

GIANT ELECTRONICS LTD.

Title: Alignment Procedure

Model: T4600/T4400

Page: 1 of 4

A. PCB LEVEL (Test Condition: under CH1)

NO	ITEM	ALIGNMENT METHOD	REMARK
1.	LCD display (Should enter test mode)	1. Turn on the radio power until a good key chirp is heard, finally, the LCD should be display '1'. 2. Press 'DOWN' key , then all LCD segments should be Anti clock wise displayed. 3. Finally, all the LCD segments should be shown for about 500ms as follows: 218	
2.	Standby current	1. Set A-METER, and RX mode. 2. Check the standby current <45mA DC.	
3.	Talk on current	1. Set A-METER, and TX mode @50ohm load. 2. Check the talk on current <400mA DC.	
4.	VCO	1. Set test mode 2. Check TP3 to provide 0.8 ~ 2.3VDC. 3. Adjust L11 to provide 2.0 ± 0.1 VDC at TP103 if VCO level are more than 2.4VDC on TX modeCH20.	
5.	TX Power	1. Set TX mode Ch15, Check transmit power to provide $0.06W_{ERP}$ GMRS power 2. Set TX mode Ch14, Check transmit power to provide $0.07W_{ERP}$ FRS power	Test Voltage is 4.5VDC.
6.	TX Frequency	Adjust C53 to provide 409.75MHz $\pm$ 50Hz.	
7.	TX Modulation & distortion	1.Set AF level 25mv, 1KHz, Adjust VR1 to provide Max TX deviation 2.25KHz to 2.35KHz. 2.Check input Mic level in 0.5~10 mV to provide normal Deviation 1.5KHz. 3.Check the demodulation distortion <= 5%. 1. Audio Frequency Response. a) Input a 2.0mV 1KHz audio frequency to TP33 and press 'PTT' switch. b) Check the response compare to 1KHz tone. i) 500Hz : -5.0 dB to -11.0 dB. ii) 2.5KHz : +3.0 dB to +9.0 dB .	Filter set : 1.HPF 50Hz 2.LPF 15KHz 3. PK + All input at TP33

THE CONTENT OF THIS DOCUMENT IS GIANT ELCT.LTD. INTELLECTUAL PROPERTY AND IS THE PROPERTY OF GIANT, IT IS TO BE TREATED AS STRICTLY AND IS NOT BE DISCLOSED, REPRODUCED, OR USED EXCEPT AS AUTHORIZED IN WRITING BY GIANT ELECTRONIC LTD. IN CONNECTION WITH THE MANUFACTURE, MAINTENANCE AND USE OF THE GIANT EQUIPMENT WHICH IT PERTAINS. COPYRIGHT @GIANT ELECT. LTD, ALL RIGHTS RESERVED.

A. PCB LEVEL (Test Condition: under CH1)

NO	ITEM	ALIGNMENT METHOD	REMARK
8.	Rx Audio test	1. Set RX mode CH10. 2. Set SG RF level to -50dBm with 1.5KHz deviation 1KHz modulation Signal. 3. Adjust L13 to provide minimum distortion & max output level at TP37. 4. Press the volume “+” key until display show 15, which give a Max audio output at TP37. 5. Check Max audio output level >1350mV. 6. Check Rx current <150mA. 7. Press the volume “-“ key until display show 13. 8. Check the 1KHz distortion <= 5%. 9. Set SG RF level to -119dBm with 1.5kHz deviation at 1KHz audio frequency. - a). Check SINAD sensitivity <= -119dBm. @12dB SINAD at TP37. 10. Audio frequency response. a) Set SG RF level to -50dBm with 1.5kHz deviation at 1KHz audio frequency. b) Press the volume “-“key until display show 9 . c) Vary the audio frequency from 300Hz to 3KHz. d) Check the RX response compare to 1KHz tone. i) 500 Hz: +3.0 dB to +7.0 dB. ii) 2.5 KHz: -6.0 dB to -11.0 dB. 11. Maximum and Minimum Audio Output Power. a) Set SG RF level to -50dBm with 1.5kHz deviation at 1KHz audio frequency. b) Press the volume “+” .key until display show 15, which give a maximum output. c) Check the voltage at TP37 >=1350mV. d) Set maximum audio output to 0dB, Press the volume “-“ key until display show 1, which give a minimum output. e) Check the minimum voltage -13dB to -30dB at T37	32 OHM
9.	Noise- Detector	1. Set SG to -120dBm with 1.5KHz deviation., 1KHz AF on CH10. 2. Adjust VR102 for transient state @ 10dB SINAD. 3. Check high state @9 to 13dB SINAD.	
10.	Normal Batter level detect	1. Low Battery level : 3.8+/- 0.3V. 2. Dead battery level: 2.9 +/- 0.3V.	
11.	SCAN	1. Set SG RF level to -50dBm with 500hz deviation, 100 Hz modulation signal . 2. Press “Mon” key 3. Unit will shows channels number.	

