

# **ALIGNMENT PROCEDURE**

**P-1010**

Rev : 01

Date : 20060522

Total Pages : 3

Prepared by : \_\_\_\_\_

Approved by : \_\_\_\_\_

<b>1. TRANSMITTER ALIGNMENT (TEST CONDITION: USE 7.4VDC 1.2A SUPPLY)</b>			
NO.	ITEM	ALIGNMENT METHOD (WITH PRODUCTION SPEC.)	REMARKS
1.1	Check LCD	<ol style="list-style-type: none"> <li>1. Switch on the power ( SW451), check all segments should display clearly &amp; correctly.</li> <li>2. Check the current should be <math>\leq 60\text{mA}</math>.</li> </ol>	
1.2	Rx / Tx VCO	<ol style="list-style-type: none"> <li>1. Connect a voltmeter between CV test point and ground</li> <li>2. Check Rx VCO should be <math>2.2 \pm 0.3\text{V}</math> on Frequency 445.25MHz</li> <li>3. Connect PTT button to ground.</li> <li>4. Check Tx VCO should be <math>2.2 \pm 0.3\text{V}</math> on Frequency 445.25MHz</li> <li>5. Release PTT button. Press and hold the MON button monitor green light will be on.</li> </ol>	
1.3	Tx Frequency	<ol style="list-style-type: none"> <li>1. Connect PPT button to ground and select frequency 445.25MHz</li> <li>2. Adjust VC2 until Tx frequency should be 445.25MHz <math>\pm 0.30\text{kHz}</math>.</li> </ol>	
1.4	Tx Power	<ol style="list-style-type: none"> <li>1. Connect PPT button to ground and select frequency 410.005MHz and frequency 479.987MHz</li> <li>2. Check Tx power should be <math>\leq 36\text{dBm}</math> at Ant point</li> </ol>	
1.5	Tx Modulation  Check CTCSS Tone Dev.  Check CTCSS Freq. Error Check Max. Deviation	<ol style="list-style-type: none"> <li>1. Connect PTT button to ground and Select frequency 445.25MHz</li> <li>2. Apply 4mVrms with 1kHz at mic input.</li> <li>3. Adjust VR552 until the frequency deviation 2.0k <math>\pm 0.1\text{kHz}</math> and check distortion should less than 5%.</li> <li>4. And also check if Tx frequency response as below: 300Hz = <math>1 \pm 0.2\text{kHz}</math> and 1.5kHz = <math>3.0\text{kHz} \pm 0.2\text{kHz}</math>.</li> <li>5. Select frequency 410.005MHz with Code 1, 12, 38, the CTCSS Dev = <math>0.6 \pm 0.15\text{kHz}</math></li> <li>6. Select frequency 479.987MHz with code 1, 12, 38, the CTCSS Dev = <math>0.6 \pm 0.15\text{kHz}</math></li> <li>7. Check CTCSS Code 12 should be 100Hz <math>\pm 0.2\%</math>.</li> <li>8. Increased mic input signal to <math>+40\text{dB}</math>, check max deviation should less than 2kHz and less than 2.5k with CTCSS.</li> </ol>	
1.6	Tx FM Noise	<ol style="list-style-type: none"> <li>1. Connect PPT button to ground.</li> <li>2. Connect 220uF E.Cap to mic input and ground.</li> <li>3. Check FM noise should less than 300Hz at frequency 410.005MHz and frequency 479.987MHz</li> </ol>	
1.7	Current Drain at max. Dev	<ol style="list-style-type: none"> <li>1. Connect PTT button to ground and selected frequency 445.25MHz</li> <li>2. Check Tx current should less than 1600 mA with max deviation.</li> </ol>	

