

## 1.4: Guided and Unguided Waves

Broadly speaking, waves may be either **guided** or **unguided**. Unguided waves include those that are radiated by antennas, as well as those that are unintentionally radiated. Once initiated, these waves propagate in an uncontrolled manner until they are redirected by scattering or dissipated by losses associated with materials. Examples of guided waves are those that exist within structures such as transmission lines, waveguides, and optical fibers. We refer to these as guided because they are constrained to follow the path defined by the structure.

Antennas and unintentional radiators emit *unguided waves*. Transmission lines, waveguides, and optical fibers carry *guided waves*.

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