

Section One: Reading Comprehension

Transmission Lines

Transmission lines are a means of conveying signals or power from one point to another. From such a broad definition, any system of wires can be considered as forming one or more transmission lines. However, if the properties of these lines must be taken into account, the lines might as well be arranged in some simple, constant pattern. This will make the properties much easier to calculate, and it will also make them constant for any type of transmission line. Thus all practical transmission lines are arranged in some uniform pattern: this simplifies calculations, reduces costs, and increases convenience. There are two types of commonly used transmission lines. The parallel-wire (balanced) line is shown in Figure 17-1b, and the coaxial (unbalanced) line in Figure 17-1a.

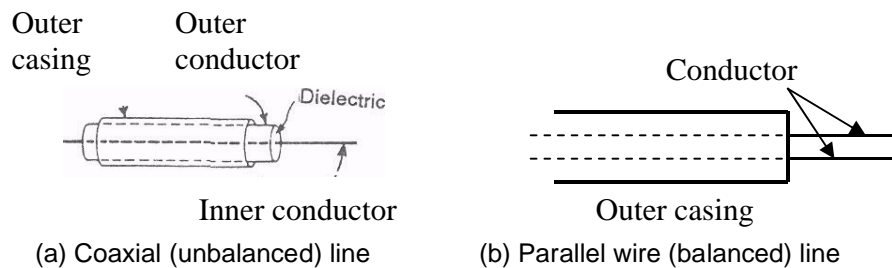


Figure 17-1. Transmission Lines.

The parallel-wire line is employed where balanced properties are required: for instance, in connecting a *folded-dipole* antenna to a TV receiver or a *rhombic* antenna to an HF transmitter. On the other hand, the coaxial line is used when unbalanced properties are needed, as in the interconnection of a broadcast transmitter to its grounded antenna. It is also employed at UHF and microwave frequencies, to avoid the risk of radiation from the transmission line itself.

Any system of conductors is likely to radiate if the conductor separation approaches a half-wavelength at the operating frequency. This is far more likely to occur in a parallel-wire line than in a coaxial line, whose outer conductor surrounds the inner one and is invariably grounded. Accordingly,