Gain Flattening Filter Optimization

Opti*System* Application Note

Gain Flattening Filter Optimization

1. Introduction

The system layout is presented in Figure 1. The WDM Transmitter generates eight channels from 195 THz to 196.4 THz, with power of -20 dBm per channel. The Gain Flattening Filter component is placed after the EDFA and it will equalize the amplifier gain.

The user can change the filter parameters manually or use the Gain Flattening Filter Optimization of OptiSystem. The optimization engine is built specifically for the Gain Flattening Filter component and the Dual Port WDM Analyzer. Both modules must be present in the layout in order to use the optimization. The filter can be placed anywhere in a layout, for example, between two stages of an optical amplifier.

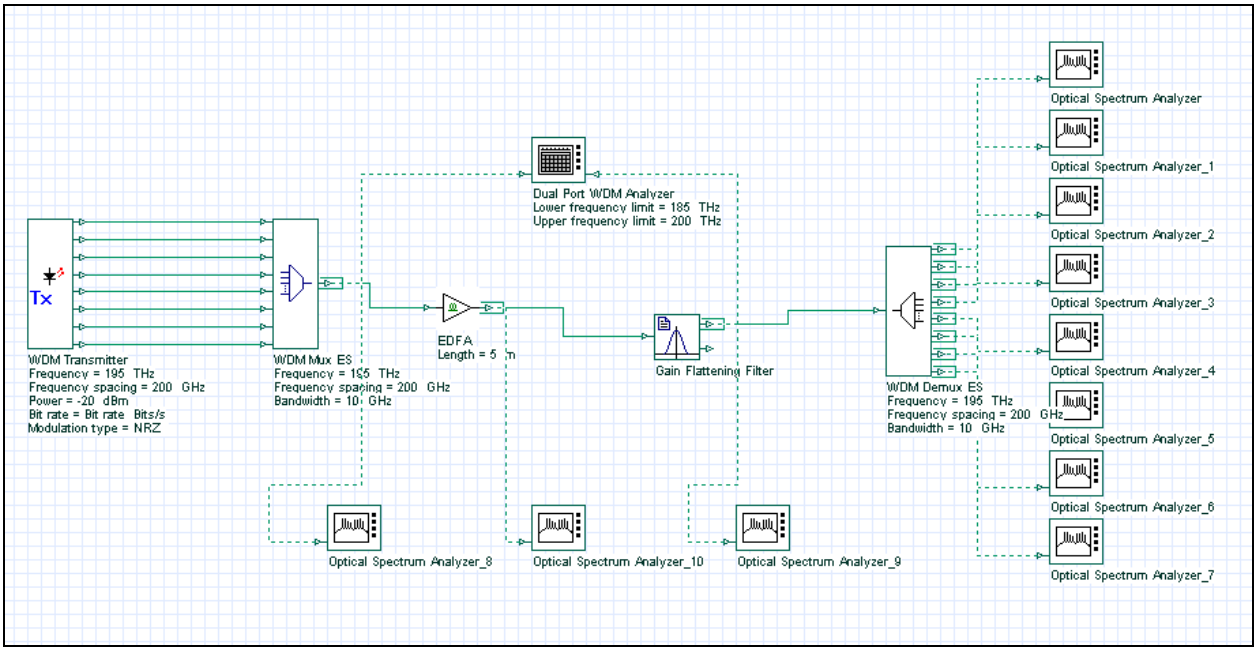

Figure 1 – System layout

2. Accessing the optimization

Figure 2 shows the steps to access OptiSystem optimization dialog box.

