Agilent E5070B/E5071B ENA Series RF Network Analyzers

TRL Calibration

Second Edition

Agilent Technologies

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VBA Macro

TRL Calibration

Overview

Use the following VBA macro to perform the TRL calibration.

Folder	VBA macro name (project name)
D:\Agilent	TRL_Calibration.vba

Don't delete this VBA macro. This VBA macro can not be restored by executing system recovery.

This VBA macro lets you perform the 2/3/4 port TRL calibration for any selected port.

You cannot perform the TRM calibration using this VBA macro.

The TRL calibration provides accuracy equivalent to full 2/3/4/ port calibration using short, open, load, and thru (SOLT) standards[1].

To perform the TRL calibration, you need to prepare thru, reflection (open or short), and line standards. The thru and line must have the same reference impedance Z0 and the transfer constant (same material).

Note on use

Set the power level to -10 dBm or less in order to accurately measure a DUT close to open or short state.

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[1]. For details, refer to Chapter 4 "Calibration" in *User's Guide*.

Operating procedure

1. Setting stimulus conditions

Set the stimulus conditions of the channel for which you perform the calibration.

For information on the setting procedure, refer to Chapter 3 "Setting Measurement Conditions" in *User's Guide*.

2. Starting VBA macro

Load the VBA project for the TRL calibration and run it.
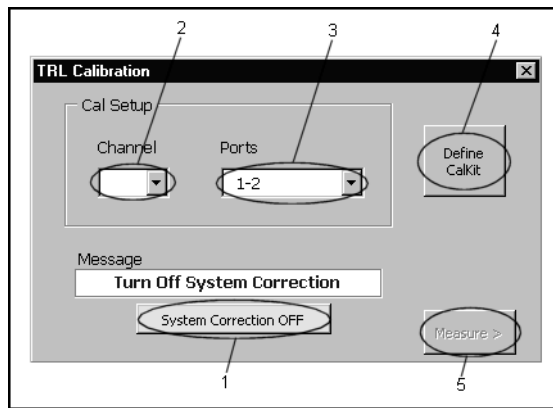
Step 1. Press **[Macro Setup]**.

Step 2. Press **Load Project**.

Step 3. The Open dialog box appears. Specify the file name "D:\AgilentTRL_Calibration.vba" and press the **Open** button.

Step 4. Press **[Macro Run]** to start the macro. (Refer to Figure 1.)

Figure 1 **TRL_Calibration macro**

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3. Turning off system correction

Press the **System Correction OFF** button (1 in Figure 1) to turn off system error correction.

NOTE The **System Correction OFF** button does not appear when system error correction has been already turned off.

4. Selecting channel and ports

Select a channel (2 in Figure 1) and test ports (3 in Figure 1).

NOTE The channel selected in this step has no relation to active channel.
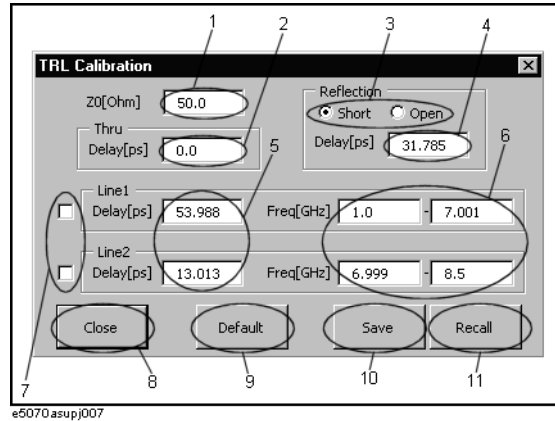
5. Defining calibration kit

Define the calibration kit you use.

Step 1. Press the **Define Cal kit** button (4 in Figure 1) to bring up the calibration kit definition screen shown in Figure 2.

Figure 2   **Calibration kit definition screen**

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Step 2. Define each standard as follows:

Reference impedance (Z0)

Enter a value of the reference impedance of thru/line (1 in Figure 2).

Thru

Enter a delay value (2 in Figure 2) in ps.

Reflection

Select a standard type (3 in Figure 2) and enter a delay value (4 in Figure 2) in ps.

Line

You can define 2 lines: Line 1 and Line 2.

Enter a delay value (5 in Figure 2) in ps and enter a frequency range (6 in Figure 2) in GHz.

Check the lines you use for calibration (7 in Figure 2).

NOTE   When you use Line 1 and Line 2, 10 kHz or more overlapped within their defined frequency ranges must be required.

Saving and loading calibration kit definitions

Press the **Save** button (10 in Figure 2) to save the definition of the current calibration kit to your desired file. Press the **Recall** button (11 in Figure 2) to recall the definition of a calibration kit from a previously saved file.

