The Institute for Interconnecting and Packaging Electronic Circuits
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IPC-TM-650
TEST METHODS MANUAL

Number	
2.5.30	
Subject	
Balanced and Unbalanced Cable Attenuation Measurements	
Date	Revision
12/87	
Originating Task Group	

1 Scope This method is used to determine the attenuation of balanced and unbalanced cables.

2 Applicable Documents None

3 Test Specimen

3.1 30.5 meters of completed flat cable

4 Apparatus

4.1 H.R. Model #8568A or equivalent spectrum analyzer

4.2 H.R. Model #8444A or equivalent 2 tracking generator

4.3 Two RG-223/U or equivalent 50 Ohm coaxial cables

4.4 North Hills or equivalent matching transformers

Unbal/Bal	Freq. Range	Model No.
50/50	100 KHz to 125 MHz	0001 BB
50/75	100 KHz to 125 MHz	0101 BB
50/90	100 KHz to 125 MHz	0200 BB
50/100	100 KHz to 100 MHz	0300 BB
50/150	100 KHz to 100 MHz	0400 BB

4.5 Resistor matching network (see Figure 1)

5 Procedure

5.1 Procedure (Balanced)

5.1.1 Calibrate spectrum analyzer and adjust the tracking generator for accurate frequency tracking.

5.1.2 Select impedance matching transformers that match (as close as possible) the characteristic impedance of the cable under test.

5.1.3 Connect the outputs of the two matching transformers together. Sweep the spectrum analyzer through the required frequency range to determine the loss in the matching transformers.

5.1.4 Separate the two matching transformers and connect 30.5 m of the test cable between them; again sweep the spectrum analyzer through the required frequency range. This measurement determines the total loss, which includes the cable and matching transformers.

5.1.5 To determine the cable attenuation, based on 30.5 meters of cable, at each frequency of interest, subtract the results of 5.1.3 from the results of 5.1.4 (see Figure 2).

5.2 Procedure (Unbalanced)

5.2.1 Calculate the resistance required to match the 50 ohm system impedance to the test cable's characteristic impedance, as shown in Figure 1.

5.2.2 Use the above resistive matching network in place of the balanced transformers as indicated in 5.1.3. Perform the unbalanced attenuation test as described in 5.1.1 through 5.1.5 (see Figure 3).

