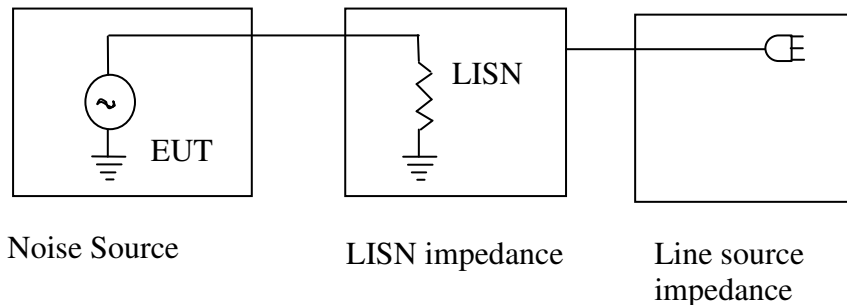


LISN (Line Impedance Stabilization Network) Function

The Line Impedance Stabilization Network is popularly known by its acronym LISN. It is used during EMI or EMC testing of electronic equipment to measure conducted RF noise. LISN consists of a circuit that is supposed to present fixed impedance, just as its name implies, to conducted noise emitted by any equipment under test (EUT). As you can see from Figure 1, the EUT emits this noise unintentionally, of course, but the measured noise would depend upon the impedance seen by the EUT. The noise emission must be below a certain limit specified by the FCC, according to whether the FCC Class-A Limit applies or FCC Class-B limit applies.

Figure 1. FCC RF Test setup



As you can imagine, the actual level of emission measured will not only depend on the EUT, but also on the impedance at the output. As an extreme condition, consider if this impedance were zero, the noise voltage would be zero. So, to get consistent data, the FCC specified the impedance for the LISN. The FCC also specified the suggested typical circuit required to get this impedance. The LISN schematic and corresponding impedance graph is shown in Figure2 and Figure3 respectively.

Figure 2: LISN Schematic

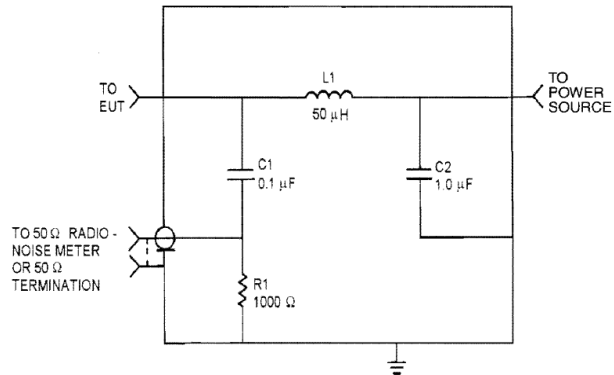
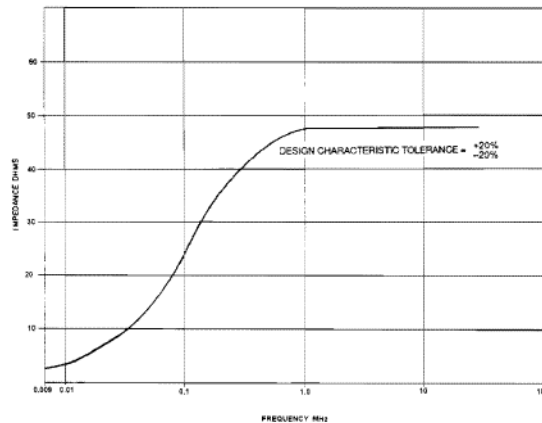


Figure 3: LISN impedance



Actually, the schematic of the LISN makes it appear that the making it is very simple. This is misleading, because like any RF circuit, this circuit has significant stray inductances and capacitances present. They create unexpected resonance and change the impedance value. There is also another reason that the LISN impedance may change unexpectedly. It is because the inductor in the circuit has value dependent on the current, if a magnetic material is used in the winding with permeability changing with the current or the flux.

The simple conclusion is that the LISN is not as simple to make as it may appear. Even if you have the circuit schematic of an LISN, it requires time and effort to make one right. Making one would cost a lot more in terms of time and effort than buying one.