R&S ZVA Series Network Analyzers "TRL" Calibration with OML Waveguide CalKit

This paper describes the procedure to perform a "TRL" calibration using Rohde & Schwarz ZVA series network analyzers with OML WR05 waveguide calibration kit. OML WR05 waveguide calibration kit standard definitions were previously transformed to a calkit file recognized by ZVA series network analyzers using ZVA built-in WR05 waveguide calkits. The 4-Port ZVA24 network analyzer used to develop this procedure has the following installed options with firmware version 4.01.

Software Option
- ZVA-K8 Converter Control

Hardware Option

- ZVAB-B4	- ZVA24-B22
- ZVA24-B32	- ZVA24-B23
- ZVA24-B34	- ZVA24-B24
- ZVA24-B16	- ZVA24-B31
- ZVA24-B21	- ZVA24-B33

This paper assumes the ZVA series network analyzer has been configured to work with OML millimeter wave frequency extension modules and recognizes OML waveguide calibration kit standard definitions.

Application note "Configure Rohde & Schwarz ZVA Series Network Analyzers for OML Millimeter Wave Frequency Extension Modules" provides an in depth review of configuring ZVA series network analyzers to work with OML frequency extension modules. Application note "Converting OML Waveguide Calibration Kit Standard Definitions to function in Rohde & Schwarz ZVA Series Network Analyzers" discusses transformation of OML calkit standard definitions to operate in ZVA series network analyzers.

Instrumentation Configuration

ZVA with firmware version 4.01 is used for capturing the screen displays in this procedure. Different firmware versions may have slightly different displays.

The steps below show the procedure to create OML WR05 waveguide calibration kits. This same procedure applies for all other waveguide band calibration kits.

Start TRL Calibration

1. Click "**Channel**" pull down menu with mouse. Highlight or click "**Calibration**", follow by "**Two-Port P1P2**" and then click "**TRL**" side-menu (Figure 1).