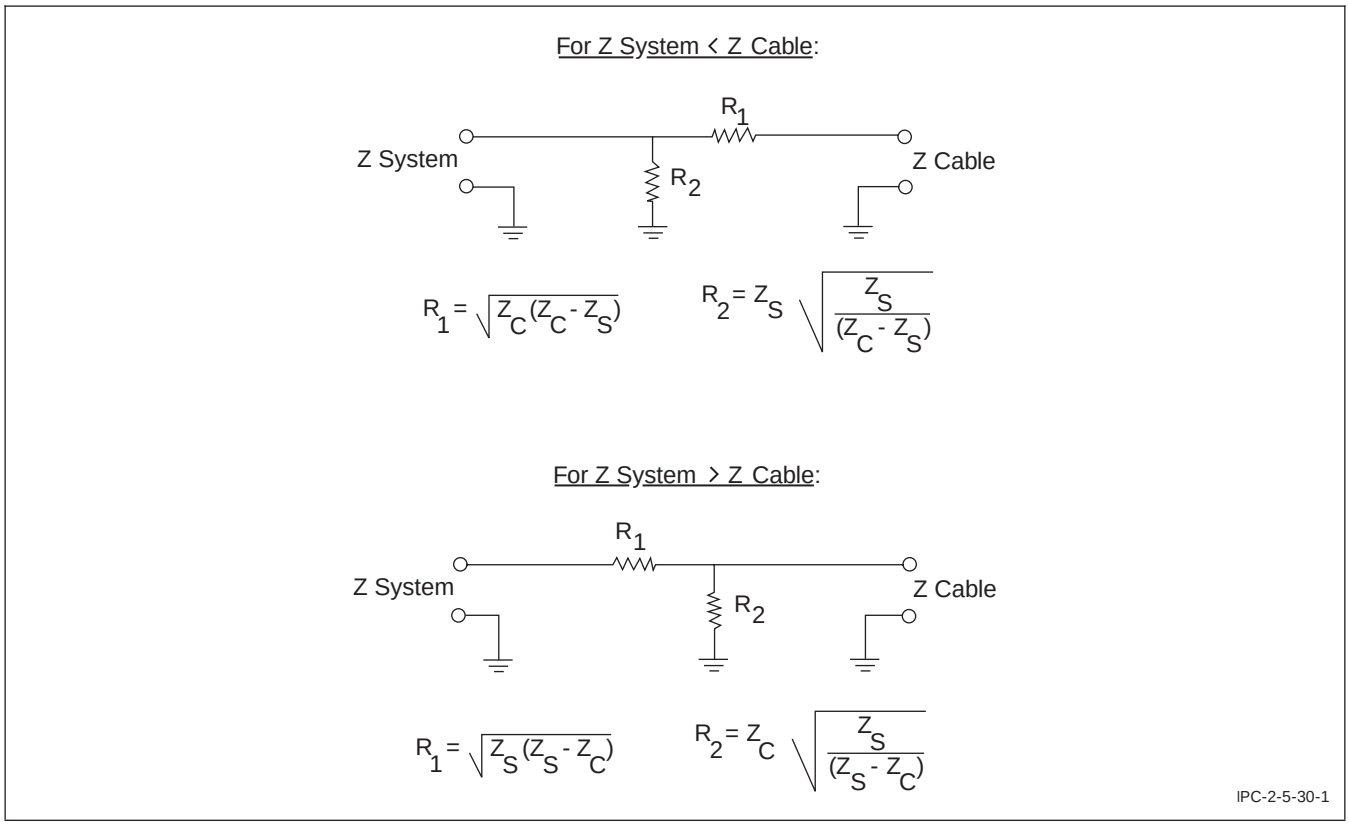

Figure 1 Resistive Matching Network for Unbalanced Cables

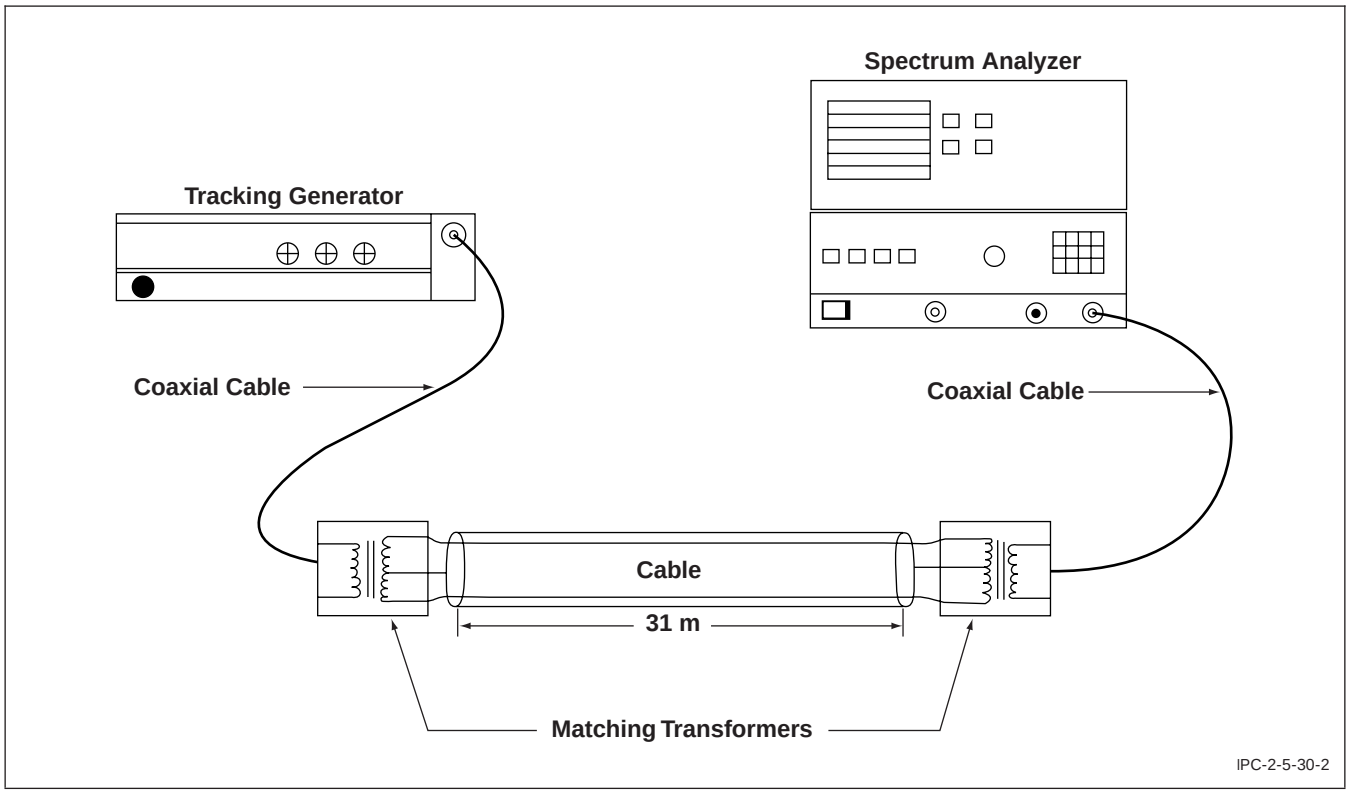