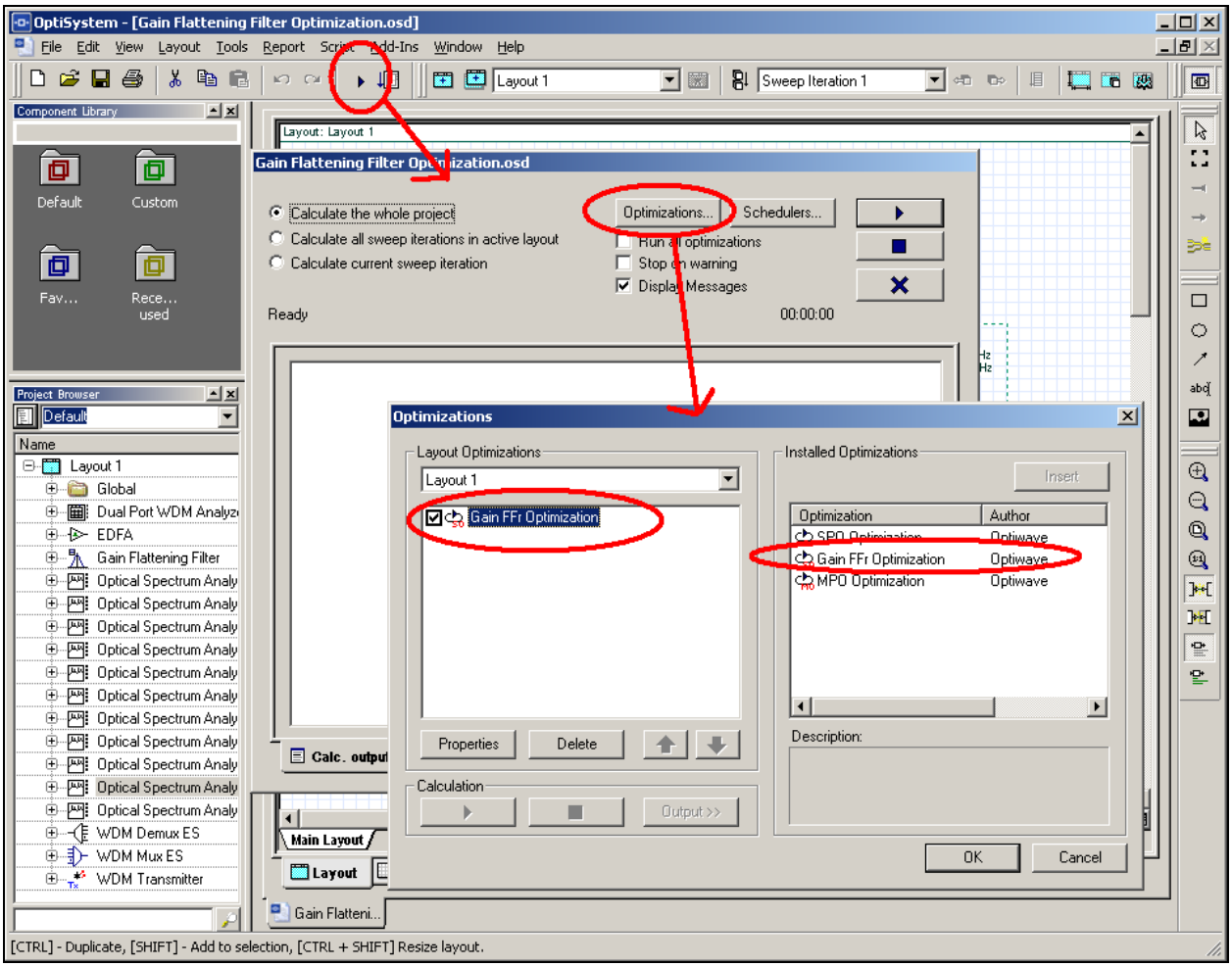

Figure 2 – Accessing the optimizations

3. Setting up the optimization

Figure 3 shows the main parameters of the optimization. The optimization will run 10 times, targeting a gain ripple of 0.1 dB from 1500 to 1600 nm. The minimum transmission value for the filter is -40 dB and the maximum value is -0.1 dB. The transmission values of the filter will be optimized at the user defined frequencies defined in the filter.

The components tab should have the filter component and the visualizers tab should have the dual port analyzer (Figures 4 and 5).

