Testing Cable Loss with a Spectrum Analyzer

*Date:*08/28/2013

Solution: A spectrum analyzer with a tracking generator can be a useful piece of test gear. This application note covers making a simple loss measurement on a coaxial cable with BNC connectors.

Required:

- 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, Berylium 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.

– Spectrum analyzer with Tracking Generator (TG)

Steps:

1) Turn on Spec An and attach adapters to the tracking generator (TG) output and RF Input.
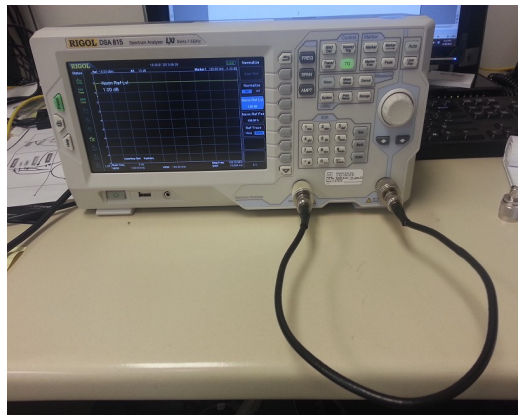
2) Connect the reference cable to the TG out and RF In.

Figure 3: Measuring reference cable

3) Adjust Span of scan for frequency range of interest.

4) Adjust TG output amplitude and spectrum analyzer display to view the entire trace.
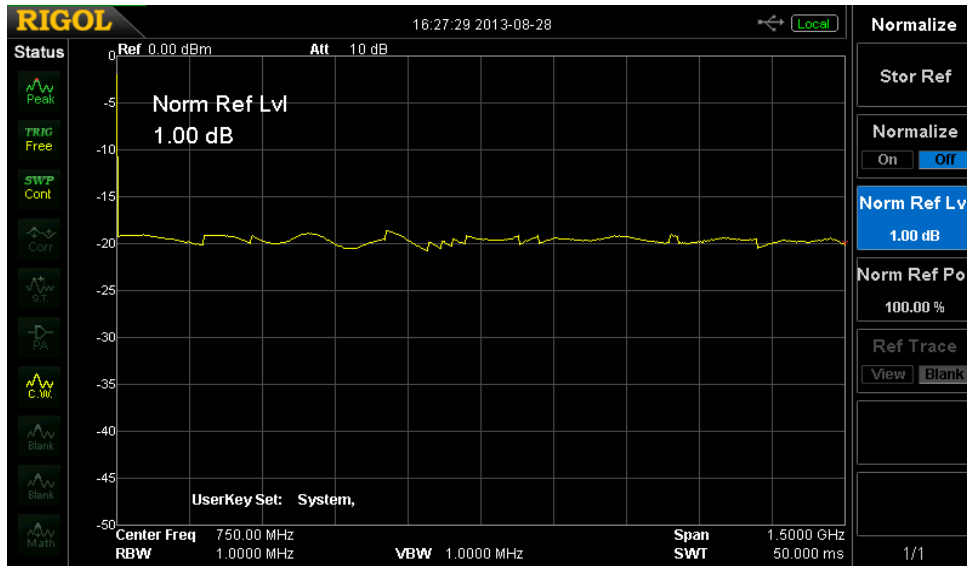
5) Enable TG.

Figure 4: Reference cable insertion loss before normalization.

6) Normalize the reference insertion loss. This mathematically subtracts a reference signal (stored automatically) from the input signal.

– With the Rigol DSA815 Press TG > NORMALIZE > STOR REF and then Enable Normalize
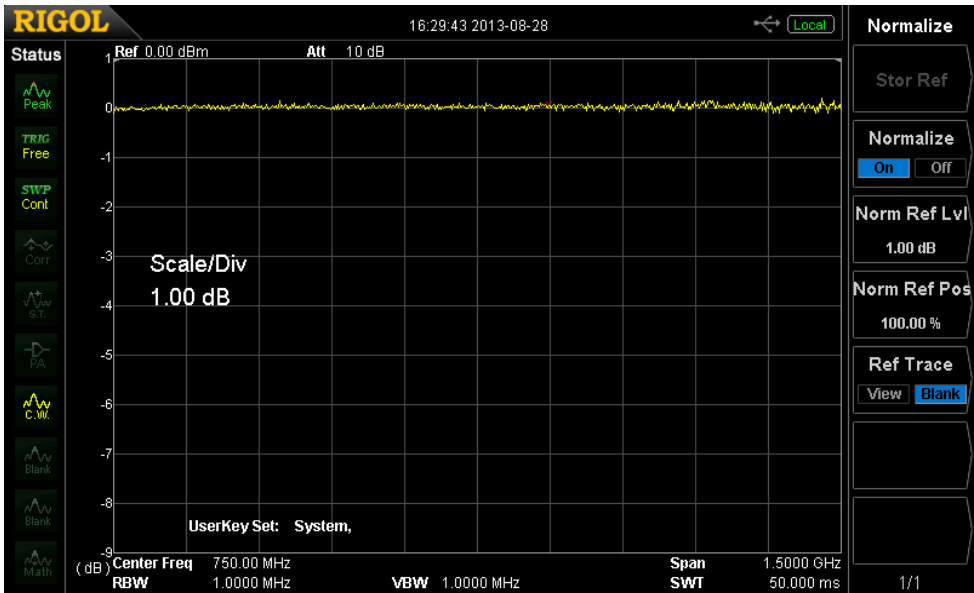

