OSA20 – Passive component testing (PCT) mode

quick reference guide

EXFO

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Introduction

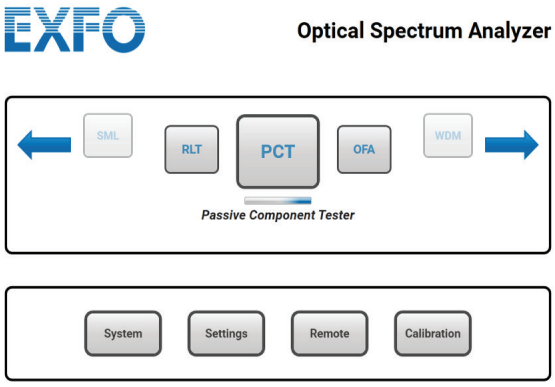
The reliability and proper functioning of optical networks can be guaranteed by characterizing the passive components in their topology. This type of measurements has, therefore, become a day-to-day practice in laboratory and manufacturing environments. Moreover, this is a growing trend with the incorporation of photonic integrated circuits (PIC) in transceivers, modulators, filters, MUX, sensors and so forth.

Among the different methods to assess the insertion loss of passive components, one of the most straightforward but efficient solution is to test with an optical spectrum analyzer (OSA). The advantages and limitations of this technique have been widely detailed in EXFO's application note entitled "Assessing passive components using a CT440 or an OSA20".

The OSA20's **passive component testing mode or PCT mode** enables the measurement and calculation of the transfer function in passive components. This quick reference guide outlines the measurement step by step.

Launching PCT mode

The PCT mode is launched from the main menu as follows:



Scan settings and analysis setup

It is recommended to define the scan settings (e.g., wavelength range, sensitivity) and analysis setup before running a test.

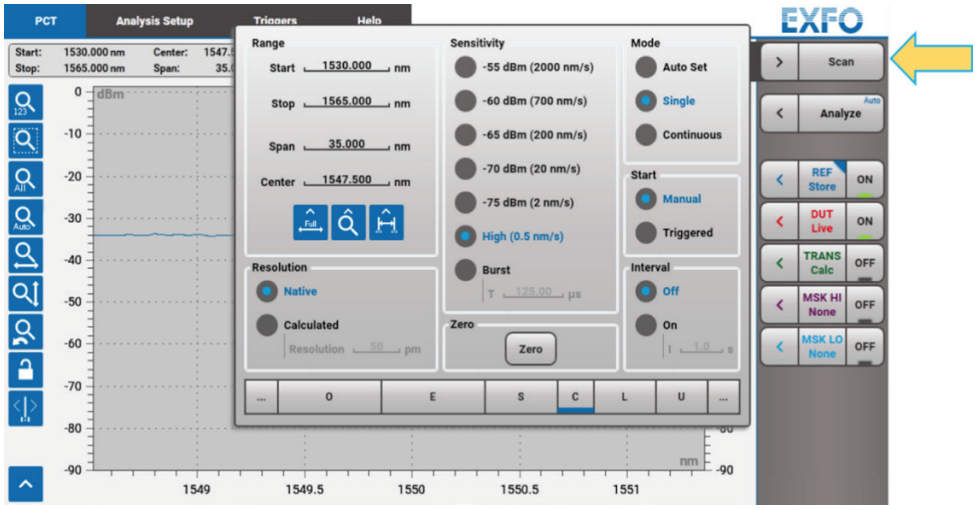


Figure 1. Scan settings menu.

