

How to measure a Cable/Connector Loss



Cable/Connector Loss

Cables and connectors can have a dramatic effect on the accuracy and validity of measurements on additional components. They also wear with time and use. This wear can show up as an increase in attenuation over particular frequency ranges.

You can use a spectrum analyzer and a tracking generator to easily test the insertion loss (loss vs. frequency) of the cables and adapters.

Required Hardware:

Two N-type to BNC Adapters. Select adapters that convert N-type (in/out connectors on most spectrum analyzers) to the cable type you are testing. Also note that higher quality connectors (Silver plated, Beryllium Copper pins, etc..) equal better longevity and repeatability.

Figure 1: N-type to BNC adapter

A short reference cable with terminations that match your adapters and cable-under-test.

An adapter to go between the reference cable and the cable-under-test. This experiment will use a BNC “barrel connector”. Note that higher quality connectors (Silver plated, Beryllium Copper pins, etc..) equal better longevity and repeatability.

Figure 2: BNC barrel adapter

Alternately, you can use two adapters a short cable as a reference assembly to normalize the display before making cable measurements. This removes the need to have the cable-to-cable adapter.

A Spectrum analyzer with Tracking Generator (TG)

Test Steps:

1. Attach the adapters to the tracking generator (TG) output and RF Input.

NOTE: Clean the surfaces of the adapters and input with a lint free cloth to prevent damage and ensure repeatability.

2. Connect the reference cable to the TG out and RF In on the analyzer.

Figure 3: Measuring reference cable

3. Adjust Span of scan for frequency range of interest.
4. Adjust the tracking generator output amplitude and spectrum analyzer display to view the entire trace.
5. Enable the tracking generator output.

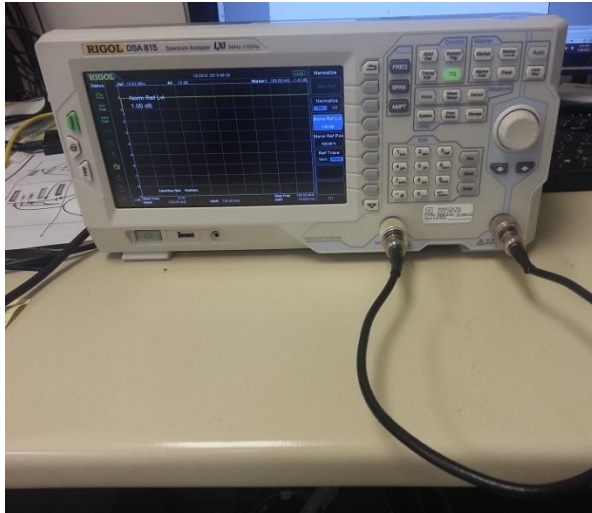


Figure 4: Reference cable insertion loss before normalization.

6. Disconnect the reference cable from the RF input. Place cable-to-cable adapter (BNC barrel or other) and connect to the cable to test.
7. Connect the cable-under-test to test to RF input and enable the tracking generator.

Figure 5: Cable-under-test connected and test result

The screen displays the cable-under-test losses plus the error of the cable-to-cable adapter.

