Agilent E5070B/E5071B ENA Series RF Network Analyzers

Balanced Cable Measurement

Second Edition

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Sample Program

Balanced Cable Measurement

Overview of the sample program

This is a sample program for measuring balanced cables such as LAN and USB cables. When the user presses the "Sweep" button, the ENA measures the balanced cable and displays the differential characteristic impedance (Zc) and other key cable parameters.
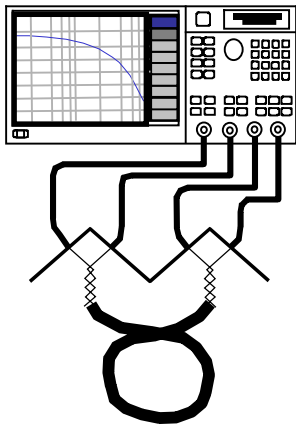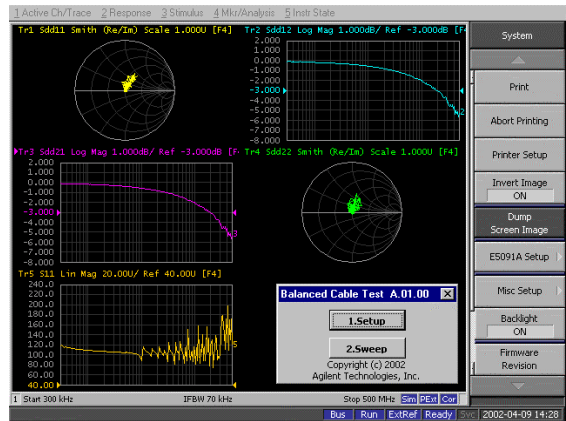

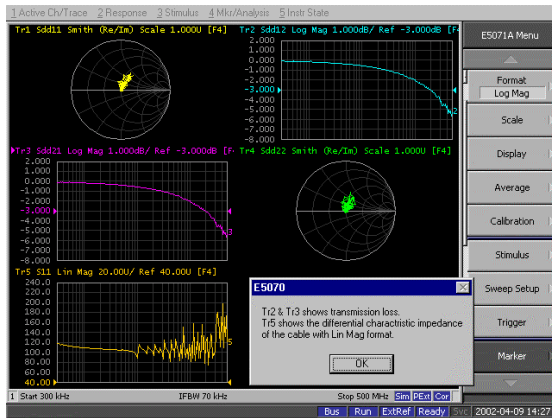Figure 1. Measurement configuration

Figure 2. User interface

Figure 3. Zc is shown in trace 5

How to use the sample program

Step1.　Preset your ENA

Step2.　Press **[Macro Setup]** on the front panel.

Step3.　Press **{Load Project}** and load "b_cable.vba".

Step4.　Press **[Macro Run]** on the front panel.

　　　　　The dialog box shown in Figure 2 appears.

Step5.　Set up the measurement conditions by pressing the "Setup" button.

Step6.　Perform a full 4-port calibration.

Step7.　Conect the balanced cable to the ENA.

Step8.　Press the "Sweep" button to measure.


Default setting of the sample program

Frequency:	300 kHz to 8.5 GHz
Number of measurement points:	201
Sweep type:	LOG
Trigger Mode:	BUS trigger

Measurement parameters:

Trace1: Sdd11/Smith	Trace2: Sdd12/LogMag
Trace3: Sdd21/LogMag	Trace4: Sdd22/Smith
Trace5: Zc/LinMag	

Fixture Simulator

Balanced device type:	Balance-balance
Port impedance conversion:	Each port is 50 ohm
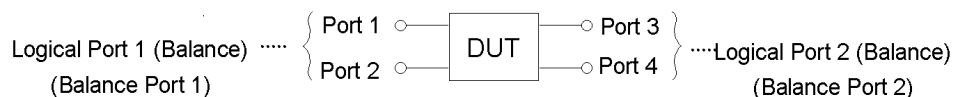
NOTE: The user must modify this sample program according to the measurement conditions

The equation for Zc calculation

The characteristic impedance (Zc) is given as the following equation:

$$Zc = Z_0 \times \sqrt{\frac{\{(1 + S_{dd11})(1 + S_{dd22}) - S_{dd12}S_{dd21}\}\{(1 + S_{dd11})(1 - S_{dd22}) + S_{dd12}S_{dd21}\}}{\{(1 - S_{dd11})(1 - S_{dd22}) - S_{dd12}S_{dd21}\}\{(1 - S_{dd11})(1 + S_{dd22}) + S_{dd12}S_{dd21}\}}}$$

This sample program displays the Zc on trace 5 after the calculation.