<b>2. RECIEVER ALIGNMENT (TEST CONDITION: USE 7.4VDC 3A SUPPLY)</b>			
NO.	ITEM	ALIGNMENT METHOD (WITH PRODUCTION SPEC.)	REMARKS
2.1	Check Rx Audio Level  Rated Audio Output Power	<ol style="list-style-type: none"> <li>1. Set RF generator to 445.25MHz and set RF output to <math>-47\text{dBm}</math> with 1.5kHz deviation/1kHz.</li> <li>2. Terminated speaker point with 8 ohm load.</li> <li>3. Set speaker output level to 1.0V of unit. Check distortion should be less then 3%.</li> <li>4. Set speaker output level to 1.5Vrms. Check distortion should be less then 4.5%.</li> <li>5. Set speaker output level to max. Check distortion should <math>\leq 10\%</math>.</li> </ol>	

2.2	Check Rx Audio Response	<ol style="list-style-type: none"> <li>1. Set RF generator to <b>445.25MHz</b> and set RF output to -47dBm with 1.5kHz deviation/1kHz.</li> <li>2. Set speaker output to 1.0V of unit with input signal is 1kHz as reference point (0dB).</li> <li>3. Check Freq. Response : 300Hz <math>\pm</math>2 <math>\pm</math>3dB and 2.5kHz <math>\pm</math>6 <math>\pm</math>3dB</li> </ol>	
2.3	Rx Sensitivity	<ol style="list-style-type: none"> <li>1. Set RF generator to <b>445.25MHz</b> and set RF output to -47dBm with 1.5kHz deviation/1kHz.</li> <li>2. Set speaker output to 1.0V of unit and decrease RF output level to 12 dB sinad.</li> <li>3. Check RF output level of RF generator should less than -123dBm.</li> <li>4. Set RF generator to CH15 with 2.5kHz dev/1kHz and decrease RF output level to 12 dB sinad.</li> <li>5. The RF output level should less than -123dBm.</li> </ol>	
2.4	S/N ratio	<ol style="list-style-type: none"> <li>1. Set RF generator to <b>445.25MHz</b> and set RF output to -47dBm without modulation.</li> <li>2. Set speaker output to max of unit.</li> <li>3. Check (speaker output) S/N ratio should be &gt;40dB.</li> </ol>	
2.5	Rx Audio with CTCSS  Check RX Sens. with CTCSS  Check CTCSS Tone Decoder	<ol style="list-style-type: none"> <li>1. Select <b>445.25MHz</b> with CTCSS Code 12.</li> <li>2. Apply -47dBm RF signal with 1.5kHz deviation/1kHz and external input of RF Gen with 0.6kHz deviation/100Hz as CTCSS code.</li> <li>3. A 1kHz signal will be heard from speaker.</li> <li>4. Set speaker output to 1.0V and decrease RF level to 8dB sinad.</li> <li>5. The speaker should be on.</li> <li>6. Increase RF output level to -47dBm and change the external input Freq. of RF Gen. to 200Hz.</li> <li>7. The speaker should be off.</li> </ol>	

### 3. DC CURRENT DRAIN

(TEST CONDITION: USE 7.4VDC 3A SUPPLY ONLY)

NO.	ITEM	ALIGNMENT METHOD (WITH PRODUCTION SPEC.)	REMARKS
3.1	Check Battery Low	<ol style="list-style-type: none"> <li>1. Set the power supply to 5.1V <math>\pm</math>0.15V. Battery low icon should be flashing.</li> </ol>	
3.2	Check Standby Current (squelched)	<ol style="list-style-type: none"> <li>1. Check the standby current should less than 60mA (squelched).</li> </ol>	
3.3	Max. Audio Output	<ol style="list-style-type: none"> <li>1. Adjust speaker volume to set speaker output level =1.0V and distortion 5%.</li> <li>2. Check current should less than 200mA.</li> </ol>	
3.4	Check charging current	<ol style="list-style-type: none"> <li>1. Switch off the unit. Check charging current should less than 300 <math>\pm</math>30mA with 9Vdc/800mA DC adaptor.</li> </ol>	

~~ END ~~