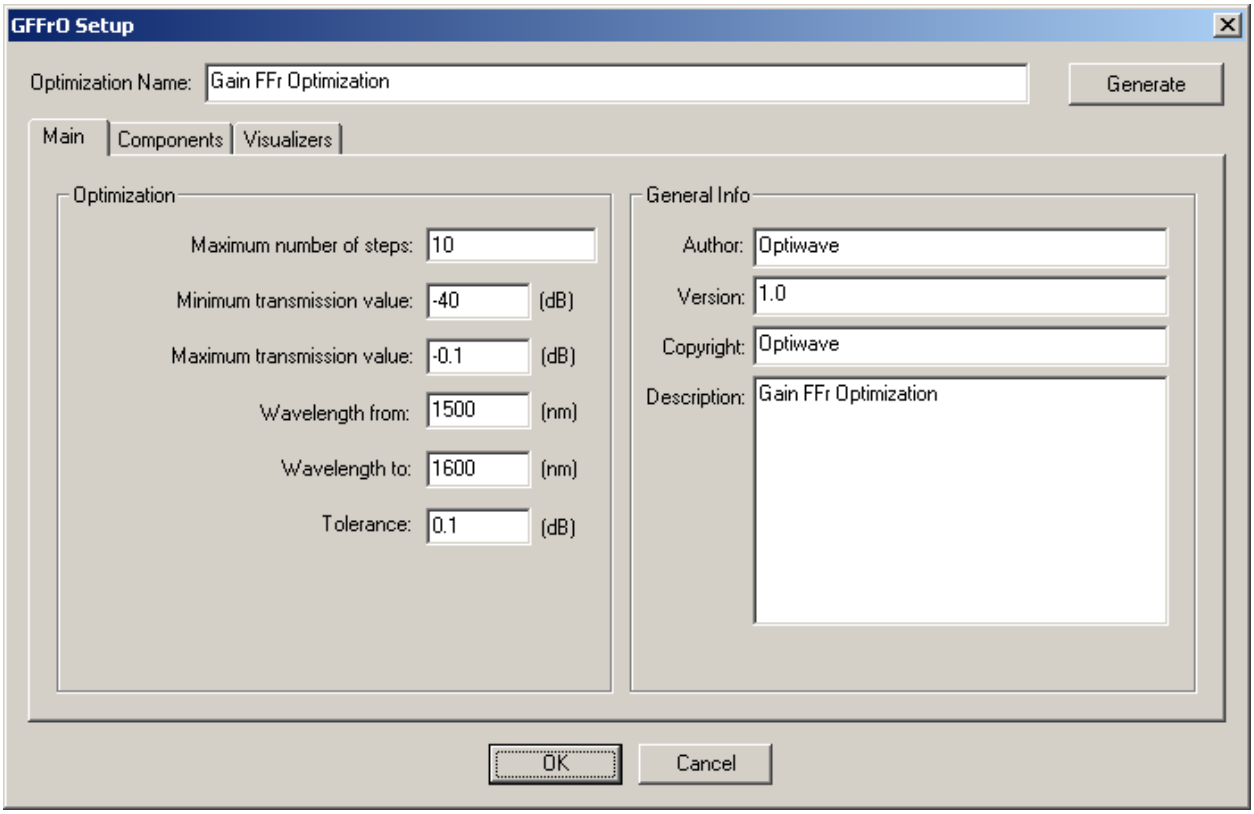

Figure 3 – Main parameters.

