OSA20 – Optical fiber amplifier (OFA) mode

quick reference guide

EXFO

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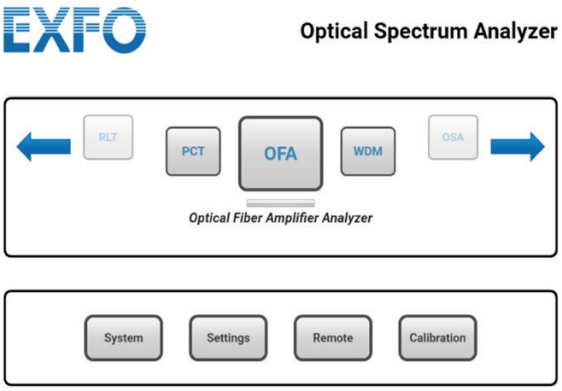
Introduction

Optical amplifiers generate noise, known as amplified spontaneous emission (ASE), which is injected into the network. ASE is considered the main cause of errors in data transfer.

EXFO's OSA20 is equipped with a mode to analyze optical amplifiers. This quick reference guide walks you through the optical fiber amplifier or OFA mode step by step.

Launching the OFA mode

Select the OFA mode in the main menu:



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.

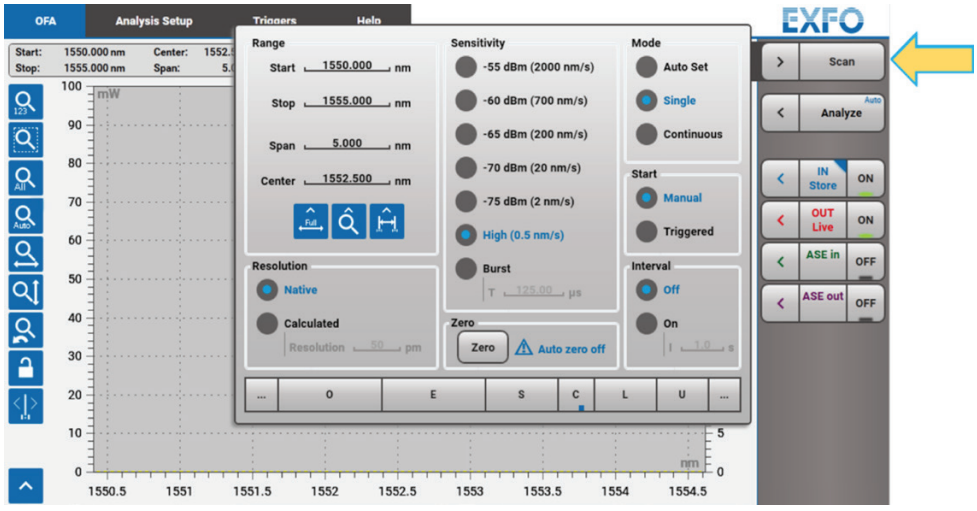


Figure 1. Scan settings menu.

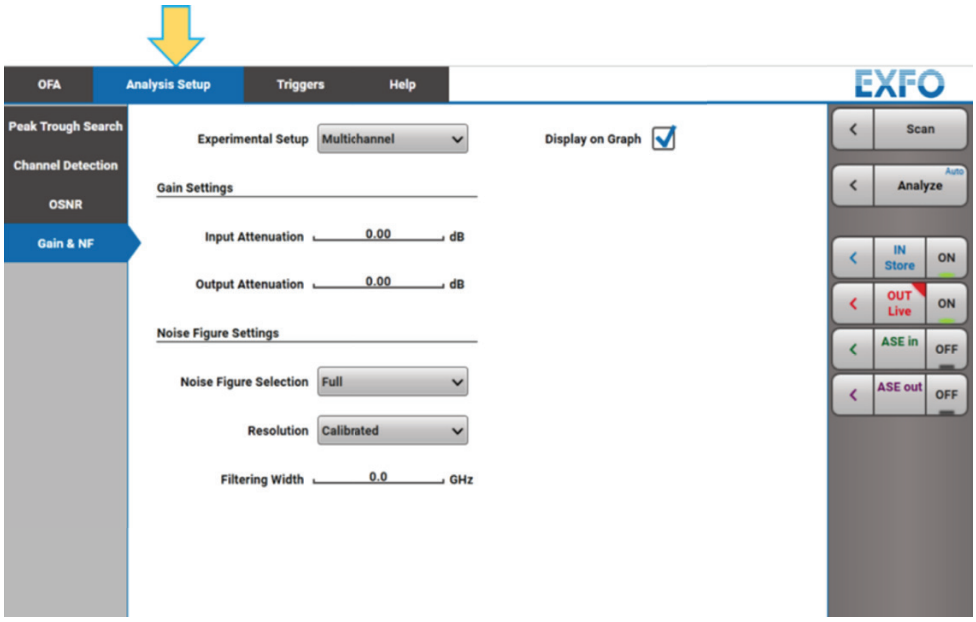


Figure 2. Analysis setup menu.