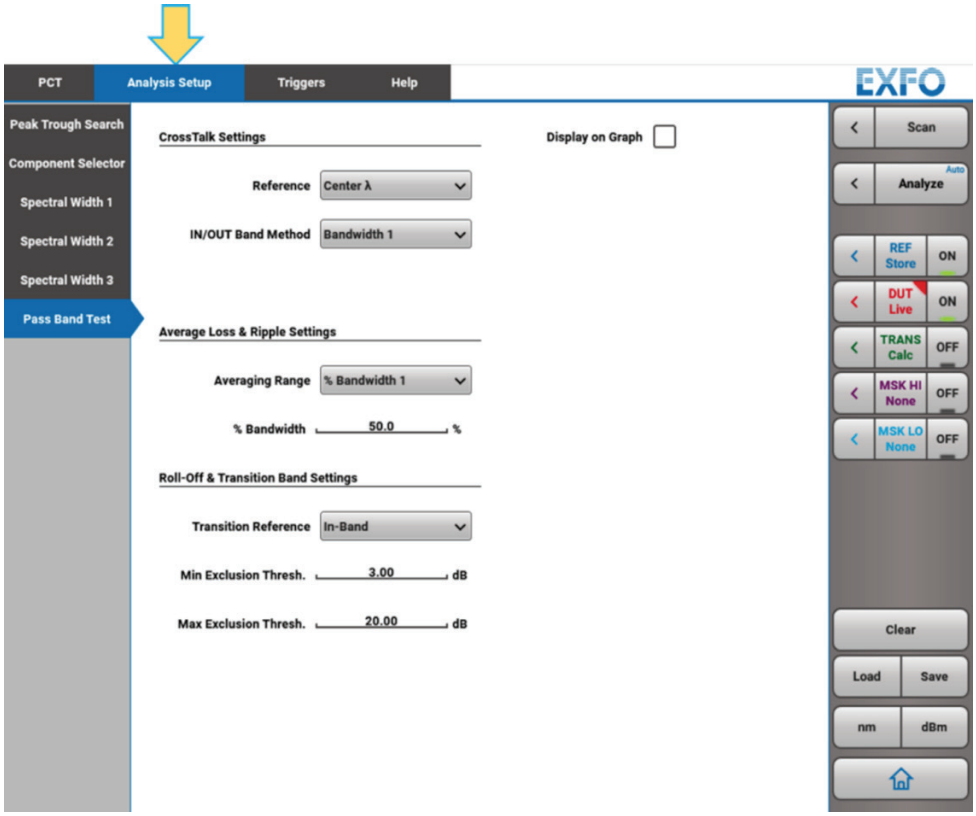


Figure 2. Analysis setup menu.

The PCT mode involves two steps in the characterization of a passive component (see figure below). In the current example, the device under test (DUT) is given by a bandpass filter for which the insertion loss is measured and analyzed.

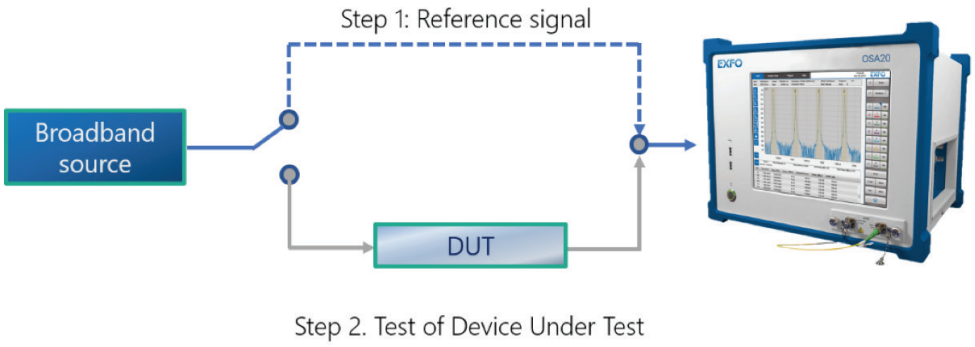


Figure 3. Typical setup for using the PCT mode in OSA20.

Test and analysis of passive components

The measurement starts by acquiring the reference trace, which corresponds to the signal coming from the broadband source. So, on the right-hand side menu of the GUI, the "*In*" trace is recorded as "*Live*" and is displayed by clicking the button "*ON*", as shown below:

