

TUNE UP PROCEDURE

PCB Testing

1. Adjust the power supply voltage to 12.5V before connect FC-301D to power supply, switch the power on. Then set up the channel frequency.
2. Set the transceiver to TX and switch CF3 to channel 16 and test the VT voltage on TP1, Adjust TC301 to make VT to be $5.6V \pm 0.1V$, the frequency should be 174.125Mhz. Switch CF3 to channel 7 and measure VT voltage to be $3.1V \pm 0.1V$, the frequency should be 150.125Mhz. Switch CF3 to channel 1 and measure VT voltage to be $1.9V \pm 0.1V$, the frequency should be 136.125Mhz. Test TP2 and set the channel frequency, Set spectrum analyzer to SPAN=100K, Amplitude=0dBm, the amplitude should be $0 \pm 3dBm$. Spurious Emission $\geq 70dB$.
3. Set the transceiver to RX and switch CF3 to channel 16 and test the VT voltage on TP1, Adjust TC302 to make VT to be $5.0V \pm 0.1V$, the frequency should be 219.225Mhz. Switch CF3 to channel 7 and measure VT voltage to be $3.2V \pm 0.1V$, the frequency should be 195.225Mhz. Switch CF3 to channel 1 and measure VT voltage to be $2.0V \pm 0.1V$, the frequency should be 181.225Mhz. Test TP2 and set the channel frequency, Set

spectrum analyzer to SPAN=100K, Amplitude=0dBm, the amplitude should be $0\pm 3\text{dBm}$. Spurious Emission $\geq 70\text{dB}$.

RF Test of TX

1. Set HP 8920A in status of 'TX Test', transceiver PCB to be in TX status.
2. Test TP6 and respectively read the transmission power of channel 1, 7, 16 to be $20\text{mW}\pm 10\text{mW}$. Fine tuning VR1 to control the frequency error between TX and standard value in range of $\pm 300\text{Hz}$.
3. Set the channel space as wide-band and test TP6: Set 1KHz, 100mV sinusoidal signal as signal source on HP8920A. Connect CON1① of the radio to audio output of HP8920A, Set jumper S1 at MIC-IN, set the radio in TX status. Test channel 1, 7 and 16 respectively, Adjust VR41, the Max frequency deviation $< 5\text{KHZ}$, distortion is less than 10%, The HP8920A will output 1KHz sinusoidal signal with amplitude 20mV, the frequency deviation is $3\text{KHZ}+0.5\text{KHZ}$; Also off the output signal of HP8920A, the residual frequency deviation should be less than 70Hz.
4. Set the channel space as wide-band and test TP6: Choose 1KHz, 100mV square signal as signal source on HP8920A.

Connect CONI① of the radio to audio output of HP8920A, Set jumper S1 at DATA-IN, set the radio in TX status. Test channel 1 ,7 and 16 respectively, Adjust VR404, VR403, the frequency deviation should be in range of 2.0KHz to 2.8KHz. Change the signal source to 100Hz, 100mV square signal, Adjust VR407, the demodulated output audio should be 100Hz square signal.

5. Set the channel space as wide-band and test TP6: Set 1KHz ,100mV sinusoidal signal as signal source on HP8920A. Connect CONI① of the radio to audio output of HP8920A, Set jumper S1 at MIC-IN, set the radio in TX status. Test channel 1 ,7 and 16 respectively, Adjust VR41, the Max frequency deviation $<3\text{KHZ}$, distortion is less than 10%, The HP8920A will output 1KHz sinusoidal signal with amplitude 20mV, the frequency deviation is $1.5\text{KHZ}+0.5\text{KHz}$; Also off the output signal of HP8920A, the residual frequency deviation should be less than 70Hz.

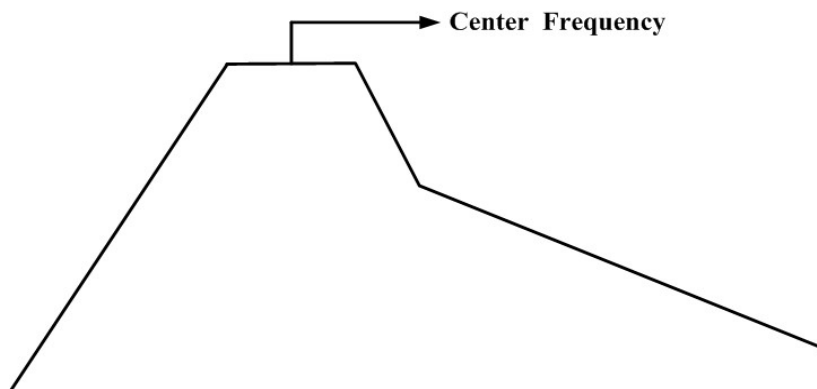
Passband Test of RX

1. Setting of HP8920A as below:

TX Test---- SPEC ANL---- RF Ant-----Center Freq
-----Input scanning frequency-----Ref Level set as —

20dBm-----Span set as 200MHz-----Main select RF Gen
-----Exited-----Amplitude set as -40dBm---- RF Out.

2. Connect the ANT IN port of HP8920A to TP7, and see its frequency spectrum as below



3. While testing, each frequency should be set to corresponding tuning value.

TX Test of FC-301/D

1. Set HP8920A at the status of TX Test and set FC-301/D radio in TX status
2. Fine tuning VR1 to meet the error between TX frequency and standard frequency among $\pm 300\text{Hz}$.
3. Adjust suitable tuning value for each channel, to control the TX output power of each channel to be 4.5W-6W and current to be less than 1.5A
4. Set 1KHz, 200mV sinusoidal signal as signal source on HP8920A. Connect CONI① of the radio to audio output of

HP8920A, Set jumper S1 at MIC-IN, set the radio in TX status. Test channel 1, 7 and 16 respectively, the Max frequency deviation $< 5\text{KHZ}$ for 25KHz, 3KHz for 12.5KHz, distortion is less than 3%, Also off the output signal of HP8920A, the residual frequency deviation should be less than 80Hz.

RX Wide Band Test of FC-301/D

1. Set HP8920A in status of RX Test (preset the modulation signal to RF output level=1mV, frequency=1KHz, Frequency deviation= 3kHz.). Set the radio in RX status.
2. The reading of AF OUT level should be $190\pm 20\text{mV}$ and distortion less than 5%.
3. Test RX sensitivity: Set the RF output signal of HP8920A to $0.25\mu\text{V}$ and test the demodulation audio signal, SINAD should be better than 12dB.
4. When SINAD drops to be 10dB, SQ should be high level output. When SINAD rises to more than 12dB, SQ should be low level output.
5. RSSI output level should to be from 2.2V to 0.8V
6. Audio output power should be $2.2\text{V}\pm 50\text{mV}$.

RX Narrow Band Test of FC-301/D

1. Set HP8920A in status of RX Test(preset the modulation signal to RF output level=1mV, frequency=1KHz, Frequency deviation= 1.5kHz.). Set the radio in RX status.
2. The reading of AF OUT level should be $190\pm 20\text{mV}$ and distortion less than 5%.
3. Test RX sensitivity: Set the RF output signal of HP8920A to $0.25\mu\text{V}$ and test the demodulation audio signal, SINAD should be better than 12dB.
4. When SINAD drops to be 10dB, SQ should be high level output. When SINAD rises to more than 12dB, SQ should be low level output.
5. RSSI output level should to be from 2.2V to 0.8V
6. Audio output power should be $2.2\text{V}\pm 50\text{mV}$.