

Measuring Devices other than 50Ω Impedance

The **System Zo Conversion** facility allows measurements, which are always taken in 50Ω, to be converted to another impedance selected by the user. This feature can be useful, for example, for measuring 75Ω devices. The value of Zo entered must be real (purely resistive) and must be within the range of 10Ω to 200Ω. Whenever this facility is selected, an indicator is displayed on the top right corner of the graphics display as shown in Fig. 2. **Note** that when requested, impedance conversion will performed on the **live measurement** and any stored **memory trace**.

There are two possible ways of using the **System Zo Conversion** facility. Taking, for example, 75Ω devices, these can be measured using the techniques illustrated in Fig.1.

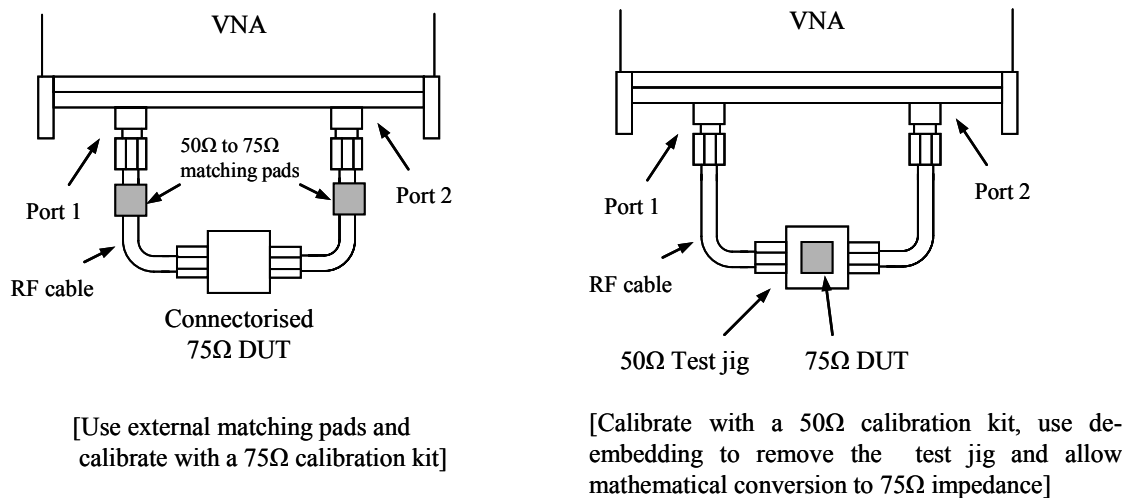


Figure 1. Possible techniques for measuring 75 Ω devices. Impedance matching pads can be used to measure a connectorised device albeit with some degradation (e.g. reduced directivity) to system performance. A discrete device mounted on a 50Ω test jig is somewhat simpler to measure.

The steps necessary for each of the two techniques illustrated in Fig. 1, are as follows:

75Ω Device with Connectors

- (i) Connect **50Ω to 75Ω impedance matching networks** (e.g. matching pads) at the ends of the cables connected to ports 1 and 2.
- (ii) In the Enhancement window, **check** the box 'Convert System Zo'
- (iii) Check **External Zo match** to indicate external matching networks in use
- (iv) Enter **75** in the Convert System Zo value box and click **Apply**
- (v) Proceed to calibrate using a **75Ω calibration kit**
- (vi) Connect the DUT and **start the measurement**

75Ω Device mounted on 50Ω Test Jig

- (i) In the Enhancement window, **uncheck** the box 'Convert System Zo'
- (ii) Calibrate at the ends of the test cables using a **50Ω calibration kit**

- (iii) **Apply de-embedding** to remove test jig effects. See section 5.4 of the users' manual for some suggestions.
- (iv) In the Enhancement window, **check** the box 'Convert System Zo'
- (v) **Uncheck External Zo match** box (in this case mathematical impedance conversion is done by the software)
- (vi) Enter **75** in the Convert System Zo value box and click **Apply**
- (vii) Connect the DUT and **start the measurement**

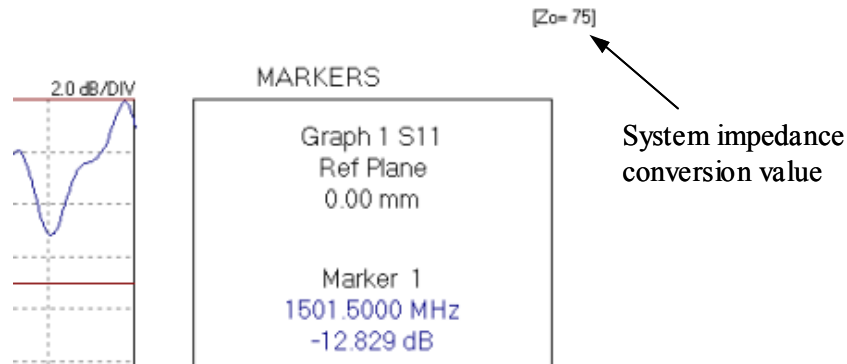


Figure 2. System impedance chosen is displayed on the top right corner

Check this box when external matching networks (e.g. matching pads) are used

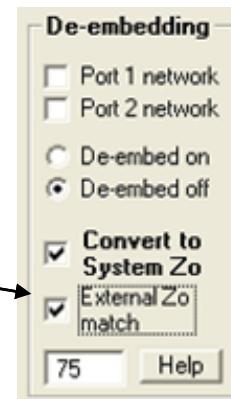


Figure 3. Indicate if external matching networks are used

Note: All S-parameters are inter-related, so, when using the Zo conversion facility (with no external impedance matching network) without a full set of S-parameters available (e.g. with only an S11 calibration) the program will assume values for the unavailable parameters as shown in Table 1. A warning message will be displayed in such cases.

Table 1. Values assumed for parameters not available during Zo conversion

S11	S12	S21	S22
$10^{-6}, j0.0$	$10^{-6}, j0.0$	$10^{-6}, j0.0$	$10^{-6}, j0.0$