

GIANT ELECTRONICS LTD.		
Title: Alignment and Test Procedure		Version: 1.0
Model: T9140	Document No.: ENG-T9140-08	Page: 1 / 5

A. RF PCBA Level			
NO	ITEM	ALIGNMENT METHOD	REMARK
1	Tuning VCO	1. Place the RF board under test into the test jig, 2. Set the main board in the test jig to Channel 14 and then make it enter TX mode. 3. Adjust L113 until the voltage tested at TP103 falls into the range of 1.8V to 2.2V. 4. Check the voltage at TP103 must be >0.6V for CH15 at RX mode.	

B. Combined PCBA Level			
NO	ITEM	ALIGNMENT METHOD	REMARK
1.	LCD display (Under the test mode)	1. Together hold down “+” and “-” keys, then press the “MP3/FRS” key until a call tone sound is heard, which signifies the radio enters the test mode. 2. Press the “-” key, then, all segments in FRS area of LCD should be displayed one by one. 3. Finally, all segments should be shown for about 500ms.	
2.	Power off current	1. Set A-Meter for the unit under Power-down mode. 2. Check the Power off current <100uA	
3.	Adjust TX Frequency	1. Adjust C159 to provide 462.5625MHz \pm 100Hz at CH1.	
4.	TX Power and Current	1. Connect the unit to Spectrum Analyzer. 2. Set CH # to enter TX mode. 3. Check TX power should be 0.06W ERP at Ch 4 and 0.05W ERP at Ch11. 4. Check TX current should be <400mA DC	DC Power Supply 4.5V
5.	TX Modulation Parameters	1. Provide a tone of 100mV 1KHz at TP116, adjust VR101 to provide max FM deviation of 2.0+/-0.1KHz. 2. Check that input level should be 5~15 mV when the normal deviation of 1.5KHz presents. 3. Check FM distortion <= 6%. 4. Audio Frequency Response <ul style="list-style-type: none"> a) Set the input signal to 3mV and press ‘PTT’ key. b) Check the response (the deviation of 1KHz tone as 0dB reference) <ul style="list-style-type: none"> i) 500Hz: -8.5dB to -2.5dB. ii) 2.5KHz: +1.5dB to + 7.5dB. 	Tester Settings: 1. <20Hz HPF 2. 15KHz LPF 3. PK +-Max Detector
6	EVOX level	1. Input 1KHz AF signal at TP116. 2. Set VOX level at 3 Unit start transmission: 4.0+/-0.5mV Unit stop transmission: 3.4+/-0.5mV 3. Set VOX level at 2 Unit start transmission: 8.0+/-1.0mV Unit stop transmission: 6.4+/-1.0mV 4. Set VOX level at 1 Unit start transmission: 11.5+/-2.0mV Unit stop transmission: 9.4+/-2.0mV	