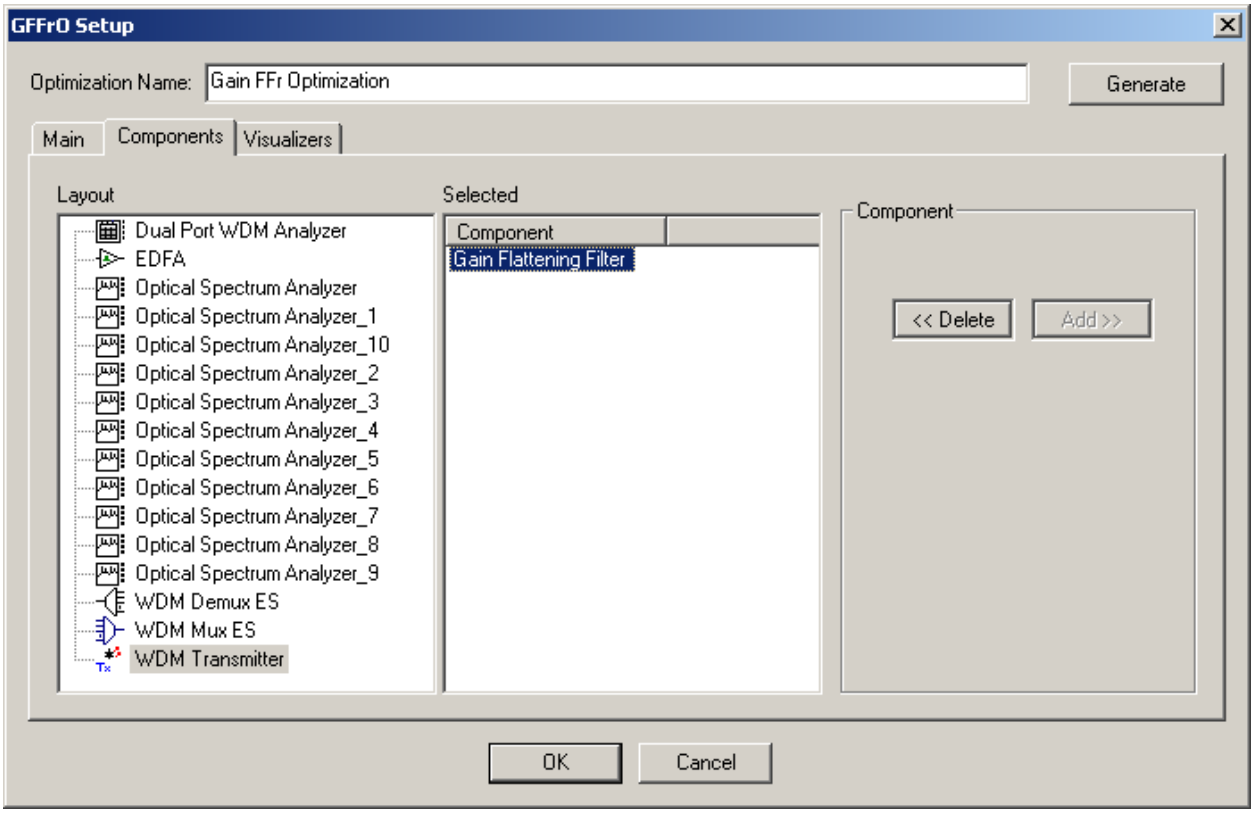

Figure 4 – Components tab.