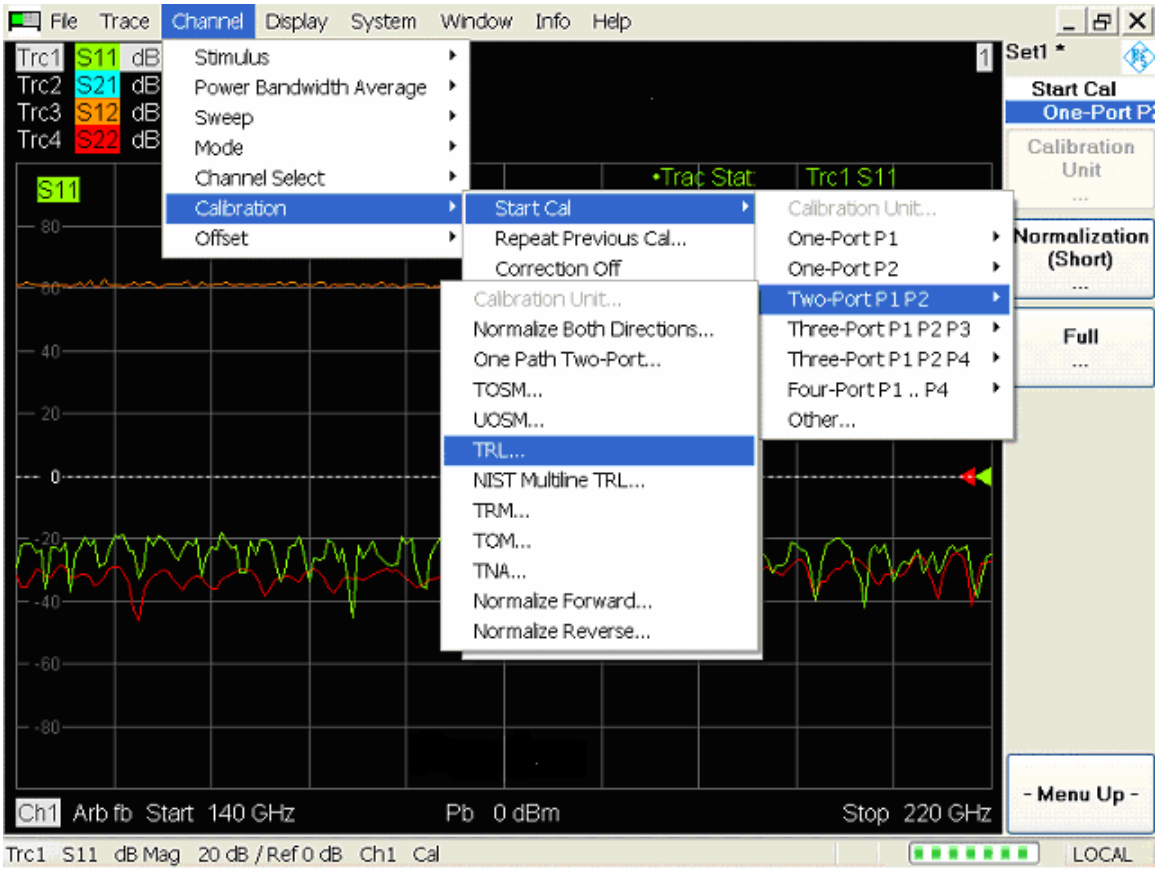

Figure 1 – Calibration Startup Configuration

2. Select Port 1 and Port 2 Connector Type to be "**WR05**" and Calibration Kit V05-AL-30 to Port 1 and Port 2 using the pull down arrow once **Calibration** table appears (Figure 2).

