400±50 Hz.

d) Set the audio signal amplitude to 0 mVrms.

5.7 C4FM Deviation Adjustment

Applicable only to APCO P25 models.

a) Enter "C4FM Deviation Adjustment" window and click "Transmit".

b) Adjust C4FM Deviation parameter until deviation to be 2800±30 Hz.

5.8 GMSKFM Deviation Adjustment

Applicable only to SK2 models.

a) Enter "GMSKFM Deviation Adjustment" window and click "Transmit".

b) Adjust GMSKFM Deviation parameter until deviation to be 3600±40 Hz.

5.9 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 8 dB SINAD. This RF level referred at the antenna input should be less than –120 dBm for VHF or –119 dBm for UHF.

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 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 Openning Level.

f) Squelch Openning Level should be less than –120 dBm for VHF or –119 dBm for UHF, the ratio between Squelch Openning Level and Squelch Closing Level should be 2.5±1.0 dB and SINAD at Squelch Openning Level should be 8±2 dB.

5.10 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".

d) Displayed RSSI values should be "@ -114 dBm:185±30, @ -102 dBm:240±30".

5.11 C4FM Receive Level Adjustment

Applicable only to APCO P25 models.

a) Enter "C4FM Receive Level Adjustment" window.

b) Set the RF signal frequency to the test frequency, modulation frequency to 1200 Hz, deviation to 940 Hz and RF signal level to -47 dBm referred at the antenna input and click "READ RECEIVE LEVEL".

c) Displayed DC voltage level should be 0.95±0.1 Vdc and AC voltage level should be 135±20 mVpp.

5.12 GMSKFM Receive Level Adjustment

Applicable only to SK2 models.

a) Enter "GMSKFM Receive Level Adjustment" window.

b) Set the RF signal frequency to the test frequency, modulation frequency to 1000 Hz, deviation to 3600 Hz and RF signal level to -47 dBm referred at the antenna input and click "READ RECEIVE LEVEL".

c) Displayed DC voltage level should be 0.95±0.1 Vdc and AC voltage level should be 280±40 mVpp.