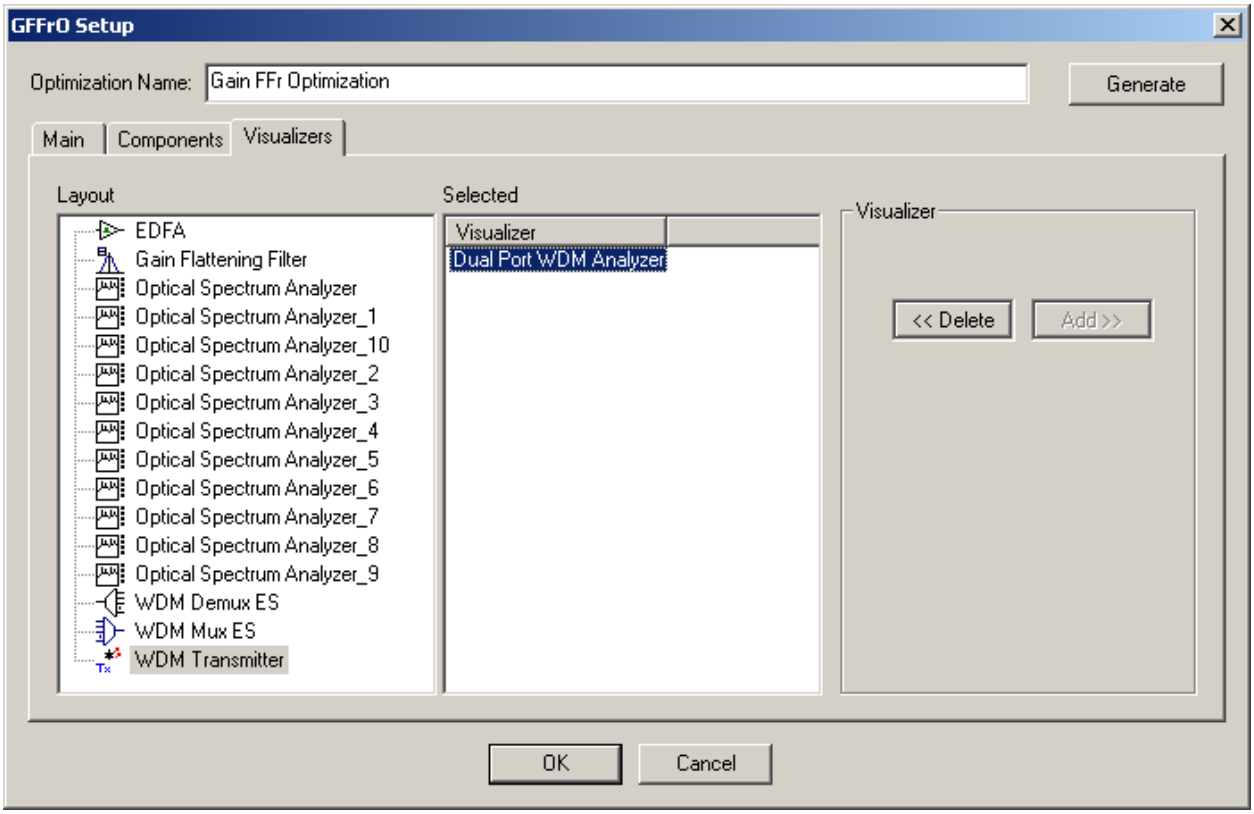

Figure 5 – Visualizers tab.

4. Running the optimization

In order to run the optimization, simply calculate the project. Make sure the ‘Run all optimizations’ check box is enabled. During the calculation the user can click on the Optimization tab and visualize the progress of the optimizations (Figure 6).

