

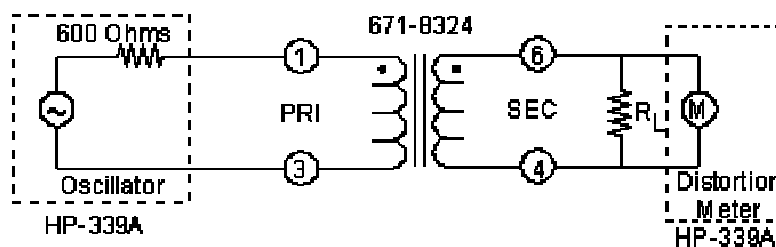
## Transformer Distortion Test Method Using an HP-339A or equivalent

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15-Jan-97

Since a telecom transformer's Total Harmonic Distortion is critical to high-speed modem use, we have been asked by many customers to describe the proper test method for measuring this parameter. The following test method is based on use of an HP-339A Total Harmonic Distortion+Noise (THD+N) meter, although other meters and methods are available which provide equivalent results.

Total Harmonic Distortion Specification: 671-8324

FREQ.	LEVEL	PRI	SEC	RL (Ohms)	DISTORTION
600 Hz	-10 dBm	PRI	SEC	301	-76 dB max.



### HP-339A setup

- Line Power: ON
- Filters: enable all three, 400 Hz, 30 kHz and 80 kHz by pushing the buttons IN
- Distortion Range: As required to obtain a valid reading (see written procedure)
- Input Range: -10 dB
- Frequency: 6.0 x 100 (600 Hz)
- Input/Gnd Select: DIS.AN./chassis ground (middle position)
- Frequency Vernier: CAL
- OSC Level: As required to obtain -10 dBm drive level into the transformer under test (see text)
- Meter Function: OSC LEVEL
- Meter Response: NORM

### Procedure

1. Connect the transformer under test as shown in the schematic.
2. With Meter Function in the OSC LEVEL position, adjust the Oscillator Level until the meter reads 0 dBm on the "Level Only" scale (the scale nearest the bottom of the meter). Since the input range is set to the -10 dB scale, the oscillator level will now equal -10 dBm.
3. Move the Meter Function switch to the DISTORTION position. Adjust the INPUT RANGE switch until both of the range limit LEDs are extinguished. Adjust DISTORTION RANGE switch until an on-scale reading as close to full-scale is obtained.
4. Read distortion by adding the DISTORTION RANGE scale value plus the value on the uppermost scale on the meter. For example, if the DISTORTION RANGE switch is set to the -70 dB position and the meter reads -6 dB, the Total Harmonic Distortion+Noise is -76 dB.
5. To reduce common-mode noise pickup, try reversing the DISTORTION ANALYZER input leads. Use whichever lead position gives the lowest value of THD+N since this will be the reading least influenced by noise and therefore the most accurate measurement of transformer-induced distortion.