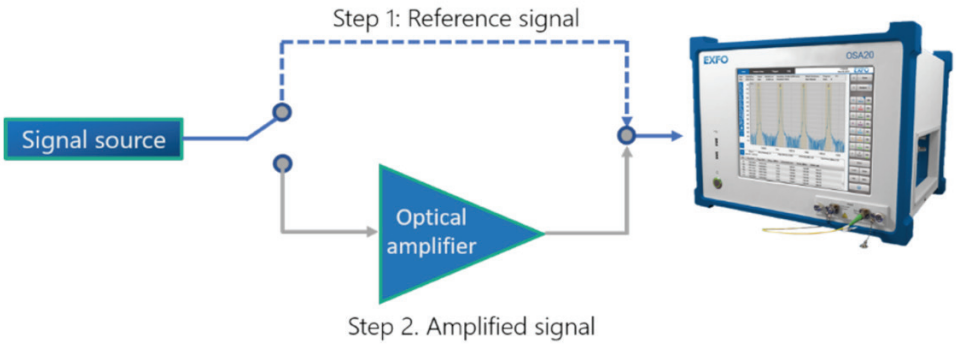


Figure 3. Typical setup for using the OFA mode in OSA20.

The OFA mode involves two steps in the analysis of an optical amplifier (see figure above). In the current example, a multichannel WDM signal is amplified and analyzed.

Test and analysis of optical amplifiers

The measurement starts by acquiring the reference trace, which corresponds to the non-amplified signal. In the right-hand side menu of the GUI, the "*In*" trace is recorded as "*Live*" and it is displayed by clicking the button "*On*", as shown below.

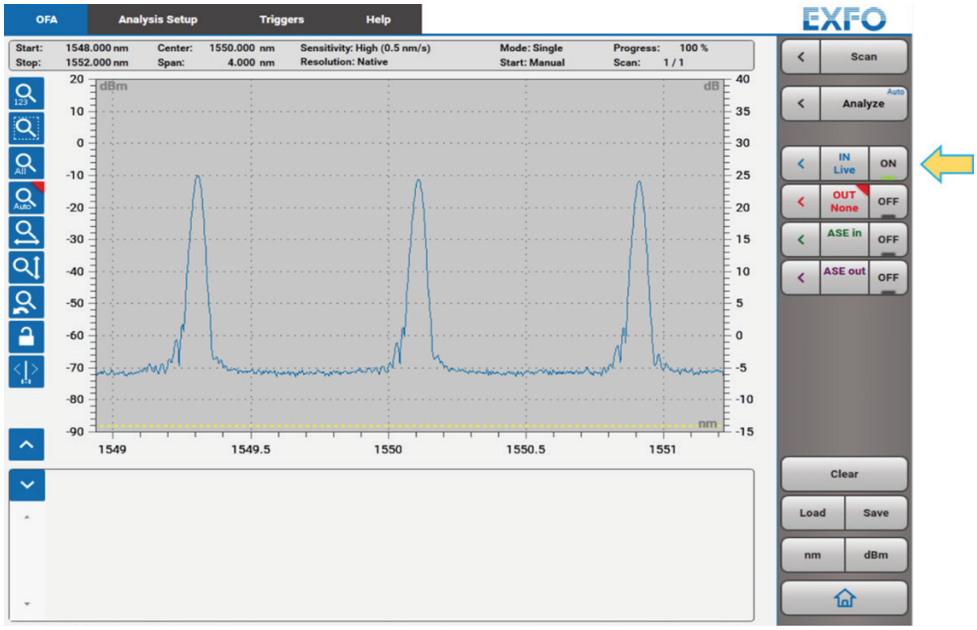


Figure 4. Measuring the non-amplified signal.

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

Figure 5. Storing the non-amplified signal.

