GMRS1072

Test and Alignment Procedure

REVISION SHEET

Rev.	Code	Rev. Date	Revision	Revised By:
M-00		Jan.3,2007		

TABLE OF CONTENT

1. RECOMMENDED TEST EQUIPMENT

1.1 HP8920A,B Radio Communication Tester or equivalent with Spectrum Analyzer option.
1.2 Fluke 187 Digital Voltmeter or equivalent
1.3 HPE3615A Power Supply or equivalent

2. TEST PREPARATION

2.1 Connect a 6.0Vdc power supply to the positive battery terminal input point and the negative battery terminal input point (GND) into the negative terminal.
2.3 Connect the HP8920A,B RF Output port to the ANT point.
2.4 SPK (+) should be connected to the *Audio In Hi* and SPK (-) should be connected to the *Audio In Lo* of the HP8920B.
2.5 Set the unit at CH1 (462.5625MHz)

3. VOLTAGE REGULATOR TEST

3.1 MCU Regulator
- Connect a voltmeter to **Pin6 of IC601** (MCU REG) and measure the voltage. The value must be between **TBD**.

3.2 RX Regulator
- Connect a voltmeter to **Pin7 of IC601** (RX REG) and measure the voltage. The value must be between **TBD**.

3.3 TX Regulator
- Connect a voltmeter to **Pin8 of IC601** (TX REG) and measure the voltage. The value must be between **TBD**.

3.4 VCO Regulator
- Connect a voltmeter to **Pin10 of IC601** (VCO REG) and measure the voltage. The value must be between **TBD**.

3.5 IC Regulator
- Connect a voltmeter to **Pin11 of IC601** (IC REG) and measure the voltage. The value must be between **TBD**.

4. VCO ADJUSTMENT

4.1 Set the unit at CH1 and connect a digital voltmeter to **VCO TP** (R510 & C520 connect point).
4.2 Press and hold the PTT Button so the unit is in transmit mode.
4.3 *Adjust L304 until the voltmeter reads 1.2 to 1.3Vdc (without VCO Plate). L304 is located under the shieldcan.*
Solder VCO Plate and let temperature stabilize. Recheck TX VCO at CH1, should be 1.0~1.3 Vdc
4.4 Release the PTT button so the unit will be in receive mode.
4.5 Observe the voltage at **VCO TP**, the voltage should be **0.6~2.5Vdc**.
4.6 Set the unit at **CH14**.
4.7 Press and hold the PTT button so the unit is in transmit mode.
4.8 Observe the voltage at **VCO TP**, the voltage should be **1.0~2.5Vdc**.

4.9 Release the PTT button so the unit will be in receive mode.
4.10 Observe the voltage at **VCO TP**, the voltage should be **0.6~2.5Vdc**.

NOTE : Above Specifications are measured with VCO Plate soldered.

5. TRANSMITTER FREQUENCY ALIGNMENT

5.1 Set the unit at CH1. Press and hold the PTT button so the unit will be in transmit mode.
5.2 Adjust **CT501** trimmer capacitor until such that the output frequency is equal to the channel frequency with maximum error of +/-200Hz **(OQA Limit of +/-800Hz).** Production will control as follows:
- *PCBA Alignment : +/-200Hz*
- *Casing Test : +/-500Hz*
- *OQA Limit : +/-800Hz*

6. TRANSMITTER OUTPUT POWER CHECK

6.1 Set the unit at CH1. Set the Power Supply at 5Vdc. Power is at Hi condition (use short cable)
6.2 Press and hold the PTT button so the unit is in transmit mode. Make sure Battery Voltage is at 5Vdc during PTT.
6.3 Transmit Power should be **> 0.8W.**
6.4 Set the unit at CH14, only Power Lo condition could be checked.
6.5 Press and hold the PTT button so the unit is in transmit mode. Ensure the TX Power is within **0.2~0.7W.**

7. TRANSMITTER DEVIATION ADJUSTMENT

7.1 Connect an audio generator (600ohms) to the microphone terminal pads. The audio frequency should be set at 1KHz with a level of 200mVrms.
7.2 Connect an FM Deviation Meter (on the HP8920B) on ANT point. Set the monitor to read *(Pk to Pk)/2* deviation. Set *Filter 1* to 25Hz and *Filter 2* to 15KHz. *De-emphasis* should be set to Off.
7.3 Press and hold the PTT button so the unit will be in transmit mode.
7.4 Adjust **VR601** and observe the reading at the Deviation Meter, the reading should be between **2.2 to 2.3**KHz. Checking at all condition (w/o CTCSS) should be 2.0~2.8KHz.
7.5 Decrease the audio generator level until the deviation reads +/-1.5KHz. The generator level should be between **3 to 10mV**.
7.6 Check that the transmit audio distortion is less than 5%.
7.7 Set the CTCSS to Code 1. Turn OFF the audio generator. Press and hold the PTT button so the unit will be in transmit mode.
7.8 Confirm that the CTCSS Code modulation is between 0.4 to 0.7KHz
7.9 Set the CTCSS to Code 38. Press the PTT button so the unit will be in transmit mode.
7.10 Confirm that the CTCSS Code modulation is between 0.4 to 0.7KHz.