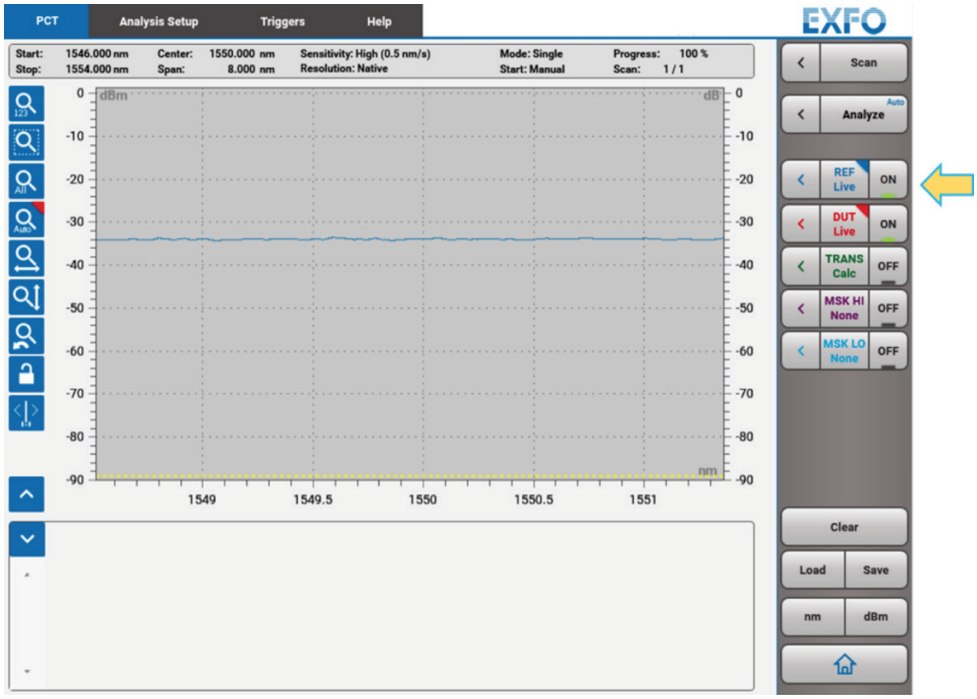


Figure 4. Measuring the reference signal (light source).

After the acquisition, the reference trace is "*Stored*" to proceed to the next measurement.

Figure 5. Storing the reference signal.

A second scan is then performed to record the spectrum when the DUT is connected to the initial setup.

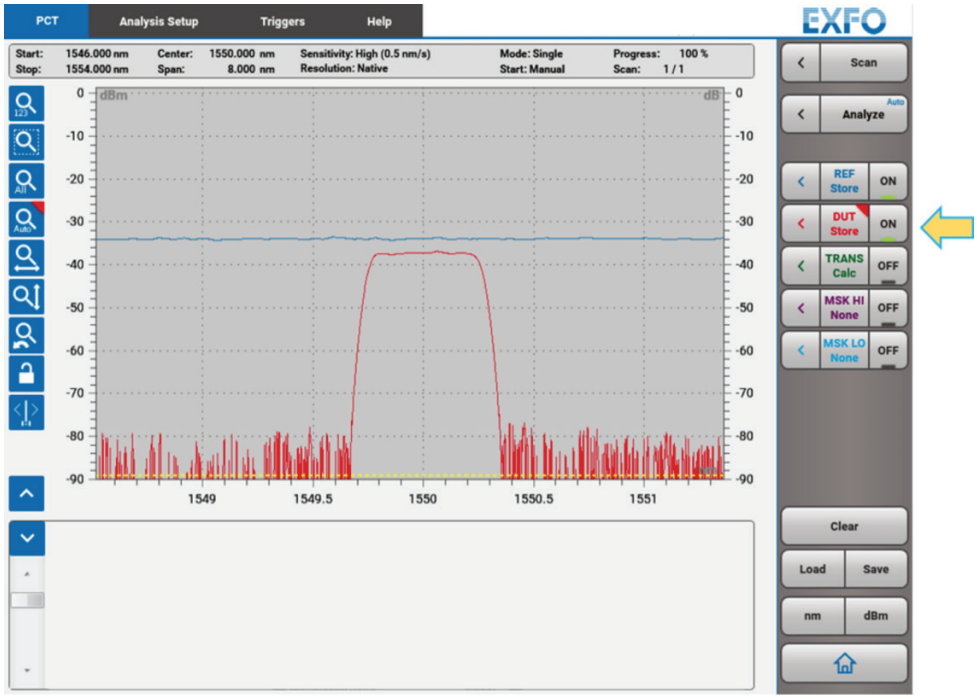


Figure 6. Scanning when the DUT is present in the experimental setup.

