

Tandy Electronics (China) Limited

Alignment Procedures

Subject: FRS Radio
Cat. / Model No.: 21-1905

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Approved By	

Standard Alignment Conditions

Power Supply: 6 V DC
Antenna Impedance: 50 ohm
RF Signal Modulation: FM, 1 kHz sine wave with 1.5 kHz deviation
Tuning Channel: Channel 1 (462.5625MHz)
Audio Loading: 32 ohm
Audio Output Power: 200 mW

1. *VCO Tuning*

The tunable range of the VCO should be adjusted to make sure the control voltage of the VCO is enough margin for PLL locking

- 1.1 Tuning component : L201
- 1.2 Equipment : DVM for voltage measurement
- 1.3 Personnel : Skilful
- 1.4 Measure the control voltage of VCO to make sure there is enough margin for PLL margin:
 - 1.4.1 Set to channel 1
 - 1.4.2 Measure the voltage at TP201 and it should be higher than 1.4V
 - 1.4.3 Set to channel 22
 - 1.4.4 Press PTT key
 - 1.4.5 Measure the voltage at TP201 and it should be lower than 1.7V

2. *Modulation Limit Tuning*

Set the transceiver to operate in Channel1 and tune off the CTCSS tone, and connect the antenna output of the transceiver to the RF tester and monitor the modulation level.

Input audio signal (1 kHz sine wave, 100 mV) through the stereo jack to the transceiver. RF signal is transmitted. Adjust VR701 until the frequency deviation is around but less than 1 kHz

- 2.1 Tuning component : VR701
- 2.2 Equipment : Through stereo jack cable, connect the audio generator and transceiver together. Communication test set and modulation analyser.
- 2.3 Personnel : Skilful

3. *Squelch Tuning*

The squelch function of 21-1903 is realized by rectifying the demodulated noise signal. If the rectified noise level is higher than the threshold. A logic level will be generated to the MCU to determine the on and off of speaker. Hence by adjusting the level input to the rectifier, the squelch level can be controlled.

- 3.1 Tuning component : VR101
- 3.2 Equipment : Test jig with pin connected to speaker terminal

Signal generator at -123dBm with 1KHz modulation source of 1.5KHz FM modulation

3.3 Personnel : Skiful

3.4 Testing procedure :

3.4.1 Input RF signal = 462.5625 MHz, frequency deviation = 1.5 kHz, modulating signal = 1 kHz.

3.4.2 Connect the transceiver to the RF generator and monitor the audio output from the speaker terminal.

3.4.3 Rotate VR1 until the audio signal is ON.

3.4.4 Adjust output power of the RF generator until the SINAD meter show 10-13dB.

2.4.5 Rotate VR1 until the audio signal is JUST muted.

3.4.6 Increase the output power in ½ dB step until the audio is just resumed. The SINAD meter should read 12-15 dB.

4. RF power Tuning

The ERP power should be tuned to 1.87W in GMRS channel (channel 1-7, 15-22)

The ERP power should be tuned to 400mW in FRS channel (channel 8-14)

4.1 Tuning component : VR501

4.2 Equipment : Communication test set with RF power measurement option

4.3 Personnel : Skiful

4.4 Testing procedure :

4.4.1 Connect the DUT to the communication test set.

4.4.2 Set to channel 1.

4.4.3 Press PTT key to activate the TX ON.

4.4.4 Adjust VR501 to 1.87W.