

| GIANT ELECTRONICS LTD.     |                        |             |
|----------------------------|------------------------|-------------|
| Title: Alignment Procedure |                        |             |
| Model: L8270               | Document No.: ENG-     |             |
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| Prepare by                 | Check by               | Approved by |

| A. PCB LEVEL (Test Condition: under CH1) |                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                    |
|------------------------------------------|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| NO                                       | ITEM                                    | ALIGNMENT METHOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | REMARK                                             |
| 1.                                       | LCD display<br>(Should enter test mode) | 1. Press and hold the '+' key and 'Menu' key together.<br>2. Turn on the radio power until a good key chirp is heard, and the backlight is on for about 500 ms. finally, the LCD should be display '1 <sup>CH</sup> '.<br>3. Press 'DOWN' key, then all LCD segments should be anticlockwise displayed.<br>4. Finally, all the LCD segments should be shown for about 500ms as follows: 18 <sup>88</sup> .                                                                                                                                                                   |                                                    |
| 2.                                       | Standby current                         | 1. Set A-METER, and RX mode @50ohm load.<br>2. Check the standby current <45mA DC.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                    |
| 3.                                       | Talk on current                         | 1. Set A-METER, and TX mode.<br>2. Check the talk on current <480mA DC.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                    |
| 4                                        | VCO                                     | 1. Set TEST mode.<br>2. Adjust L113 to provide 0.7 ~2.2VDC at TP103<br>3. Check TP103 to provide 0.7 ~1.3VDC on Tx mode CH1.                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                    |
| 5.                                       | TX Power                                | 1. Set TX mode CH1.<br>2. Check transmit power to provide 19.8dBm ERP.<br>3. Set TX mode CH11.<br>4. Check transmit power to provide 19.9dBm ERP.                                                                                                                                                                                                                                                                                                                                                                                                                            | Supply Voltage= 4.5VDC                             |
| 6.                                       | TX Frequency                            | Adjust C159 to provide 462.5625MHz ± 50Hz at CH1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Filter Setting<br>HPF 50Hz<br>LPF 15KHz<br>PK +MAX |
| 7.                                       | TX Modulation & distortion              | 1. Set 50mv AF level at TP116; 1KHz, Adjust VR101 to provide max TX deviation 2.0KHz to 2.35KHz.<br>2. Check input mic level in 5~15 mV to provide normal deviation 1.5KHz.<br>3. Check the demodulation distortion ≤ 5%.<br>4. Audio Frequency Response <ul style="list-style-type: none"> <li>a) Input a 2.0mV 1KHz audio frequency to TP116 and press 'PTT' switch.</li> <li>b) Check the response compare to 1KHz tone               <ul style="list-style-type: none"> <li>i) 500Hz: -5.0 dB to -9.0dB.</li> <li>ii) 2.5KHz: +2.0 dB to + 9.0dB.</li> </ul> </li> </ul> |                                                    |