NOTE   If you save as "D:\Agilent\Trldata\Default.dat," the file is handled as the default definition file. The default definition file is automatically recalled when the macro starts.

NOTE   The factory-shipped default definition file has the same content as "D:\Agilent\Trldata\SysDefault.dat." Copy "D:\Agilent\Trldata\SysDefault.dat" to the default definition file in order to restore the default definition file to its factory-shipped condition.

Don't change "D:\Agilent\Trldata\SysDefault.dat."

Initializing calibration kit definition

Press the **default** button (9 in Figure 2) to recall the definition of a calibration kit from the default definition file ("D:\Agilent\Trldata\Default.dat").

Step 3. Press the **Close** button (8 in Figure 2) to finish defining the calibration kit.

6. Performing calibration

Measure necessary calibration data and enable error correction.

NOTE   The definition of the frequency range of the line standard used for measurement must cover the sweep range of the channel for which you perform calibration.

Step 1. Press the **Measure** button (5 in Figure 1) to bring up the TRL calibration execution screen. Depending on the port selection and the calibration kit definition, a button appears for data that must be measured. Figure 3 is an example when selecting "1-2-3-4" as ports and enabling Line 1 and Line 2.

Figure 3   **Example of the TRL calibration execution screen**


e5070asupj008
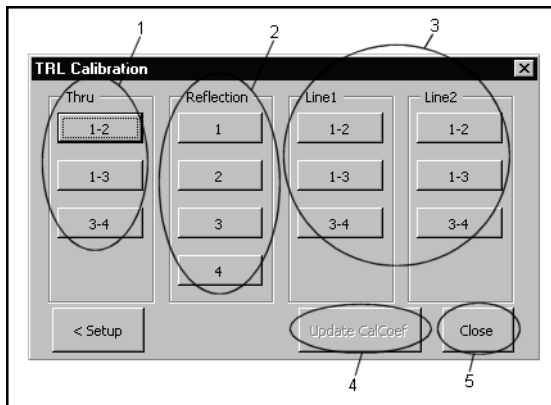
Step 2. Measure calibration data.

For thru and line, connect the standard between the ports shown on the button and then press the button (1,3 in Figure 3). The data between the ports is measured and the button changes into light blue.

For reflection, connect the standard to the port shown on the button and then press the button (2 in Figure 3). The data of the port is measured and the button changes into light blue.

NOTE   When you want to measure calibration data between two or three pairs of ports using Line 1 and Line 2, the order to use the Line 1 and Line 2 must be same for all the pairs of ports. For example, when you measure the calibration data between ports 1-2, 1-3 and 3-4 and use the Line 1 and Line 2 in order for ports 1-2, you have to use the Line 1 and Line 2 in the same order for ports 1-3 and 3-4.

e5070asupe009
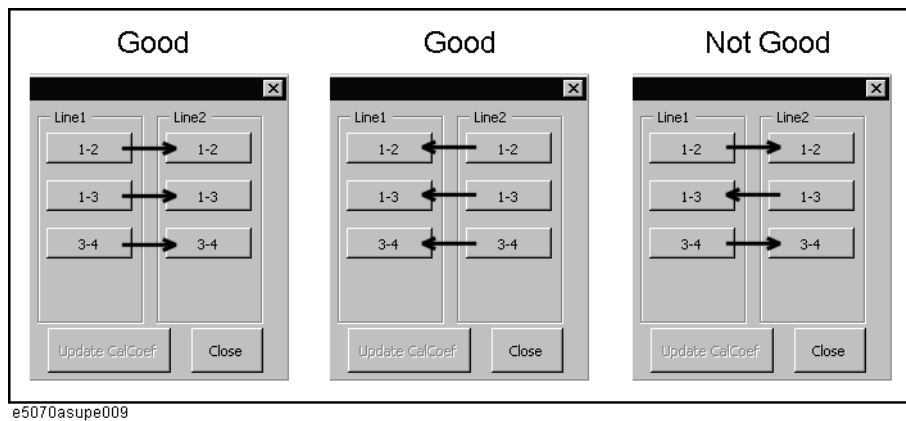
NOTE   When you use Line 1 and Line 2 and their frequency ranges overlap, data of the line measured later is used.

NOTE   The isolation measurement is not available.

Step 3. When measuring all the data is complete, press the **Update Cal Coef** button (4 in Figure 3). The calibration coefficient is calculated and the error correction is turned ON. In the calibration property display (ON/OFF with **[Cal]** - **Property**), the state is indicated by "F" (same as the full n port SOLT calibration).

7. Closing macro

Press the **Close** button (5 in Figure 3) to exit from the macro.