Then, a second scan is performed to record the spectrum when the amplifier is turned on.

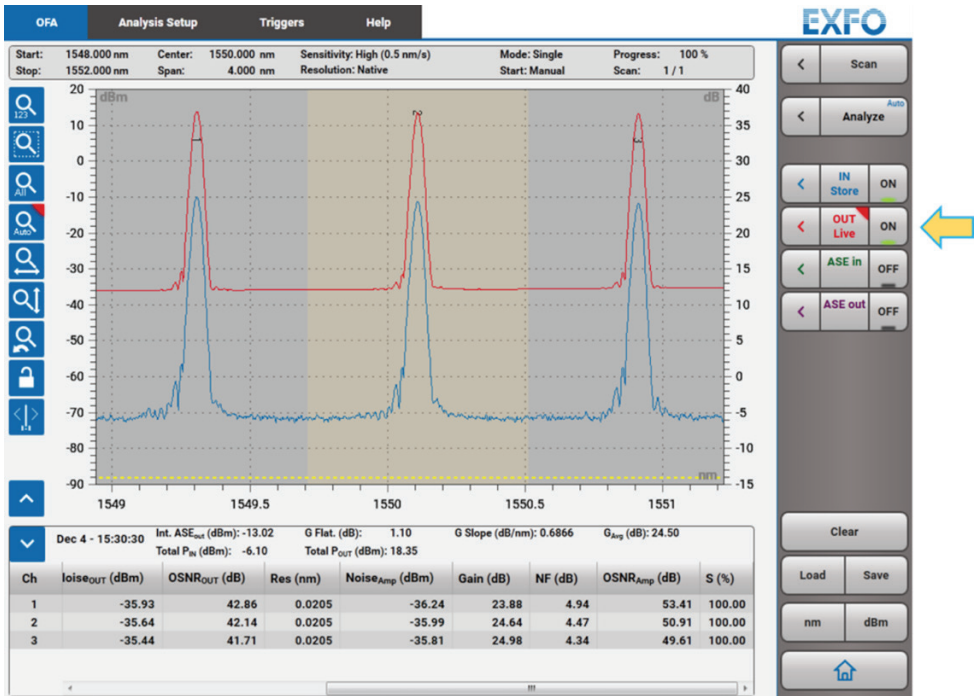


Figure 6. Measuring the amplified signal.

The results are immediately calculated and displayed in the chart below the plot, as can be seen in Figure 6. The key parameters in this analysis are gain, OSNR and noise (quality of the amplification). Moreover, the gain and noise of each channel can be plotted in the graph and their values are associated to the right-hand axis (Figure 7).

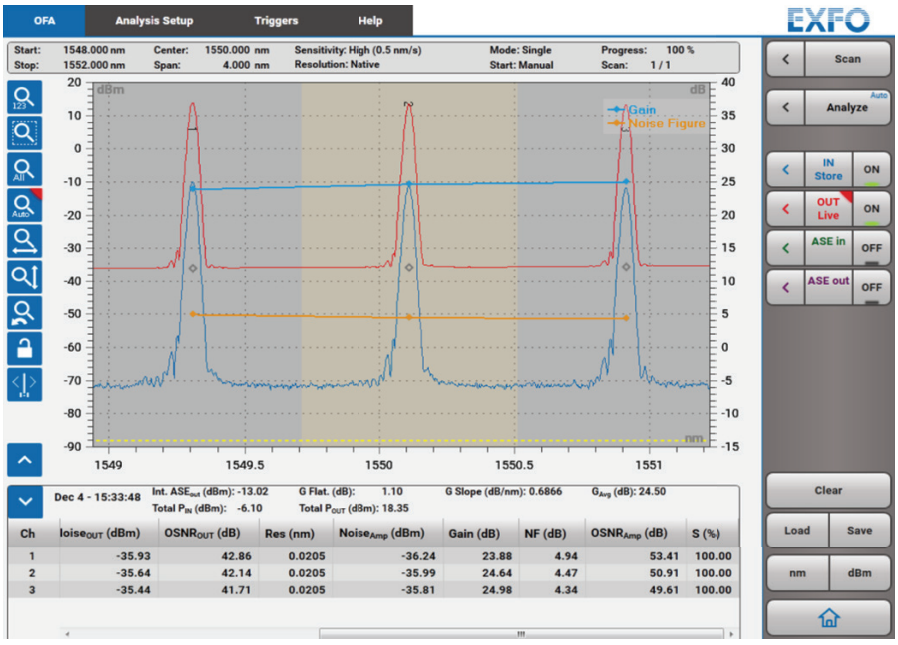


Figure 7. Displaying noise and gain results.