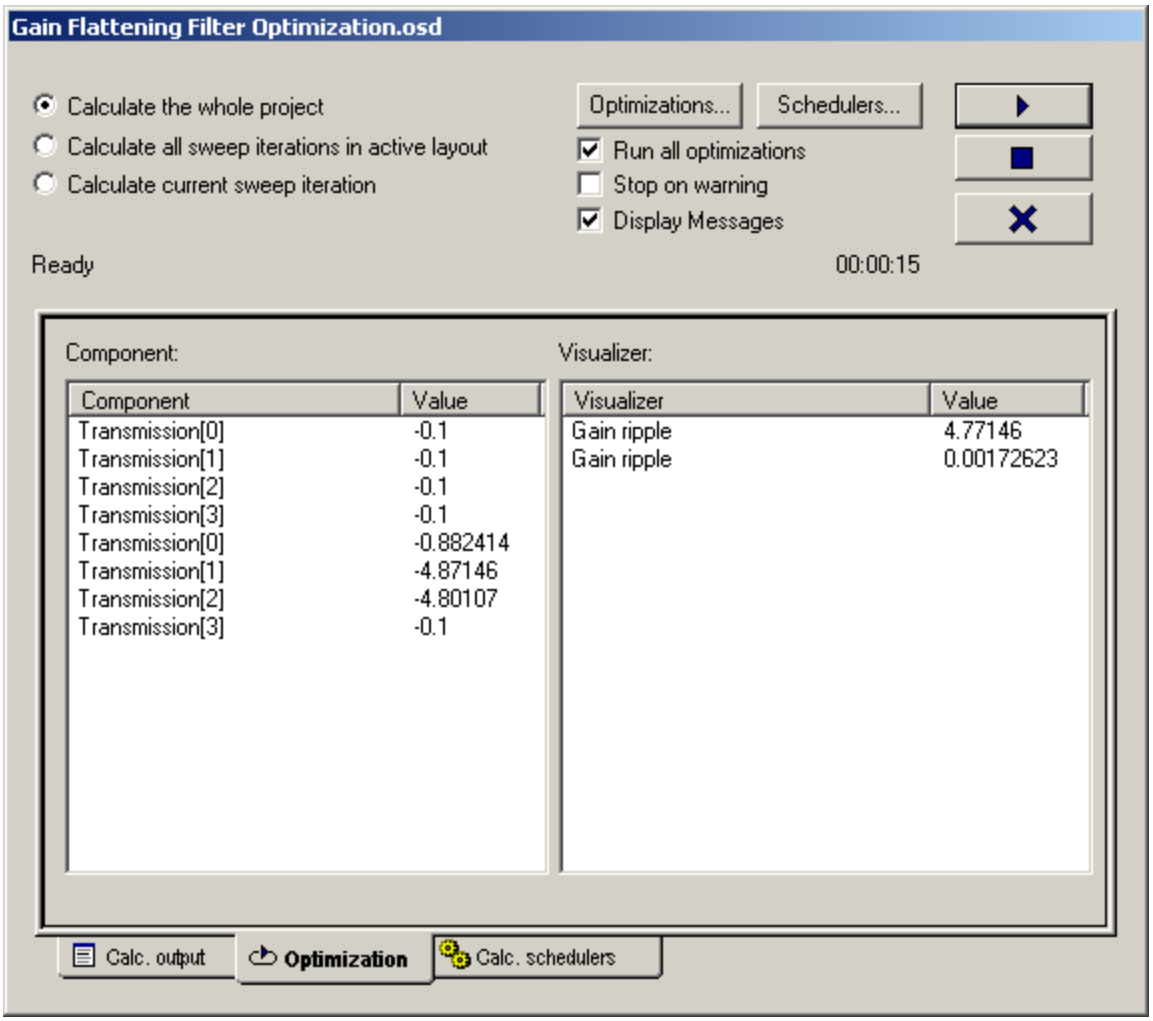

Figure 6 – Optimizing the filter.

5. Graphs and result

In this particular project we have the signal before and after the gain flattening filter available in the report page (Figure 7). The shape of the filter is also available in the report. The user can also visualize the overall gain of the amplifier using the WDM analyzer (Figure 8) and the value of the filter transmission values by looking at the filter parameters (Figure 9).