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7.	Adjust Squelch Action Level	<ol style="list-style-type: none"> 1. Set SG at 1.5 KHz FM deviation, 1 KHz AF, and carrier of CH4, then vary RF output level. 2. Adjust VR1 to make SQ opening at 10 ~ 12 dB SINAD. 3. Check SQ muting at 4 ~11 dB SINAD. 	
8.	Rx Parameters test	<ol style="list-style-type: none"> 1. Set the unit with Speaker to CH4 and RX mode. 2. Set SG RF level to 1mV with 1.5 kHz deviation 1KHz modulation signal. 3. Press the “+” key until a maximum volume level tested at TP120 is provided. 4. Check Max audio output level >1.2Vrms, the current <150mA. 5. Plug earphone into the stereo jack. 6. Check the max level of earphone tested at TP4 should be >400mVrms. 7. Set the volume to the default level 9. 8. Check the 1KHz AF distortion <= 5%. 10. Adjust SG RF level to check the RX sensitivity <= -119dBm @12dB SINAD at TP4. 11. Audio frequency response. <ol style="list-style-type: none"> a) Set SG RF level to 1mV with 1.5kHz deviation at 1KHz audio frequency. b) Set the volume to the default level, c) Check the response (the level of 1KHz tone as 0dB reference) <ol style="list-style-type: none"> i) 500Hz: -12.0 dB to -6.0 dB. ii) 2.0KHz: -21.5 dB to -15.5 dB. 9. Minimum Audio output level. <ol style="list-style-type: none"> a) Set SG RF level to -50dBm with 1.5kHz deviation at 1KHz audio frequency. b) Check the minimum volume level <65mVrms at TP4. 	
9.	RX Standby current	<ol style="list-style-type: none"> 1. Set A-Meter and make the unit under test enter standby mode. 2. Check the standby current as follows: <ol style="list-style-type: none"> 2.1. Sleep current <20mA 2.2. RX on current <50mA 	
10.	Battery capacity Detection	<ol style="list-style-type: none"> 1. Provide 1.5VDC at BP102. 2. Alkaline battery capacity: <ul style="list-style-type: none"> ● From 3 blocks display to 2 blocks: 4.22+/-0.15V ● From 2 blocks display to 1 block: 3.9+/-0.15V ● From 1 block display to Empty frame display: 3.45+/-0.15V 3. Disconnect 1.5VDC at BP102. 4. Rechargeable battery capacity: <ul style="list-style-type: none"> ● From 3 blocks display to 2 blocks: 3.9+/-0.15V ● From 2 blocks display to 1 block: 3.6+/-0.15V ● From 1 block display to Empty frame display: 3.2+/-0.15V 	

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11.	MP3 Parameters test	<ol style="list-style-type: none"> 1. Connect the unit to PC, 2. Download MP3 test files from the PC to the internal Flash of the unit. 3. Insert the earphone and dummy microphone into the stereo jack of the unit. 4. Press the PLAY key to play the 1kHz MP3 file, then set maximum volume, the level tested at TP4 should be >200mV, the total drained current <120mA, the distortion <2%. 5. Input a tone of 7.0mV 1KHz to the dummy microphone, then make MP3 record it. 6. Play the recorded signal, check the max output level at TP4 >200mV, the distortion <15% 7. Audio frequency response. <ol style="list-style-type: none"> a) Play other audio frequency files from 50Hz to 15KHz. b) Check the response (the level of 1KHz tone as 0dB reference) should be in the range of -3dB to 3 dB. 8. Enter MP3 stop mode, check the standby current <70mA 9. Enter MP3 power-off mode, the current <5mA 10. Pull out the earphone, Check the max output level at TP120 should be >400mV, the consumption current <150mA. 	
12.	Detect and Operation of SD card and Internal Flash	<ol style="list-style-type: none"> 1. Plug a SD card into the SD socket, LCD displays immediately "PROCESSING MMC/SD", 2. Then, the displayed total amount of songs included in the units is refreshed to include the songs in the SD card. 3. Select a song stored in the SD card to play 4. Connect the unit to PC, through Windows Explorer, both of the internal flash and SD card can be operated normally, that is, Copy and Delete files etc. 	
13.	Charging Current	<ol style="list-style-type: none"> 1. Connect the USB output connector of Adaptor connected to Main Line to the unit. 2. At this moment, the unit under any mode will immediately enter MP3 stop mode. 3. Monitor the current flowing through the dummy load: 65mA to 95mA 	The dummy load to imitate the rechargeable battery is a resistor of 47 Ohm.

