

## AN/GRM-122 and TS-4317 Calibration & Repair Shortcuts

### Before Calibration:

- a. Run the TS-4317 self test.
- b. Run BIT 1&2 on the J-box if the item is the GRM-122.
- c. Slave the SG-1207A oscillator to the GPS Receiver.

### Calibration Paragraph 7: Equipment Setup

- a. If the Signal Strength meter is more than a couple of dB low, go to the spectrum analyzer display and set it for 121.1 MHz. Check to see if the Amplitude is approximately correct for the -30 dB input. If it is drastically low also, you may have a bad Receive IF module. The Signal Strength meter can be set to read anything you want, which can mask a problem.

### Calibration Paragraph 8: AF Gen Frequency and Distortion

- a. Tee the AF Gen output off at the counter and connect it to the distortion analyzer. Do both Frequency and Distortion in parallel to save time.

### Calibration Paragraph 9: AF Gen Output Level

- a. If the level is off more than 1%, do the softcal adjustment first and check the results. If necessary, do the hardware adjustments.
- b. If it is necessary to do the hardware adjustments, be aware that Adjustment steps 3e and 3i should be 1 vice 7 to set the generator to Sine rather than 0 Lvl.

### Calibration Paragraphs 10 & 11: Distortion Meter and SINAD Meter

- a. If the Distortion meter is more than 0.1 % off or the SINAD meter is more than 0.1 dB off, do the softcal adjustment. Both are quick and easy and the SINAD meter especially can have a great effect on several BIT tests.

### Calibration Paragraph 12: DMM

- a. If the 200 mVAC range is not responding, check the fuses on the front of the DMM.
- b. If the Ohms function is not responding, check the fuses on the front of the DMM.
- c. If the DC current function is not responding, check the fuse inside the DMM.

### Calibration Paragraph 13: Generator Output Level

- a. The 0 dBm output level at 30 MHz will nearly always be about -0.3 dBm. If not, suspect the attenuator.
- b. When checking the Attenuator, decrease the output level in binary steps, i.e.: 1, 2, 4, 16, 32, 64, and 122 dB down.
- c. At each step, slap the TS-4317 on the left side where the Attenuator is located. If the output level indication on the 8902 changes more than a few hundredths of a dB, you probably have a bad attenuator.
- d. The check at -122 dBm tests the attenuator in the Power Termination.
- e. If the flatness tails off several dB as the frequency is increased, the likely cause is the 90 MHz Generator.

### Calibration Paragraph 14: Spectral Purity

- a. If this fails, suspect the First LO, or possibly the 90 MHz Generator.

### Calibration Paragraph 15: Generator Residuals

- a. If this paragraph fails, look at the First LO, or possibly the 90 MHz Gen.

### Calibration Paragraph 16: Generator Frequency

- a. Adjust to nominal at 900 MHz every calibration.
- b. If the softcal runs out of adjustment, set the softcal to 2200.
- c. Go to the Oscillator module in the right rear of the TS-4317 next to the power supply and remove the cover screw from the top of the module.
- d. Adjust the pot under the screw for approximately the correct frequency.
- e. Adjust the softcal for fine adjustment of the output freq.

### Calibration Paragraph 17: Oscilloscope

- a. In step 2k, set the sweep rate to 10 us.
- b. In step 5, set the sweep rate to 1 us.
- c. In step 6, set the sweep rate back to 10 us for 50 kHz and 1 us for 1 MHz.
- d. If the scope is malfunctioning, suspect the Digitizer card.

### Calibration Paragraph 18: Spectrum Analyzer

- a. Connect the SG-1207A directly to the TI with the output level set to 0 dBm.
- b. Ignore step 3.

- c. After step 5, set the TI scan rate to 20 kHz and then 200 kHz. If necessary, adjust the centering adjustment on the top of the Analyzer RF Mech Assy for the best center compromise between the two.
- d. Set the Scan Rate to 1 kHz. If the blip is not centered, go to the calibration menu, select Analyzer Horizontal Centering and adjust for a centered display at 1 kHz. The default value is 35. If you are much different from that, you may have something misadjusted.
- e. Resume with step 7, but don't bother with the 8902. For each frequency and scan rate in table 12, adjust the SG-1207 so the trace is centered and then adjust the output frequency 4 times the scan rate above and below that frequency. In other words, if you have a scan rate of 1 kHz and the trace is centered with the 1207 set to 10.000040 MHz, dial the output 4 kHz above and below that frequency. The trace should be centered on the fourth vertical line to the left and right of center plus or minus one half major divisions.
- f. If the trace shows a hump in the center when setting up for the amplitude linearity test in step 13, do the First LO Feed-through alignment portion of the Spectrum Analyzer alignment.

#### 1. Calibration Paragraph 19: Power Meter

- a. **Do not leave the Attenuator in the setup above 100 mW!!!**
- b. **When the meter is indicating one watt, you are applying 4 watts to the power splitter. Be very careful you are not exceeding the rated power of your splitter!!!!**
- c. I adjust the softcal of the power meter at 10 MHz, because it is easier for me to control the low frequency amp, but you may have different equipment.
- d. The power meter actually has two ranges: 2W and 200 W. I adjust the 2W range using the Bird wattmeter as the standard, as well as the 200W range.
- e. If you replace the power termination, be sure you have the correct diode type selected in the power meter calibration screen. The old style power termination (7005-7849-800) is a type 1 diode and the new style (7005-1142-200) is a type 3.
- f. Once you have changed the diode type, you have to cycle the instrument power to reboot it.

#### 1. Calibration Paragraph 20: Generator Amplitude Modulation

- a. In step 4e, set the frequency to 121.1 MHz.
- b. Ignore steps 5-7. Assume the residual AM is zero.
- c. In step 14, leave the 50 Hz HP filter off.

#### 1. Calibration Paragraph 21: Generator Frequency Modulation

- a. In table 16 ignore the 20 kHz check for both frequencies. I have never seen a TI pass this check.
- b. In table 17, ignore the 900 MHz 15 kHz filter line.

#### 1. Calibration Paragraph 22: FM Peak Deviation Meter

- a. In step 8, after doing the FM Zero, adjust the 1207 output frequency to balance the residual about zero before recording it.
- b. If the residual deviation is a significant portion of the indication tolerance once the post detection low pass filter has been widened out to 9 or 15 kHz, you may have a bad 3<sup>rd</sup> LO or 1<sup>st</sup> LO.
- c. If you need to go through the adjustment procedure, do step 7 before step 6.

#### 1. Calibration Paragraph 23: Amplitude Modulation Meter

- a. Works as advertised.

#### 1. Calibration Paragraph 24: Frequency Error Meter & RF Counter

- a. Use the SG-1207 for both 1 MHz and 900 MHz.

#### 1. Calibration Paragraph 25: AF Counter

- a. Works as advertised.