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| A. PCB LEVEL (Test Condition: under CH1) |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |        |
|------------------------------------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| NO                                       | ITEM                        | ALIGNMENT METHOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | REMARK |
| 8.                                       | Rx Audio test               | <ol style="list-style-type: none"> <li>1. Set RX mode CH4.</li> <li>2. Set SG RF level to <math>-50\text{dBm}</math> with 1.5 kHz deviation 1KHz modulation Signal.</li> <li>3. Adjust L114 to provide minimum distortion &amp; max output level at TP117.</li> <li>4. Rotate the volume switch to the position, which give a Max audio output at TP117.</li> <li>5. Check Max audio output level <math>&gt;1400\text{mV}</math>.</li> <li>6. Check Rx current <math>&lt;150\text{mA}</math>.</li> <li>7. Check the 1KHz distortion <math>\leq 3.5\%</math>.</li> <li>8. Set SG RF level to <math>-119\text{dBm}</math> with 1.5kHz deviation at 1KHz audio frequency. <ol style="list-style-type: none"> <li>a). Check SINAD sensitivity <math>\leq -118\text{dBm}@12\text{dB SINAD}</math> at TP117.</li> </ol> </li> <li>9. Audio frequency response. <ol style="list-style-type: none"> <li>a) Set SG RF level to <math>-50\text{dBm}</math> with 1.5kHz deviation at 1KHz audio frequency.</li> <li>b) Rotate the volume switch to the position, which give an output <math>100\text{mV}\pm 5\text{mV}</math> at TP117.</li> <li>c) Vary the audio frequency from 300Hz to 3KHz.</li> <li>d) Check the RX response compare to 1KHz tone. <ol style="list-style-type: none"> <li>i) 500Hz: <math>-9\text{ dB}</math> to <math>-18\text{dB}</math>.</li> <li>ii) 2.5KHz: <math>-18.0\text{ dB}</math> to <math>-25.0\text{ dB}</math>.</li> </ol> </li> </ol> </li> <li>10. Maximum and Minimum Audio Output Power. <ol style="list-style-type: none"> <li>a) Set SG RF level to <math>-50\text{dBm}</math> with 1.5kHz deviation at 1KHz audio frequency.</li> <li>b) Rotate the volume switch to the position, which give a maximum output.</li> <li>c) Check the voltage at TP117 <math>\leq 1400\text{mV}</math>.</li> <li>d) Set maximum audio output to 0dB; rotate the volume switch to the position, which give a minimum output.</li> <li>e) Check the minimum voltage <math>-23</math> to <math>-40\text{dB}</math> at TP117.</li> </ol> </li> </ol> |        |
| 9.                                       | Noise- Detector             | <ol style="list-style-type: none"> <li>1. Set SG to <math>-120\text{dBm}</math> with 1.5KHz deviation. 1KHz AF on CH4.</li> <li>2. Adjust VR1 for transient state @ 10dB SINAD.</li> <li>3. Check high state @ 7 to 14dB SINAD.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |
| 10.                                      | Normal Battery level Detect | <ol style="list-style-type: none"> <li>1. Provide 1.5V DC at BP102.</li> <li>2. Battery level: <math>4.2\pm 0.1\text{V}</math> level 1, <math>3.8\pm 0.1\text{V}</math> level 2, <math>3.4\pm 0.1\text{V}</math> level 3, <math>3.1\pm 0.1\text{V}</math> level 4.</li> <li>3. Disconnect 1.5V DC at BP102.</li> <li>4. Battery level: <math>3.7\pm 0.1\text{V}</math> level 1, <math>3.4\pm 0.1\text{V}</math> level 2, <math>3.2\pm 0.1\text{V}</math> level 3, <math>3.1\pm 0.1\text{V}</math> level 4.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |

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| <b>B. CASING LEVEL</b> |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                             |
|------------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| NO                     | ITEM                | ALIGNMENT METHOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | REMARK                                                                                      |
| 1.                     | Current Consumption | 1. Set A-METER.<br>2. With volume switch OFF, check the OFF current <10 $\mu$ A.<br>3. With volume switch ON, check the standby current <45mA.<br>4. TX Current.<br>a) Press 'PTT' switches and check the TX current <480mA.                                                                                                                                                                                                                                                                                                                         |                                                                                             |
| 2.                     | TX Frequency        | 1. Check CH1=462.5625MHz -/+500Hz;<br>2. Check CH14=467.7125 MHz -/+500Hz.                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                             |
| 3.                     | Noise- Detector     | 1. Set the distance between antennas of SG and checked unit to 0.3M ~ 0.5M.<br>2. The antennas of SG and checked unit should be parallel to make the electromagnetic field of SG.<br>3. Radiate equally to the antenna of checked unit.<br>4. Set SG to -90dBm with 1.5KHz deviation, 1KHz tone on CH4.<br>5. Adjust VR102 for HIGH state: 7 ~ 13 dB SINAD.                                                                                                                                                                                          | When adjusting Noise-Det. , Should reduce any interference from other Instruments and body. |
| 4.                     | Vox Detector        | 1.Set VOX level at 1.<br>2.Set AF level at 12 +/-0.2mV, 1KHz at TP116<br>3.Unit start to transmit.<br>4.Set AF level at 8.5 +/-0.2mV,1KHz at TP116<br>5.Unit stop to transmit<br>6.Set VOX level at 2.<br>7.Set AF level at 7.5 +/-0.2mV,1KHz at TP116<br>8.Unit start to transmit.<br>9.Set AF level at 5.0 +/-0.2mV,1KHz at TP116<br>10.Unit stop to transmit<br>11.Set VOX level at 3.<br>12.Set AF level at 3.5 +/-0.2mV,1KHz at TP116<br>13.Unit start to transmit<br>14.Set AF level at 2.0 +/-0.2mV,1KHz at TP116<br>15.Unit stop to transmit |                                                                                             |