The transfer function of DUT, given by the difference of the reference signal (*REF Store*) and the spectrum of the DUT (*DUT Store*), is calculated by enabling the "*TRANS Calc*". The analysis results are immediately displayed in the chart under the plot, as can be seen in the following figure.

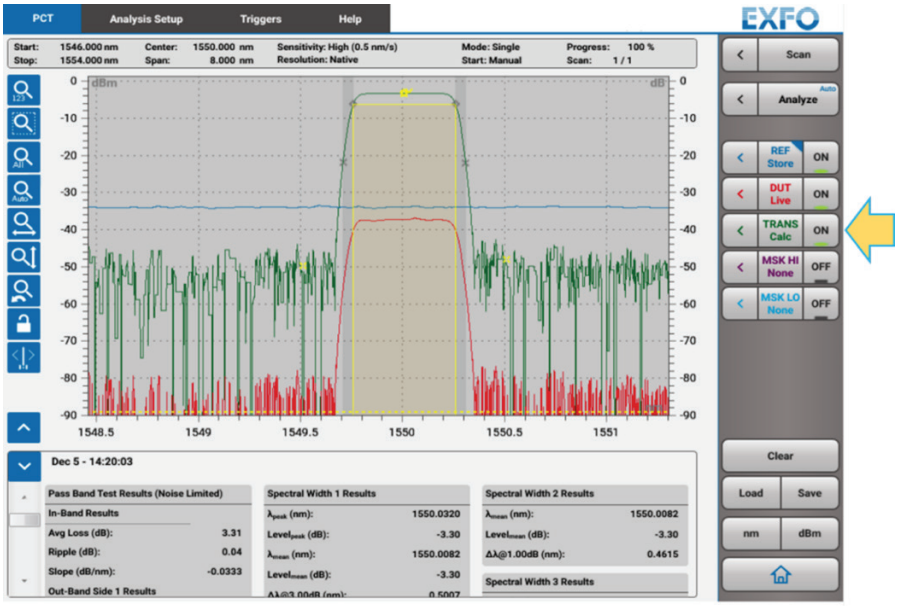


Figure 7. Displaying the transfer function (green trace).

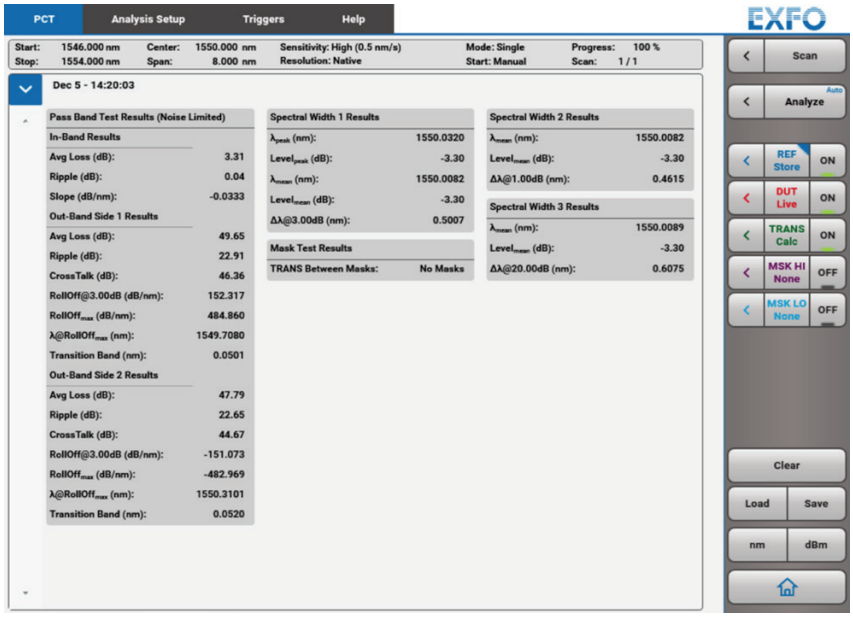


Figure 8. Maximizing the analysis results chart.

SUMMARY

The OSA20's **PCT mode** tests passive components with elegance and simplicity. This document shows how straightforward it is to take the measurement. Please bear in mind, however, that the example given here represents the typical application. It is highly recommended to read the User manual for further details concerning the scan settings and analysis setup.