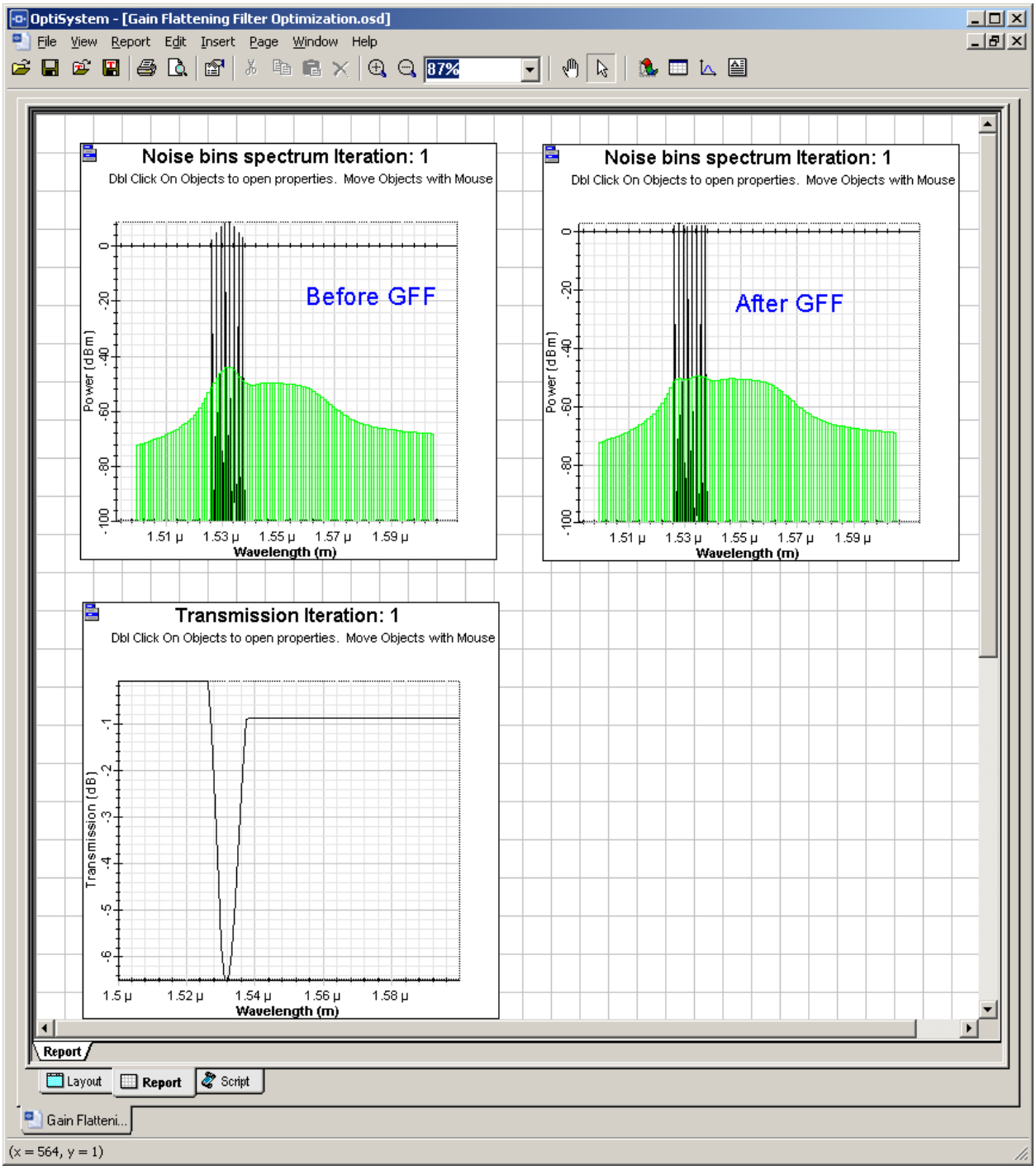

Figure 7 – Signals before and after the filter.