8. RECEIVER OUTPUT CHECK

8.1 Set the RF Generator level to –47dBm. The generator should be set for 1.5KHz deviation at 1KHz modulation.
8.2 Set *Filter 1* to 25Hz and *Filter 2* to 15kHz.
8.3 Connect Audio Analyzer to SPK(+ & - Point)
8.4 Set the unit Volume Level to maximum.
8.5 Check the maximum Audio Output Level, should be **>1.5V (w/ load)**.
8.6 Set the Volume at **500mV** Output. Confirm that the RX Distortion is less than 5%.
8.7 Reduce the RF Generator signal level until a 12dB Sinad reading is achieved. The RF Generator level should be less than –120dBm (nominal -123dBm).
8.8 Set the unit to WX Mode. Set the RF Generator to WX CH1 (162.550MHz). Repeat procedure 9.7 and confirm WX Sensitivity is **<-115dBm** at 12dB Sinad.

9. SQUELCH THRESHOLD AND HYSTERISIS

9.1 Set unit same as 9.1.
9.2 Set the RF Generator level to -124dBm.
9.3 Adjust **VR501** until the unit squelches (RX Off).
9.4 Slowly increase the RF Signal Generator level until the unit un-squelches (RX On), confirm that the sensitivity is between **6~14**dB Sinad.

10. VOX TEST

10.1 Set the unit into VOX Mode. The VOX icon should be displayed on the LCD.
10.2 Connect an audio generator into the microphone terminal. The audio frequency should be set for 1KHz frequency with a level of 1mVrms and the output should be turned off.
10.3 Turn on the output of the audio generator.
10.4 Increase the Audio Generator level until unit goes into TX Mode.
10.5 Check the Generator level, it should be between **1.5~5.0mV**.

11. LOW BATTERY LEVEL TEST

11.1 Set the unit into receive mode or standby mode.
11.2 Set the Power Supply voltage to 4.6Vdc.
11.3 Slowly decrease the Power Supply Voltage until the Low Battery icon appears and blink in the LCD Display.
11.4 Observe the Power Supply Level. The level must be **4.0 to 4.5Vdc**.

12. JACK CHARGING TEST

12.1 Connect a fully charged Ni-MH Battery Pack (~6.0Vdc) into the unit.
12.2 Set the Power Supply to **9Vdc**.
12.3 Insert the Charger Jack into the Microphone Jack.
12.4 Monitor the current on the **Battery (+)** line.
12.5 Confirm that the Charging Current is within **60~85mA**.

13. DESKTOP CHARGING TEST (for DESKTOP Charger Checking only)

13.1 Connect a fully charged Ni-MH Battery Pack (~6.5Vdc) into the unit.
13.2 Mount the unit at the DESKTOP CHARGER.
13.3 Monitor the current on the **Charger Adaptor (+)** line.
13.4 Confirm the Charging Current is within **60~85mA**.

14. FREQUENCIES & CODE TABLE

14.1 FRS & GMRS

CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)
1	462.5625	12	467.6625
2	462.5875	13	467.6875
3	462.6125	14	467.7125
4	462.6375	15	462.5500
5	462.6625	16	462.5750
6	462.6875	17	462.6000
7	462.7125	18	462.6250
8	467.5625	19	462.6500
9	467.5875	20	462.6750
10	467.6125	21	462.7000
11	467.6375	22	462.7250

14.3 CTCSS CODE

CODE NO.	FREQ. (Hz)	CODE NO.	FREQ. (Hz)
1	67.0	20	131.8
2	71.9	21	136.5
3	74.4	22	141.3
4	77.0	23	146.2
5	79.7	24	151.4
6	82.5	25	156.7
7	85.4	26	162.2
8	88.5	27	167.9
9	91.5	28	173.8
10	94.8	29	179.9
11	97.4	30	186.2
12	100.0	31	192.8
13	103.5	32	203.5
14	107.2	33	210.7

15	110.9	34	218.1
16	114.8	35	225.7
17	118.8	36	233.6
18	123.0	37	241.8
19	127.3	38	250.3