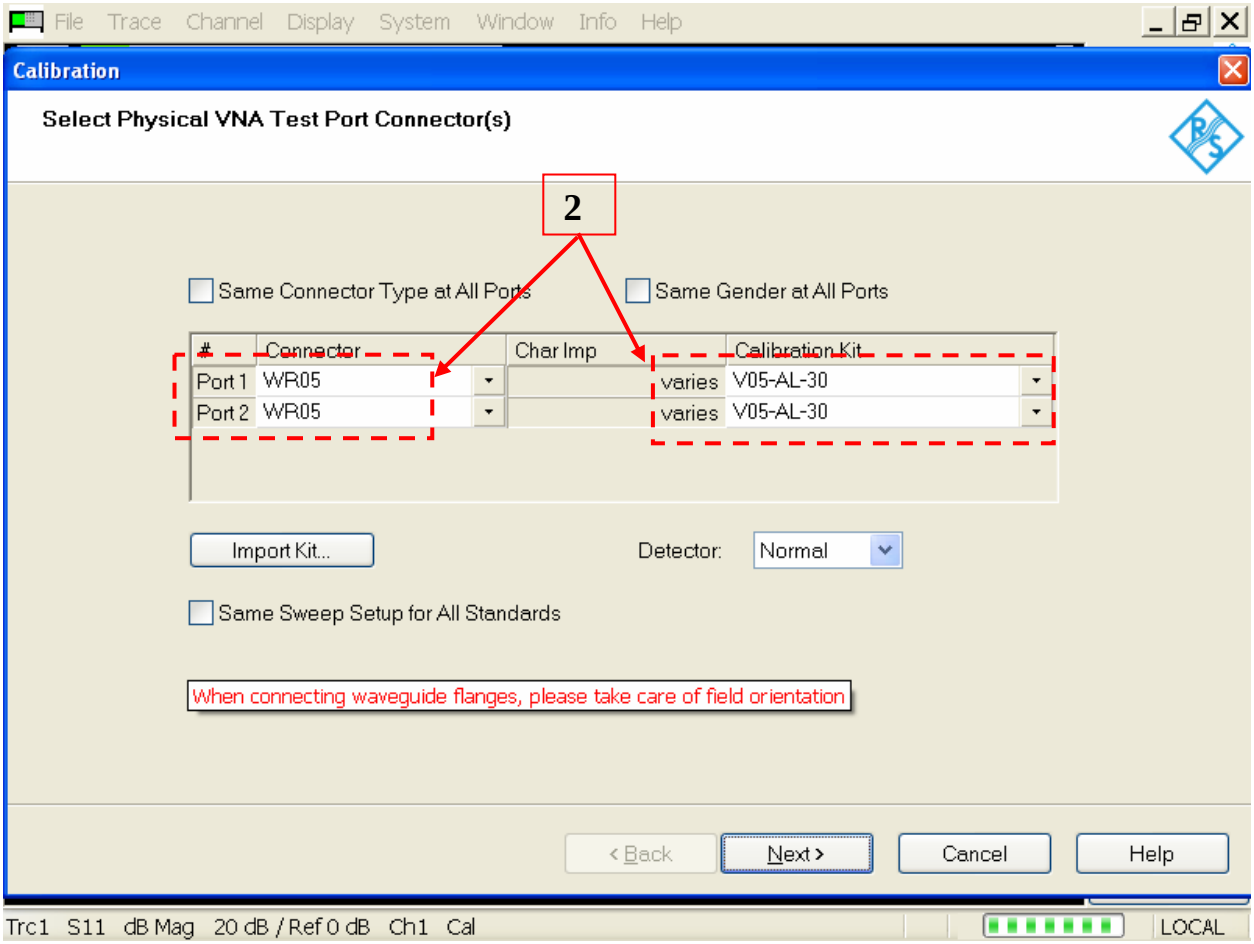

Figure 2 – Calibration Dialogue Table

3. Click **Next** to start standards measurement.
4. Connect waveguide CalKit **Short** to Port 1 and select "**Port 1: WR05**" to start Port 1 "**Reflect**" standard measurement. A "green" check mark will appear once measurement is completed (Figure 3).
5. Remove waveguide short from Port1 and connect it to Port 2.

