Tandy Electronics (China) Limited

Alignment Procedures

Subject: **FRS**
Cat. / Model No.: **21-1863**

Revision	**A**
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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 4 (462.6375MHz)**
Audio Loading:	**32 ohm**
Audio Output Power:	**200 mW**

1. TCXO Frequency Tuning

The reference frequency 10.25MHz of the PLL is generated by the TCXO circuit (X801 and Q801). Since the TCXO frequency may be off tuned. We can measure output through TP7 by using spectrum analyzer to check the accuracy.

1.1 Tuning component : VC801
1.2 Equipment : Spectrum analyzer with high stability time base
1.3 Personnel : Skilful
1.4 Measure the 10.25MHz TCXO output signal to make sure it is accuracy:
- 1.4.1 Set channel 4
- 1.4.2 Press monitor key
- 1.4.3 Monitor the frequency of the TCXO output signal through the TP7
- 1.4.4 Tune the VC801 until the TCXO output carrier is at 10.25MHz ± 0.0005 MHz

2. 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

2.1 Tuning component : L201
2.2 Equipment : DVM for voltage measurement
2.3 Personnel : Skilful
2.4 Measure the control voltage of VCO to make sure there is enough margin for PLL margin:
- 2.4.1 Set to channel 1
- 2.4.2 Press Monitor key
- 2.4.3 Measure the voltage at TP3 and it should be higher than 0.4V
- 2.4.4 Set to channel 14
- 2.4.5 Press Monitor key
- 2.4.6 Measure the voltage at TP3 and it should be lower than 2.6V

3. Modulation Limit Tuning

Set the transceiver to operate in Channel 4 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 VR101 until the frequency deviation is around but less than 2 kHz

3.1 Tuning component : VR101

3.2 Equipment : Through stereo jack cable, connect the audio generator and transceiver together. Communication test set and modulation analsyer.

3.3 Personnel : Skilful

4. Squelch Tuning

The squelch function of 21-1863 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.

4.1 Tuning component : VR101

4.2 Equipment : Test jig with pin connected to speaker terminal
Signal generator at –124dBm with 1KHz modulation source of 1.5KHz FM modulation

4.3 Personnel : Skiful

4.4 Testing procedure :

4.4.1 Input RF signal = 462.6375 MHz, frequency deviation = 1.5 kHz, modulating signal = 1 kHz.

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

4.4.3 Hold down MONITOR key and reduce the generator output power in ½ dB step until the SINAD meter shows 9-11 dB.

4.4.4 Rotate VR101 until the audio signal is **JUST** resumed from mute.

4.4.5 Reduce the RF generator output power until the audio signal is muted. Increase the output power in ½ dB step until the audio is just resumed. The SINAD meter should read 8-12 dB.

5. RF power Tuning

In order to meet FCC requirement, the ERP output power should be tuned to 410mW.

5.1 Tuning component : R503

5.2 Equipment : Communication test set with RF power measurement option

5.3 Personnel : Skiful

5.4 Testing procedure :

5.4.1 Connect the DUT to the communication test set.

5.4.2 Set toe channel 4.

5.4.3 Press PTT key to activate the TX ON.

5.4.4 Set the R503 to lower or higher value to increase or decrease the RF power respectively.