ATTENUATOR DEFINITIONS

Attenuators are used to control the amplitude of a signal and can be fixed, mechanically variable or electrically variable. MITEQ attenuators are electrically variable, solid-state devices with high speed adjustment capability.

OPERATING FREQUENCY RANGE
Range of frequencies over which the attenuator will meet the specified parameters.

INSERTION LOSS
The loss a signal experiences in dB when it transitions through the attenuator in the “no attenuation” state.

ATTENUATION
The amount of signal suppression in dB experienced in excess of the insertion loss at any given frequency.

MEAN ATTENUATION
The average of the minimum and maximum attenuation within the minimum frequency range of the attenuator for a specified control input.

ACCURACY OF MEAN ATTENUATION
The difference between the ideal attenuation and the mean attenuation of the attenuator for a specified control input.

ATTENUATION FLATNESS
The maximum difference between the mean attenuation and the minimum or maximum attenuation within the minimum frequency range of the attenuator.

POWER HANDLING (FULL PERFORMANCE)
Defined as the maximum input power the attenuator can handle without degradation of performance.

POWER HANDLING (NO DAMAGE)
Defined as the maximum input power the attenuator can handle without damaging the device, but with performance degradation.

INPUT AND OUTPUT VSWR
Most RF and microwave systems are designed around a 50 ohm impedance system. An absorptive attenuators impedance is designed to be as close as possible to 50 ohms.

The VSWR is derived from the reflection coefficient Γ, where Γ is a ratio of the normalized impedance:

$$\Gamma = \frac{Z - Zo}{Z + Zo}$$

and:

$$VSWR = \frac{1 + |\Gamma|}{1 - |\Gamma|}$$

VSWR is "measured" with either a scalar or vector network analyzer. The reflection coefficients are determined by comparing the incident power and the reflected power at both ports of the device which in turn are converted and displayed as VSWR. The ratio of the reflected power to the incident power is also known as the return loss.

ATTENUATOR DEFINITIONS (CONT.)

SWITCHING SPEED
The time to change the state of an attenuator from insertion loss to maximum mean attenuation or from maximum mean attenuation to insertion loss. It is characterized in two ways: rise/fall time and on/off time.

RISE TIME
The time period from 10% to 90% of the square-law detected RF output as an attenuator is changed from a maximum attenuation to an insertion loss state.

FALL TIME
The time period from 90% to 10% of the square-law detected RF output as a switch arm is changed from an insertion loss to a maximum attenuation state.

Rise Time and Fall Time does not include the attenuator driver delay time.

ON TIME
The time period from 50% of the transition of an input command word to 90% of the square-law detected RF output as an attenuator is changed from a maximum attenuation to an insertion loss state.

OFF TIME
The time period from 50% of the transition of an input command word to 10% of the square-law detected RF output as a switch arm is changed from an insertion loss to a maximum attenuation state.

On Time and Off Time includes the driver propagation delay.