Insertion Loss Testing

Insertion loss is a measure of how much microwave energy traveling from Point A to Point B is reduced by the introduction (or insertion) of a microwave absorbent material in the path. An insertion loss measurement does not differentiate between all the factors which will affect the reduction in power including reflection from the material and loss as the wave transits through the material.

A well designed setup for testing insertion loss would include two antennas oriented so that their maximum directivity is towards each other. They will be separated sufficiently to satisfy far field requirements though the greater the separation, the larger the sample size must be to minimize errors caused by energy leaking around the edges of the sample under test.

In practice insertion loss measurement is straightforward. A signal is transmitted through one antenna and the response measured at the second antenna. This establishes the reference or 0 dB level and is usually measured as a function of frequency. The material under test is then placed between the antennas and a measurement is performed. The insertion loss is expressed in dB as a function of frequency.

At Emerson & Cuming Microwave Products, standard insertion loss testing is performed at a 45° incidence angle with the polarized electric field perpendicular to the incidence plane. This reduces the impact of the reflected signal interfering with the measurement. Insertion loss testing for ECCOSORB® LS and QR-13AF material is performed at 3 GHz. At higher frequencies phase cancellation effects can distort the results.

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**Insertion Loss Test Setup**

- **Transmit Antenna**
- **Receive Antenna**
- **Network Analyzer**
- **Material under test**
Use of Information and Material: Values shown are based on testing of laboratory test specimens and represent data that falls within normal range of the material. These values are not intended for use in establishing maximum, minimum or ranges of values for specification purposes. Any determination of the suitability of the material for any purpose contemplated by the user and the manner of such use is the responsibility of the user. The user should determine that the material meets the needs of the user’s product and use. We hope that the information given here will be helpful. It is based on data and knowledge considered to be true and accurate and is offered for the user’s consideration, investigation and verification but we do not warrant the results to be obtained. Please read all statements, recommendations or suggestions in conjunction with our conditions of sale INCLUDING THOSE LIMITING WARRANTIES AND REMEDIES, which apply to all goods supplied by us. We assume no responsibility for the use of these statements, recommendations or suggestions nor do we intend them as a recommendation for any use, which would infringe any patent or copyright. Emerson & Cuming Microwave Products Inc.