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C. CASING LEVEL			
NO	ITEM	ALIGNMENT METHOD	REMARK
1.	Current Test	1. Set A-METER. 2. Power on the unit, check the standby current as follows: a) Sleep current: <20mA, b) RX on current: <50mA 3. TX Current: <400mA. 4. Set volume to max level, RX current: <150mA. 5. MP3 play current with max speaker output: <150mA 6. MP3 standby current: < 70mA 7. MP3 power off current: <5mA 8. Unit Power off current: <100uA 9. Charging current: 65mA to 95mA	
2.	TX Frequency	1. Check CH1=462.5625MHz -/+500Hz; 2. Check CH14=467.7125 MHz -/+500Hz.	
3.	Audio TX Path	1. Check the radiated power compared with golden sample at CH14. 2. Plug the dummy microphone into the stereo jack. 3. TX Deviation. a) Input a tone of 100mV 1kHz to dummy microphone and press 'PTT' key. b) Check maximum FM deviation: 2.0+/-0.2KHz. c) Check input level of 5~15mV to provide normal deviation 1.5KHz, the distortion <6%. 4. Audio Frequency Response. a) Set the input signal to 3mV and press 'PTT' key. b) Check the response (the deviation of 1KHz tone as 0dB reference) 1) 500Hz: -8.5dB to -2.5dB. 2) 2.5KHz: +1.5dB to + 7.5dB 5. Repeat above steps for CH15	Tester Settings: 1. <20Hz HPF 2. 15KHz LPF 3. PK +-Max Detector The dummy microphone is a resistor of 10KOHM.
4	EVOX level	1. Input 1KHz AF signal at TP116. 2. Set VOX level at 3 Unit start transmission: 4.0+/-0.5mV Unit stop transmission: 3.4+/-0.5mV 3. Set VOX level at 2 Unit start transmission: 8.0+/-1.0mV Unit stop transmission: 6.4+/-1.0mV 4. Set VOX level at 1 Unit start transmission: 11.5+/-2.0mV Unit stop transmission: 9.4+/-2.0mV	
5.	Audio RX Path at CH5	1. Set SG RF level to 1mV with 1.5kHz Dev. at 1kHz AF, Press the "+" key until LCD shows 16 to give a max AF output. 2. Check speaker acoustic intensity >83dBspL. (30cm distance). 3. Plug the earphone and dummy microphone into the stereo jack. 4. Check AF output level to the earphone: Max >400mVrms; Min <65mVrms, the distortion with the volume of level 9 should be <5%. 5. Audio frequency response. a) Set the unit to the volume of level 9 b) Vary the audio frequency from 300Hz to 3KHz, check	The dummy microphone is a resistor of 10 KOhm

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		the RX response (the level of 1KHz tone as 0dB reference) 1) 500Hz: -12.0 dB to -6.0 dB. 2) 2.0KHz: -21.5 dB to -15.5 dB.	
6.	Noise-Detector	1. Set the distance between antennas of SG and checked unit to 0.3m ~ 0.5m. 2. The antenna of SG and checked unit should be parallel in order to attain maximum coupling in air. 3. Set SG to -90dBm with 1.5KHz deviation, 1KHz tone on CH4. 4. Check SINAD should be >12dB 5. Check the radiated sensitivity compared with the golden sample. 6. Turn off RF level of SG, the unit should mute fully.	When adjusting Noise-Det. , Should reduce any interference from other Instruments and body.
7.	Function check and Intercom function (between the golden sample and production unit)	1. Turn on the tested radio, a good key chirp should be heard. 2. The LCD display should be clear, not miss the segment when pressing '+' and '-' or '-' key, the key tone should also be heard clearly. 3. Set channels of the golden sample and production to 8. 4. Press 'PTT' key to intercom between the golden sample and production unit. 5. The sound quality between both should be clear and no metal sound. 6. Press 'CALL' key, the call tone should be heard clearly each other. 7. Change channel of the production unit to 7, then Press 'PTT' key of the golden sample. 8. Any noise should not be heard from the speaker of production unit. 9. Press any keys, the dead problem should not occur.	
8.	MP3 Part Test	1. Connect the unit to PC. 2. Download MP3 test files from the PC to the internal Flash of the unit. 3. Insert the earphone and dummy microphone into the stereo jack of the unit. 4. Press the PLAY key to play the 1kHz MP3 file, then set maximum volume, the level should be >200mV, the distortion <2%. 5. Input a tone of 7.0mV 1KHz to the dummy microphone, then make MP3 record it. 6. Play the recorded signal, check the max output level >200mV, the distortion <15%. 7. Audio frequency response. a) Play other audio frequency files from 50Hz to 15KHz. b) Check the response (the level of 1KHz tone as 0dB reference) should be in the range of -3dB to 3 dB.	The dummy microphone is a resistor of 10 KOhm

Remark:

1. TX mode: Press and hold PTT button
2. RX mode: Release PTT button
3. Power supply: Min DC 3.5V; Max DC4.5V

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