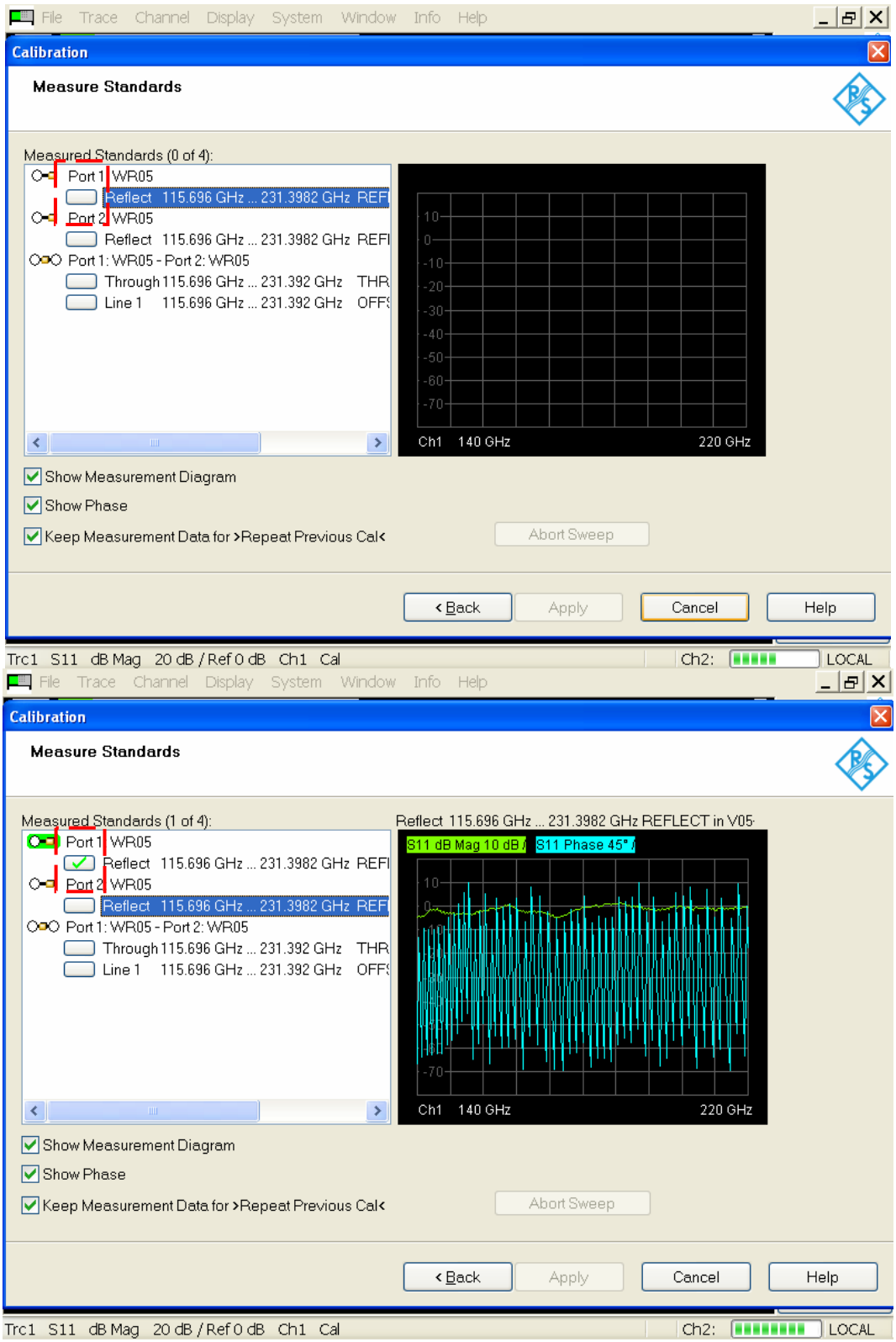

Figure 3 – Port 1 "Reflect" Standard Measurement

6. Select "**Port 2: WR05**" to start Port 2 "**Reflect**" standard measurement. A "green" check mark will appear once measurement is completed (Figure 4).

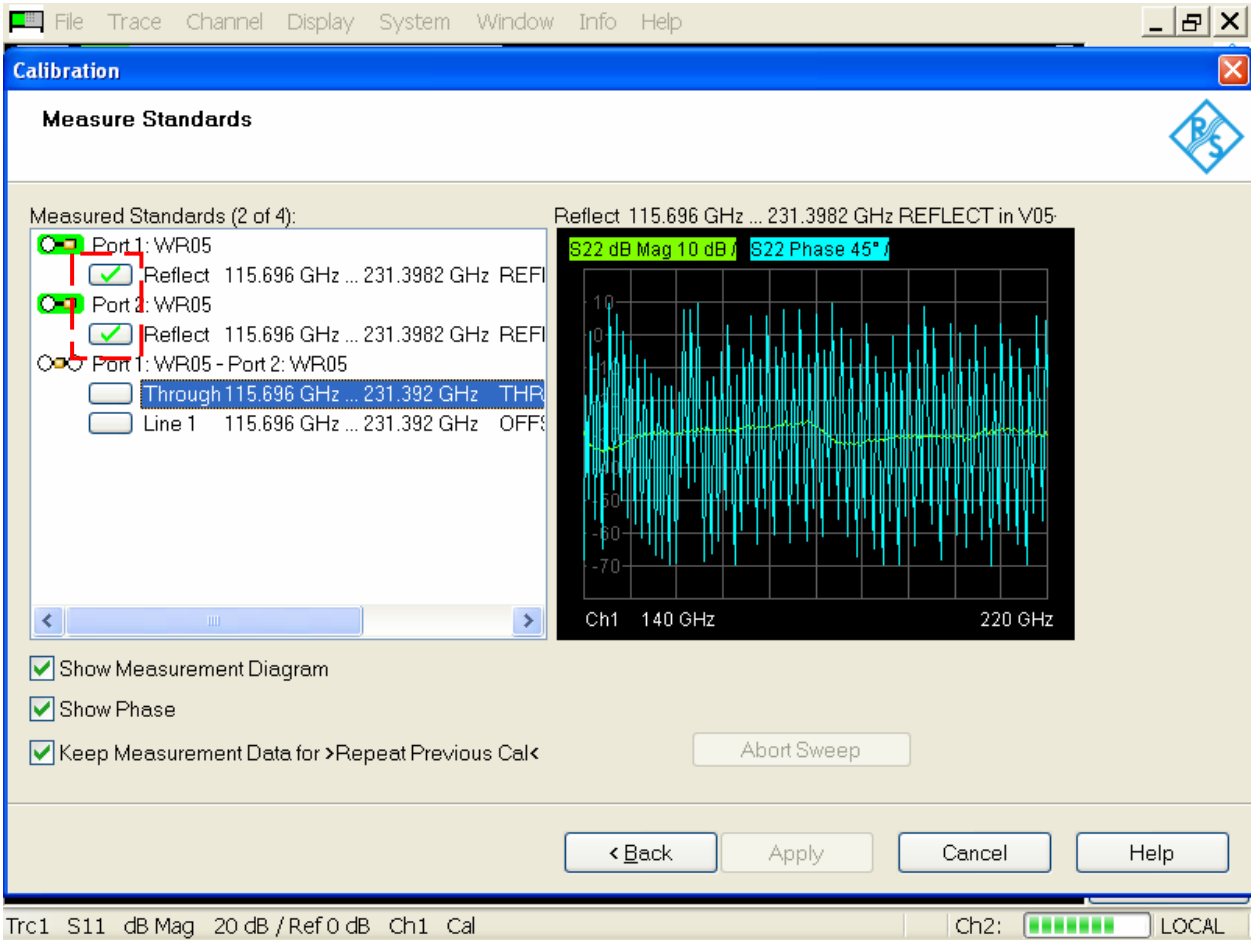

Figure 4 – Port 2 "Reflect" Standard Measurement

7. Remove waveguide short from Port 2 and connect Port 1 to Port 2 directly.
8. Select "**Port 1: WR05 – Port 2: WR05 -Through**" to start "**Thru**" standard measurement. A "green" check mark will appear once measurement is completed (Figure 5).

