The following suggested procedure does not obligate Tektronix to use this technique or specifications as cited. Responsibility is only assumed for appropriate specifications as published in the manual furnished with an instrument.

SUGGESTED PROCEDURE FOR

CALIBRATION GR 50/250 MC OSCILLATORS AGAINST

180A to GR Specifications of 1%

I. METHOD:

A. Use a 180A which has been certified against WWV or suitable standard.

B. Feed 180A into harmonic generator.

C. Mix appropriate harmonic with GR Oscillator.

D. Read difference frequency from mixer from oscilloscope display.

II. EQUIPMENT TO BE USED:

A. Any oscilloscope with 500 KC bandpass and .05 volt sensitivity.

B. Mixer-rectifier *(contains harmonic generator). Available from FMS.

C. 180A Time Mark Generator, 50 mc output.

III. PROCEDURE:

A. Arrange equipment as shown in Figure I.
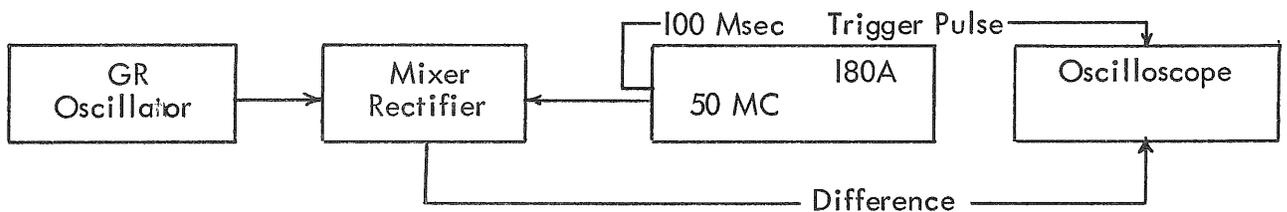
FIGURE I

B. Set scope controls:

1. Vertical sensitivity   .2 volts/cm, AC

2. Triggering mode   Ext., AC

3. Sweep   1 millisec/cm

4. Trigger from 180A with 100 millisec trigger pulse.

C. As the GR oscillator is adjusted to a harmonic of 50 mc, a display may be observed.

NOTE:

Due to harmonics beating against harmonics, there may be several outputs (as viewed on the test scope) in the vicinity of the frequency being checked. Use the highest amplitude display when checking the calibration of the GR Oscillator.

The frequency of the GR Oscillator should be changed slowly enough to insure that the difference signal can be seen on the test scope. If the oscillator is adjusted through the desired test frequency too fast, a display may not be seen.

1. The display frequency is the difference in frequency between the GR oscillator and the harmonic frequency. This display will not be stable but the instability is negligible compared to the frequency of operation.

2. Example:

   a. GR oscillator dial at 200 mc.

   b. 2 kc display observed on oscilloscope.

   c. $\dfrac{2\ kc}{200,000\ kc} = .001\%$

   d. ±3% oscilloscope error insignificant as it would contribute ±.03 x 2 kc = ±.06 kc.

   $\dfrac{\pm.06\ kc}{200,000\ kc} = \pm.00003\%$

   e. 1% error at 200 mc would be 2 mc.

   f. Recalibration 180A error in the order of .0003%.

   g. This method easily allows calibration of GR oscillators to better than 1%.

D. Record dial reading for each 50 mc interval as necessary.

E. Calibrator should be aware that frequency varies with loading of GR oscillator.

Dave Barr
Inst. Mfg. Qual. Assurance
Measurement Standards and
 Product Reliability