

## 2.1095 Frequency Stability

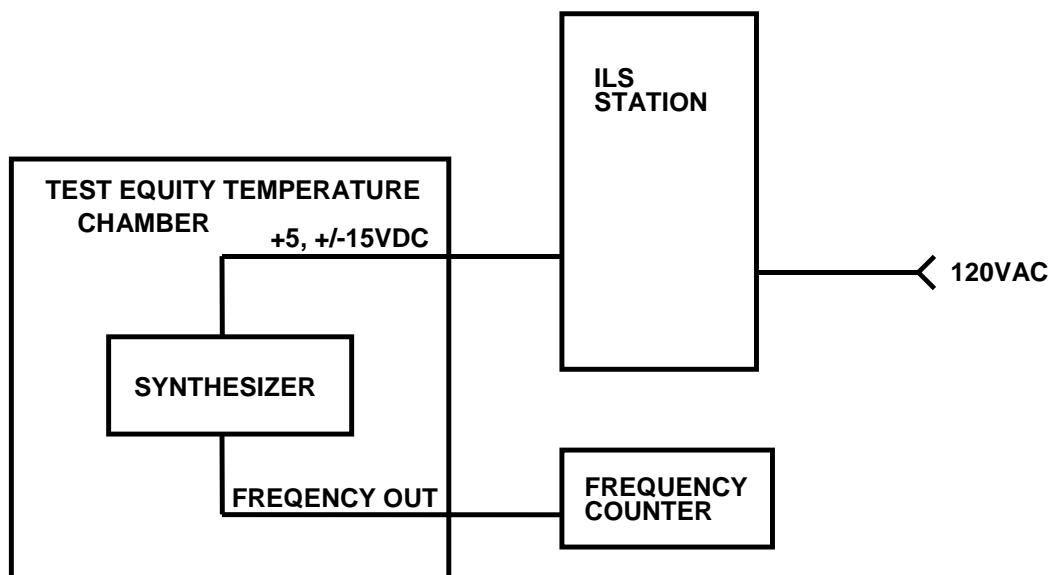
### Measurements Required:

The frequency stability shall be measured with variations of ambient temperature from  $-30^{\circ}$  to  $+50^{\circ}$  centigrade. Measurements shall be made at the extremes of the temperature range and at intervals of not more than  $10^{\circ}$  centigrade through the range. A period of time sufficient to stabilize all of the components of the oscillator circuit at each temperature level shall be allowed prior to frequency measurement.

The frequency variation shall be measured with variation in primary supply voltage.

- (1) Vary primary supply voltage from 85 to 115 percent of the nominal values for other than hand carried battery equipment.
- (2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point.
- (3) The supply voltage shall be measured at the input to the cable normally provided with the equipment.

### Test Arrangement:



The measure procedure outlined below shall be followed:

Step 1: The transmitter synthesizer shall be installed in an environmental test chamber whose temperature is controllable. Provision shall be made to measure the frequency of the unit.

Step 2: The chamber shall be stabilized at  $+20^{\circ}$  centigrade. After a temperature stabilization period of one hour at  $+20^{\circ}$  C, the transmitter frequency shall be measured. This frequency is the *reference frequency* for the remainder of the test.

Step 3: Increase the Chamber temperature to  $+50^{\circ}$ C. After stabilizing the transmitter at  $+50^{\circ}$ C, measure the transmitter frequency.

Step 4: Decrease the chamber temperature in 10°C steps and measure the transmitter frequency after a stabilization period at each 10°C step making the last measurement at -30°C.

The frequency stability was measured with variations in supply voltage (battery) to the DC-DC converter. An HP6032 DC power supply was used to vary the voltage at the battery input. The frequency was measured and its variation in parts-per-million was calculated. Data was taken per paragraphs 2.1095 and 87.133.

FREQ (MHz)	FREQUENCY STABILITY VS TEMPERATURE IN PARTS PER MILLION (PPM)								
	TEMPERATURE IN °C								
	-30	-20	-10	0	+10	+20	+30	+40	+50
110.104	-3.77	-0.95	-0.05	+0.27	+0.25	0	0	-0.31	-0.36

FREQ (MHz)	STABILITY VS VOLTAGE VARIATION (±15%) IN INPUT VOLTAGE PPM		
	102 Vac	120 Vac	138 Vac
110.104	0	0	0

The limit of 20 parts-per-million was specified in paragraph 87.133 for radio navigation equipment. Specifications of paragraphs 2.1095 and paragraph 87.133 are met. There are no deviations to the specifications.