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| <b>B. CASING LEVEL</b> |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |
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| NO                     | ITEM               | ALIGNMENT METHOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | REMARK |
| 5.                     | Audio RX Path CH10 | <ol style="list-style-type: none"> <li>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.</li> <li>2. Check speaker O/P level &gt;85dBspL(30cm distance).</li> <li>3. Set SG RF level to -60dBm with 1.5kHz Dev.; 1kHz AF.</li> <li>4. Plug the dummy speaker and dummy microphone into audio jet.</li> <li>5. Rotate the volume switch to the position, which give an output 900+/-50mv.</li> <li>6. Set SG RF level to -90dBm with 1.5kHz Dev.; 1kHz AF.</li> <li>7. Check the radiated sensitivity correlate to the golden sample.</li> <li>8. Audio frequency response. <ol style="list-style-type: none"> <li>a) Set SG RF level to -60dBm with 1.5kHz deviation at 1KHz audio frequency.</li> <li>b) Rotate the volume switch to the position, which give an output 100mV <math>\pm</math>5mV (voltage difference of dummy speaker).</li> <li>c) Vary the audio frequency from 300Hz to 3KHz.</li> <li>d) Check the RX response compare to 1KHz tone. <ol style="list-style-type: none"> <li>i) 500Hz: -9dB to -18.0 dB.</li> <li>ii) 2.5KHz: -18.0 dB to -25.0 dB.</li> </ol> </li> </ol> </li> <li>9. Maximum and Minimum Audio Output Power <ol style="list-style-type: none"> <li>a) Set SG RF level to -60dBm with 1.5kHz deviation at 1KHz audio frequency.</li> <li>b) Rotate the volume switch to the position, which give a maximum output with distortion &lt;5%.</li> <li>c) Check the voltage difference of dummy speaker <math>\leq</math>900mV.</li> <li>d) Set maximum audio output to 0dB; rotate the volume switch to the position, which give a minimum output.</li> <li>e) Check the voltage difference between of dummy speaker -23 dB to -40dB.</li> </ol> </li> </ol> |        |

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|----|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| 6. | Audio TX Path CH1 | <ol style="list-style-type: none"> <li>1. Check the radiated power correlate to golden sample.</li> <li>2. Plug the dummy speaker and dummy microphone into audio jet.</li> <li>3. Standard TX Deviation. <ol style="list-style-type: none"> <li>a) Input mic level to dummy microphone and press 'PTT' switch.</li> <li>b) Check max dev 1.8KHz&lt;max dev &lt;2.5KHz.</li> <li>c) Check input level in 0.5~10mV to provide normal deviation 1.5KHz.</li> </ol> </li> <li>4. Audio Frequency Response. <ol style="list-style-type: none"> <li>a) Input a 2.0mv@1KHz audio frequency to dummy microphone and press 'PTT' switch.</li> <li>b) Check the response. <ol style="list-style-type: none"> <li>i) 500Hz: -5.0 dB to -9.0 dB.</li> <li>2.5KHz: +2.0 dB to + 9.0 dB.</li> </ol> </li> </ol> </li> <li>5.Repeat CH8.</li> </ol> |  |
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| B. CASING LEVEL |                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |        |
|-----------------|---------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| NO              | ITEM                                                                      | ALIGNMENT METHOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | REMARK |
| 7.              | Function check and Intercom function (between sample and production unit) | 1. Turn on the radio power , the backlight should be on For a while and a good key chirp should be heard at The same time.<br>2. The LCD display should be clear, not miss the segment when pressing '+' and '-' or '-' key, the key tone should also be heard clearly.<br>3. Set channel of the sample and production unit CH=4.<br>4. Press 'PTT' switch to intercom between sample and Production unit, the LED should be light.<br>5. The sound quality between both should be clear and no metal sound.<br>6. Press 'CALL' key, the call tone should be heard clearly each other.<br>7. Change channel of the production unit to CH=8 , then Press 'PTT' switch of sample.<br>8. Any noise should not be heard from the speaker of Production unit.<br>9. Press any key, the dead problem should not occur. |        |

\* Remark:

Power supply: Min DC 3.3v; Max DC4.5v

TX mode:

1. Press and hold PTT button

RX mode:

1. Release PTT button

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