Finally, in Figure 8, we can calculate the noise level "*ASE in*" and "*ASE out*", representing the ASE of the non-amplified and the amplified signal, respectively.

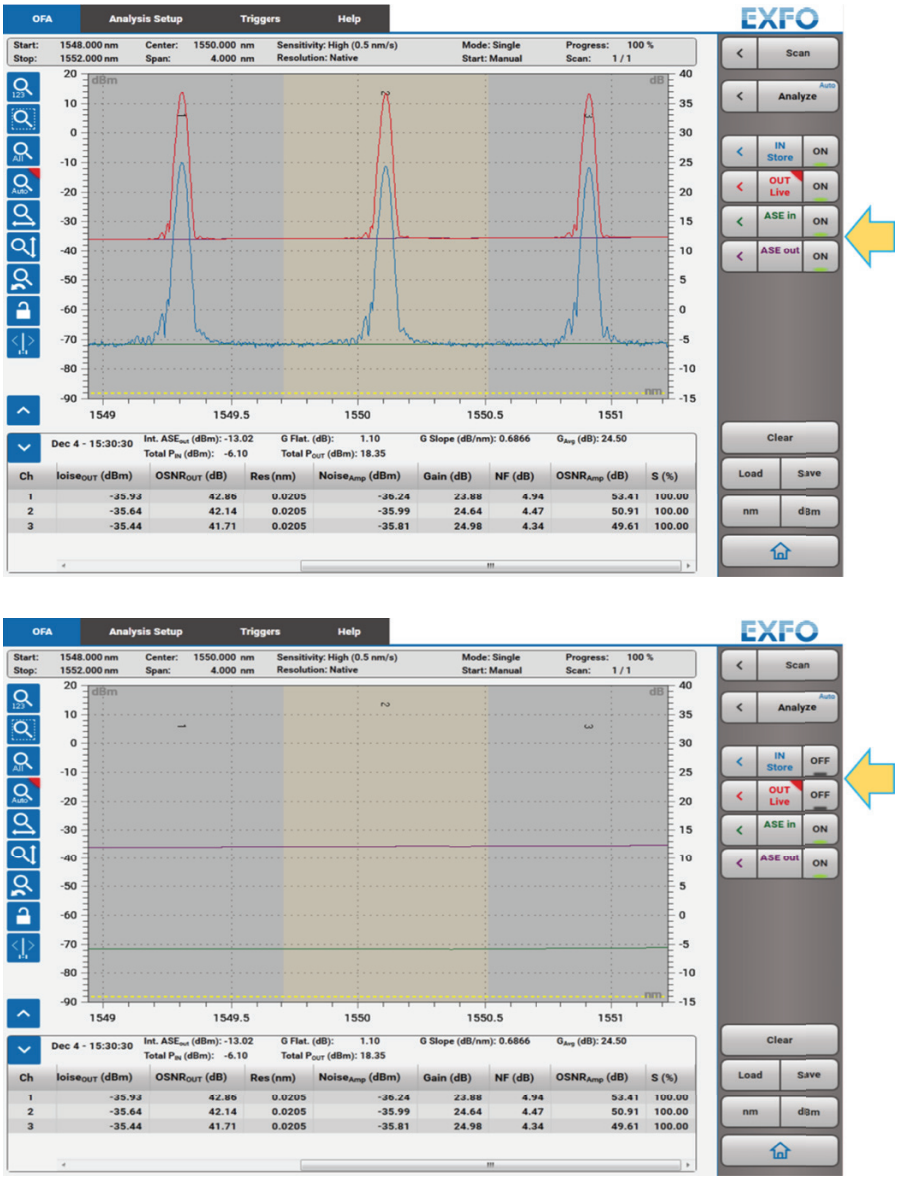


Figure 8. Displaying the ASE level for the signal before and after the amplification.

SUMMARY

The OSA20 is a powerful tool for the advanced analysis of optical amplifiers through its **OFA mode**. This document shows how straightforward it is to take the measurement. Please bear in mind, however, that the example given represents a typical application. Please read the User manual for further details about the scan settings and analysis setup.