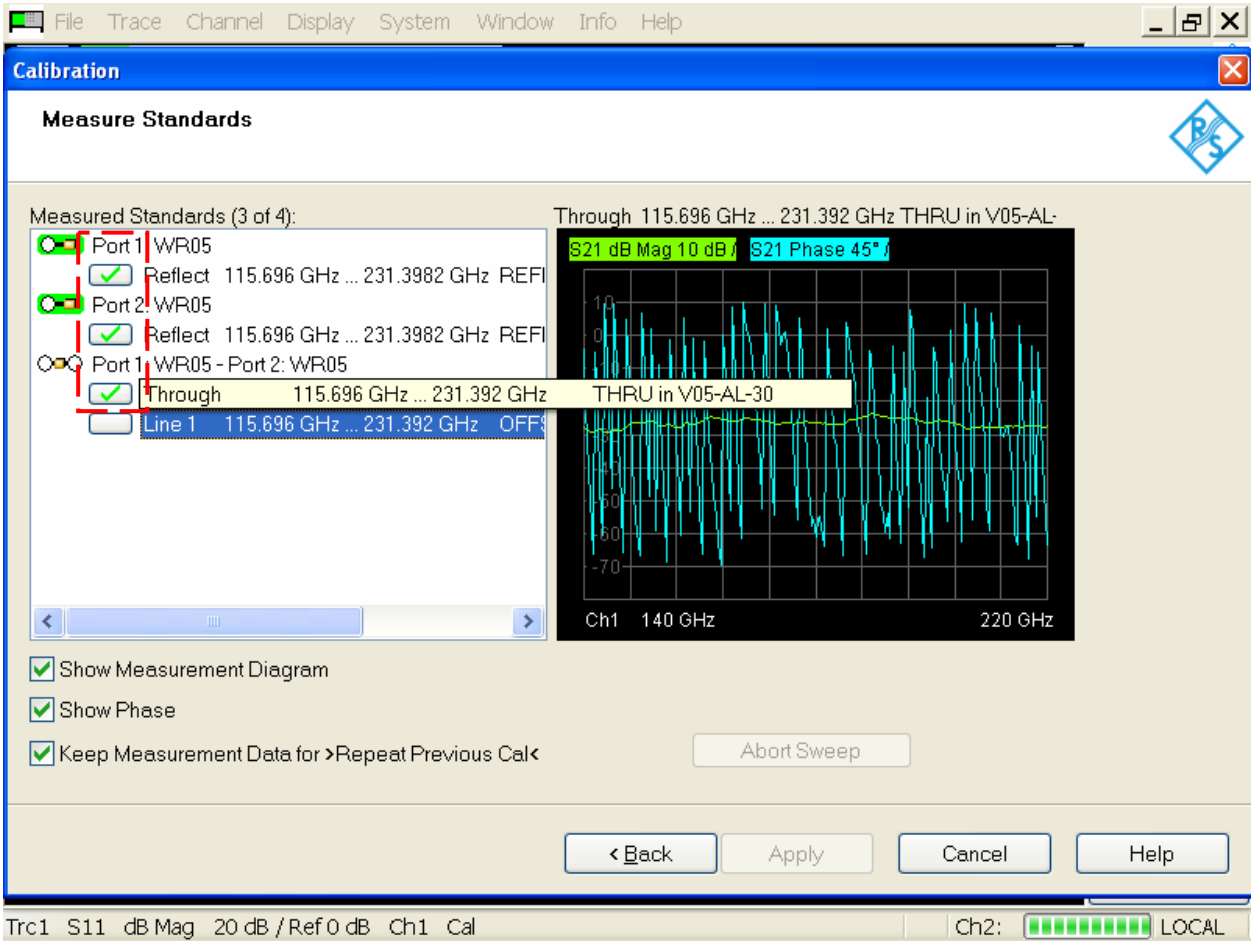

Figure 5 – "Thru" Standard Measurement

9. Disengage Port 1 from Port 2 and insert the 1/4 waveguide shim (1/4OS-05) between Port 1 and Port 2.
10. Select "**Port 1: WR05 – Port 2: WR05- Line 1**" to start "**Line**" standard measurement. A "green" check mark will appear once measurement is completed (Figure 5).