B. CASING LEVEL

NO	ITEM	ALIGNMENT METHOD	REMARK
1.	Current Consumption	1. Set A-METER. With volume switch OFF, check the OFF current $<10 \mu A$. 2. With volume switch ON, check the standby current $<50mA$. Press 'PTT' switches and check the TX current $<400mA$.	
2.	TX Frequency	1. Check CH1=409.7500Mhz $\pm 500Hz$. 2. Check CH20 =409.9875MHz $\pm 500Hz$.	
3.	Noise- Detector	1. Set the distance between antennas of SG and checked unit to 0.3M ~ 0.5M . 2. The antennas of SG and checked unit should be parallel to make the electromagnetic field of SG . 3. radiate equally to the antenna of checked unit . 4. Set SG to -90dBm with 1.5KHz deviation, 1KHz tone on CH10. 5. Adjust VR102 for HIGH state : 9 ~ 13dB SINAD .	When adjusting Noise-Det. Should reduce any interference from other Instruments and body.
4.	Audio RX Path CH10	1. Set SG RF level to -50dBm with 1.5kHz Dev.;1kHz AF , Rotate the volume switch to the position, which give an Max output. 2. Check speaker O/P level $>85dB_{spL}$ (30cm distance). 3. Set SG RF level to -60dBm with 1.5kHz Dev.;1kHz AF. 4. Plug the dummy speaker and dummy microphone into audio jet. 5. Rotate the volume switch to the position, which give an output $900 \pm 50mV$. 6. Set SG RF level to -90dBm with 1.5kHz Dev.;1kHz AF. 7. Check the radiated sensitivity correlate to the golden sample. 8. Audio frequency response. a) Set SG RF level to -60dBm with 1.5kHz deviation at 1KHz audio frequency. b) Rotate the volume switch to the position, which give an output $100mV \pm 5mV$ (voltage difference of dummy speaker). c) Vary the audio frequency from 300Hz to 3KHz. d) Check the RX response compare to 1KHz tone. i) 500Hz : + 5.0 dB to +14.0 dB. ii) 2.5KHz : -12.0 dB to -20.0dB. 9. Maximum and Minimum Audio Output Power. a) Set SG RF level to -60dBm with 1.5kHz deviation at 1KHz audio frequency. b) Rotate the volume switch to the position, which give a maximum output with distortion $<5\%$. c) Check the voltage difference of dummy speaker $\geq 900mV$. d) Set maximum audio output to 0dB, rotate the volume switch to the position, which give a minimum output. e) Check the voltage difference between of dummy speaker -25dB to -40dB.	

THE CONTENT OF THIS DOCUMENT IS GIANT ELCT.LTD. INTELLECTUAL PROPERTY AND IS THE PROPERTY OF GIANT, IT IS TO BE TREATED AS STRICTLY AND IS NOT BE DISCLOSED, REPRODUCED, OR USED EXCEPT AS AUTHORIZED IN WRITING BY GIANT ELECTRONIC LTD. IN CONNECTION WITH THE MANUFACTURE, MAINTENANCE AND USE OF THE GIANT EQUIPMENT WHICH IT PERTAINS. COPYRIGHT @GIANT ELECT. LTD, ALL RIGHTS RESERVED.

GIANT ELECTRONICS LTD.

Title: Alignment Procedure

Model: T4600/T4400

Page: 4 of 4

B. CASING LEVEL

NO	ITEM	ALIGNMENT METHOD	REMARK
5.	Audio TX Path CH15	1. Check the radiated power correlate to golden sample. 2. Plug the dummy speaker and dummy microphone into audio jet. 3. Standard TX Deviation. a) Input mic level to dummy microphone and press 'PTT' switch. b) Check max. Dev. 1.9KHz < max. Dev. <2.2KHz. c) Check input level in 5~15mV to provide normal deviation 1.5KHz. 4. Audio Frequency Response. a) Input a 2.0mv@1KHz audio frequency to dummy microphone and press 'PTT' switch. b) Check the response. i) 500Hz : -5.0 dB to -11.0 dB. 2.5KHz : +3.0 dB to +9.0 dB 5.Repeat CH20.	Filter set : 1.HPF 50Hz 2.LPF 15HHz 3. PK +
6.	Function check and Intercom function (between sample and production unit)	1. Turn on the radio power , 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 channel of the sample and production unit CH=5. 4. Press 'PTT' switch to intercom between 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 CH=15 , then Press 'PTT' switch of sample. 8. Any noise should not be heard from the speaker of Production unit. 9. Press any key , the dead problem should not occur . 10.Set CH1/code5,SG to be CH1/code4 and code6,check the speaker mute.	

* Remark:

TX mode :

1. Press and hold PTT button

RX mode :

1. Release PTT button
2. Power supply: Min DC 3.5v;Normal DC4.0v; Max DC4.5V

THE CONTENT OF THIS DOCUMENT IS GIANT ELCT.LTD. INTELLECTUAL PROPERTY AND IS THE PROPERTY OF GIANT, IT IS TO BE TREATED AS STRICTLY AND IS NOT BE DISCLOSED, REPRODUCED, OR USED EXCEPT AS AUTHORIZED IN WRITING BY GIANT ELECTRONIC LTD. IN CONNECTION WITH THE MANUFACTURE, MAINTENANCE AND USE OF THE GIANT EQUIPMENT WHICH IT PERTAINS. COPYRIGHT @GIANT ELECT. LTD, ALL RIGHTS RESERVED.

tuneup.doc