Figure 2 Balanced Attenuation Equipment Setup

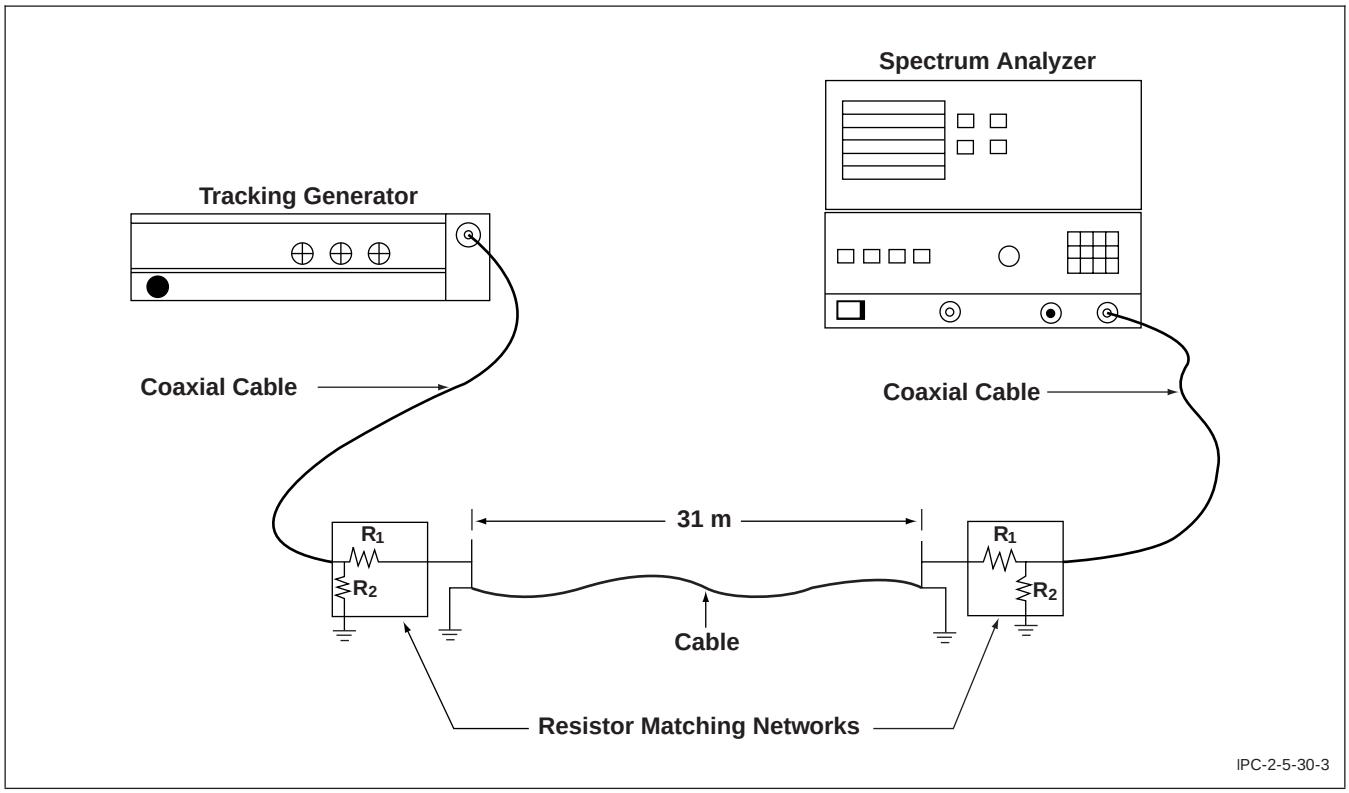

Figure 3 Unbalanced Attenuation Equipment Setup