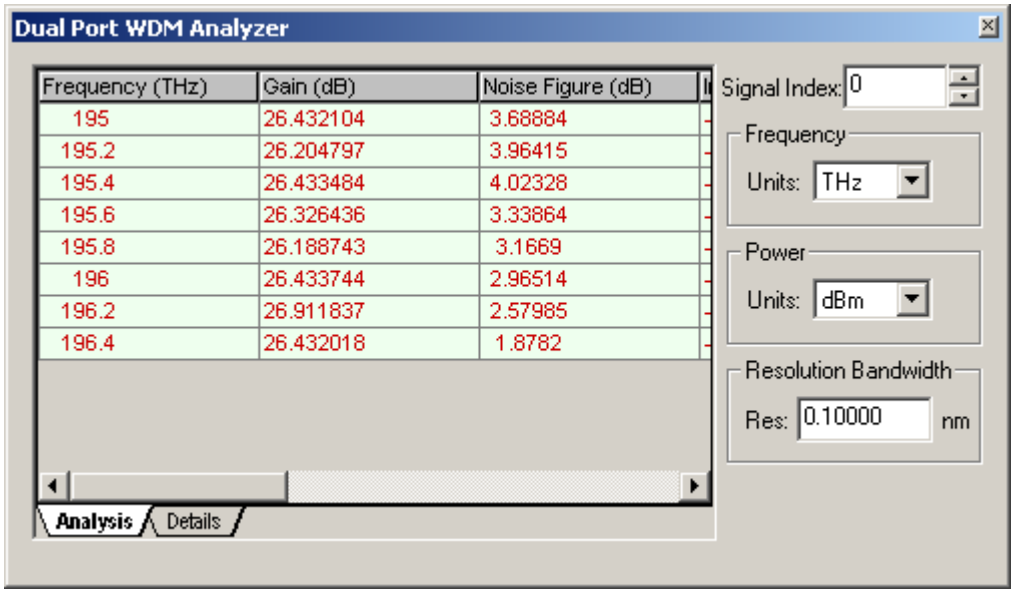

Figure 8 – The total gain of the EDFA+GFF system.

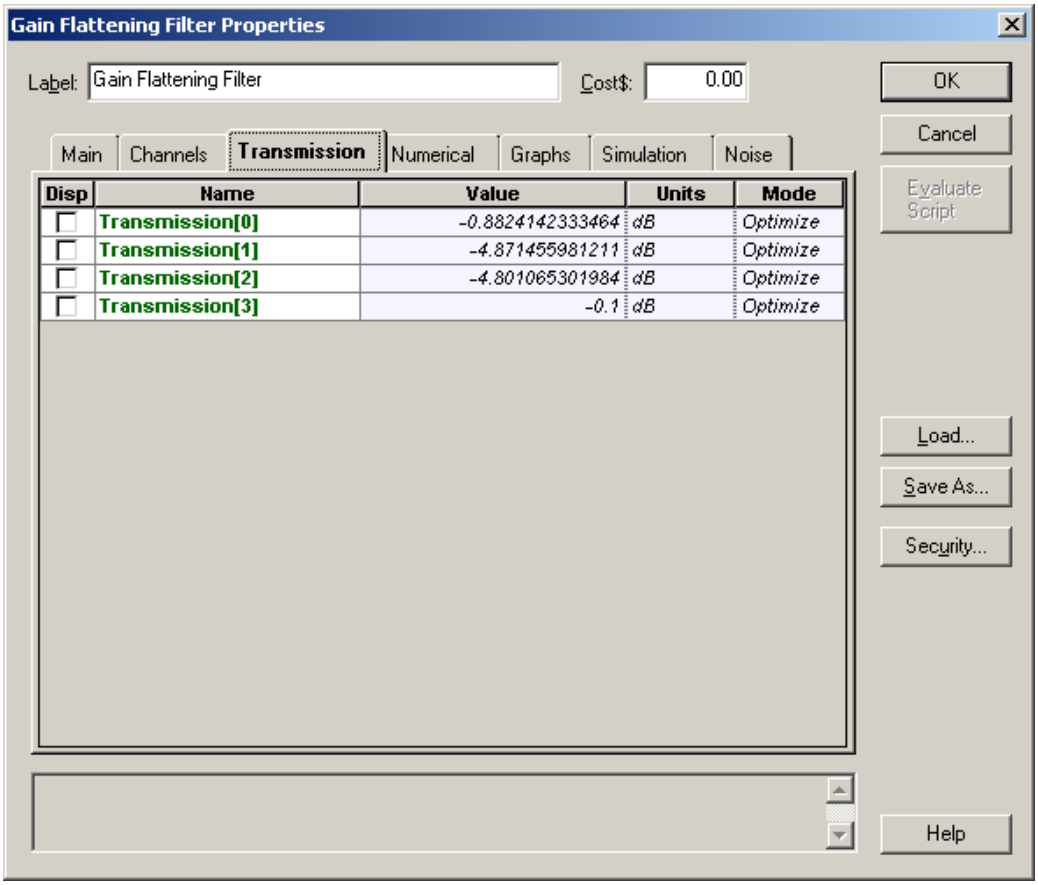

Figure 9 – Filter transmission value.

Optiwave
7 Capella Court
Ottawa, Ontario, K2E 7X1, Canada

Tel.: 1.613.224.4700
Fax: 1.613.224.4706

E-mail: support@optiwave.com
URL: www.optiwave.com
Forum: www.optiwave.us