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Test Method For
Coaxial Cable Impedance

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1.0   SCOPE AND DEFINITIONS

DEFINITIONS:

Return Loss – The ratio of reflected signal to incident signal, expressed in dB.

Bridge – A device for separating the incident and reflected signals in a return loss measurement.

Network Analyzer – An instrument used for measuring the swept frequency response of a cable.

SCOPE

1.1.   The purpose of this procedure is to provide instructions for measuring cable impedance. Two test methods are presented. The accuracy, ease of use, and required test equipment differ for each test method. The two methods are as follows:

1.2.   Variable bridge method: The return loss of a cable is measured, while varying the impedance of a reflection bridge. The value of impedance, which gives the minimum reflection, is the average cable impedance. This method requires simple, scalar (magnitude only) measurements. It is subject to errors from the cable connection and operator skill.

1.3.   Fixed bridge method: The cable impedance as a function of frequency is calculated from a vector (magnitude and phase) return loss. The average of this impedance across the desired frequency range is the cable impedance. This may be automated, but requires a vector network analyzer, and may be subject to errors due to the cable connection.

2.0   TEST SAMPLES

2.1   Cable impedance is typically tested on whole reels of coaxial cable and two (2) tests are performed, one from each end of the cable. The cable to be tested must be terminated with a fixed, precision 75 ohm load for normal cable lengths. The effect of reflection from the end termination is reduced by twice the cable loss, such that for long lengths of cable, the precision of the end termination is not significant. For shorter lengths of cable, the end termination return loss plus twice the cable loss must be included in error analysis.

2.2   The input cable connector must be a good impedance match to the cable impedance or the measurement results will be affected. The cable must be prepared according to both the cable and connector manufacturer's instructions.

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