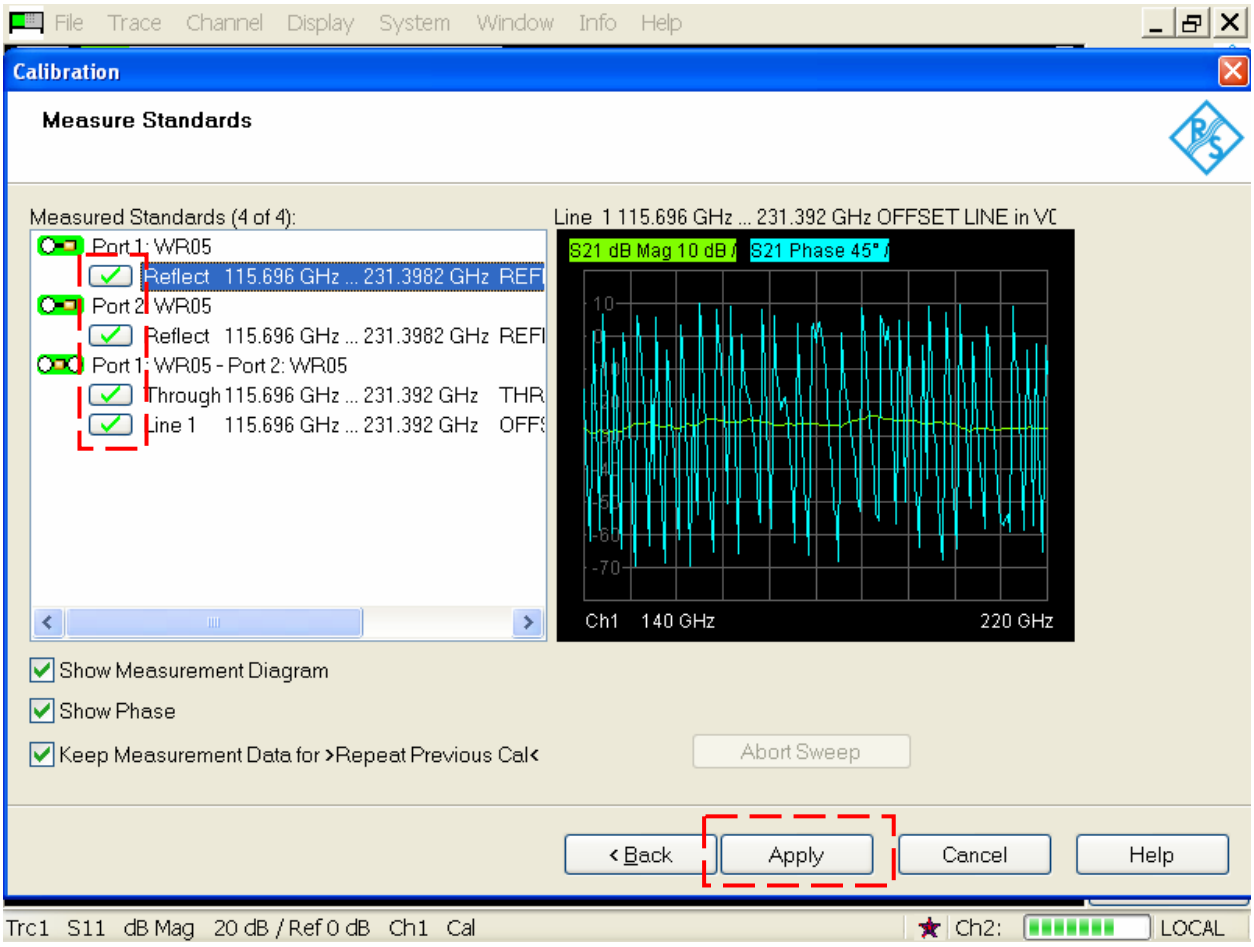

Figure 6 – "Line" Standard Measurement

11. Click **Apply** to use the TRL calibration to subsequent two-port measurements.