Figure 5: Reference cable insertion loss after normalization.

7) Disconnect the reference cable from the RF input.

8) Place cable-to-cable adapter (BNC barrel or other) and connect to the cable to test.

9) Connect the cable-under-test to test to RF input and enable the TG.
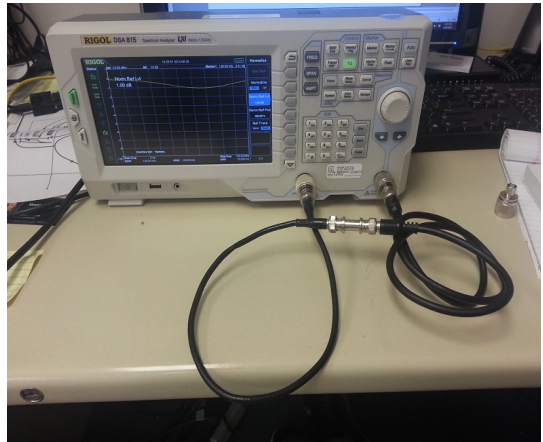
Figure 6: Cable-under-test connected.

The screen displays the cable-under-test losses plus the error of the cable-to-cable adapter.
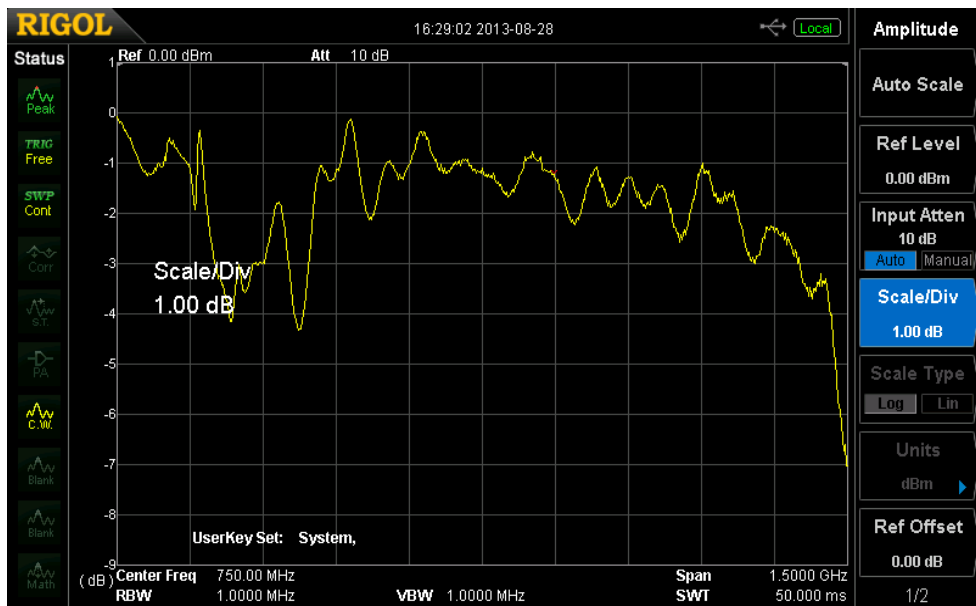
Figure 7: Cable-under-test loss.

Headquarters

RIGOL TECHNOLOGIES, INC.

No.156,Cai He Village,

Sha He Town,

Chang Ping District, Beijing,

102206 P.R.China

Tel:+86-10-80706688

Fax:+86-10-80705070

Email: support@rigol.com

USA

RIGOL TECHNOLOGIES,USA INC.

7401 First Place, Suite N

Oakwood Village

OH 44164, USA

Toll free: 877-4-RIGOL-1

Office: (440) 232-4488

Fax: (216)-754-8107

Email: info@rigol.com

EUROPE

RIGOL TECHNOLOGIES GmbH

Lindbergh str. 4

82178 Puchheim

Germany

Tel: 0049- 89/89418950

Email: info-europe@rigoltech.com