

Directional Couplers are passive, matched, reciprocal and essentially lossless devices except for incidental, unavoidable dissipation. By construction, these are devices in which two transmission lines are positioned such that energy propagating on one line can couple over to the other. Couplers are commonly used for sampling a single direction of power which is propagating on a transmission line.

OPERATIONAL DESCRIPTION

A directional coupler is a functional four-port network, although one of the ports may be internally terminated. Directionality is dependent on internal symmetries and matching. For each of the four ports of the coupler, one of the other ports is isolated at another port, energy is coupled from the referenced port and the balance of the energy (after coupling losses) exits the remaining port called the “mainline” or “low-loss” port. A directional coupler, as its name implies, samples signal energy based on the direction of energy flow.

COUPLER PARAMETERS

Coupling: The relative signal attenuation between an input port and its corresponding coupled port.

Coupling Loss: The remainder of the input power left after accounting for coupled power and power transmitted to the isolated port.

Main Line Loss: The total insertion loss in the main line as measured in a matched system. The main line loss includes coupling losses, reflection losses and dissipation losses.

Coupling Tolerance: The tolerance of the average value of the coupling in dB over a specified frequency range.

Coupling Variation: The peak-to-peak variation of coupling in dB about the average value over the frequency range.

Directivity: The ratio of the power (in dB) measured at the coupled port when a signal is applied in the forward direction (input to output) verses the reverse direction (output to input).

VSWR: Voltage Standing Wave Ratio is a measure of the deviation of impedance from the characteristic impedance of the coupler.