Arrayed Waveguide Gratings

File name: `AWG 16-16.apc`
`AWG 16-32.apc`

Theses are two examples that implement an Arrayed Waveguide Grating with 16 input and 16 output capable to manage 16 channels spaced 1 nm.
In the example `AWG16-16` the central array is composed by 16 waveguides while in `AWG16-32` by 32 waveguides. In both examples star couplers can be set to a have a uniform output field distribution or a Gaussian distribution.
These are two relatively large circuits, with 146 components / 320 ports and 258 components / 576 ports, respectively, but the transfer function can be calculated at 250 wavelengths in less than 5 minutes on classical desktop.
Fig. 1 refers to the transfer function of the `AWG16-16`, obtained by using a uniform and a Gaussian Star coupler. The bandwidth at -3dB of the main lobe is 115 GHz (0.92 nm) in both cases, roughly equal to the FSR divided by the number of waveguides of the array. With a Gaussian star coupler the main lobe insertion loss is 3.2 dB higher respect the uniform (ideal) case. Markers (the two green marks on the main lobes of Fig. 1) can be easily used to measure the desired quantities.
Fig. 2 shows the comparison between the transfer function of the two circuits. Once you have simulated the first one, all the results are automatically stored in the "Cache" memory with the default name 'Last (x).std'. These data are accessible through the 'Data File' sub-panel available in Plot mode left panel. You can also rename the results for an easer later use. In any case the plot windows remain active and hence the simulations of other circuits can be plotted on the same graph.
Fig. 3 shows the transmission characteristics of the AWG 16-32 with uniform (ideal) and gaussian star couplers, to put in evidence the lower crosstalk and the reduced insertion loss.
A large number of traces can be put together, selected, edited, copied and saved.

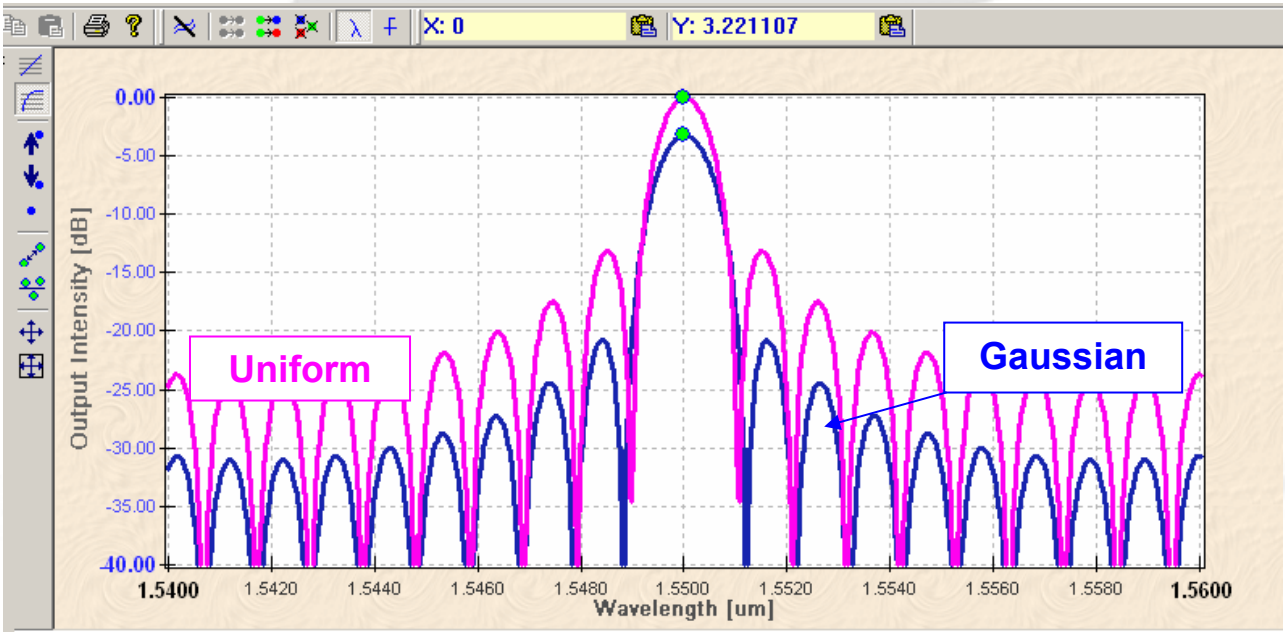

Fig. 1 – Single channel input-output intensity transfer function of the 16 channels AWG with uniform (ideal) and Gaussian star couplers.

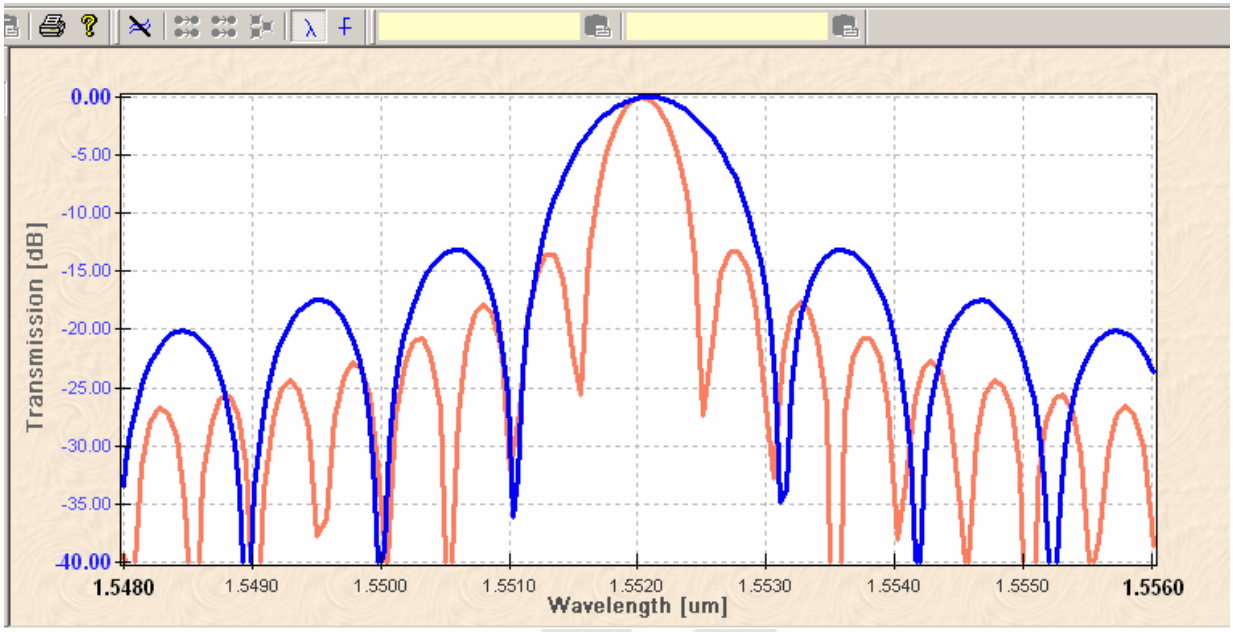

Fig. 2 – Single channel input-output intensity transfer function of the AWG with 16 (blue) and 32 (orange) waveguides in the central array.

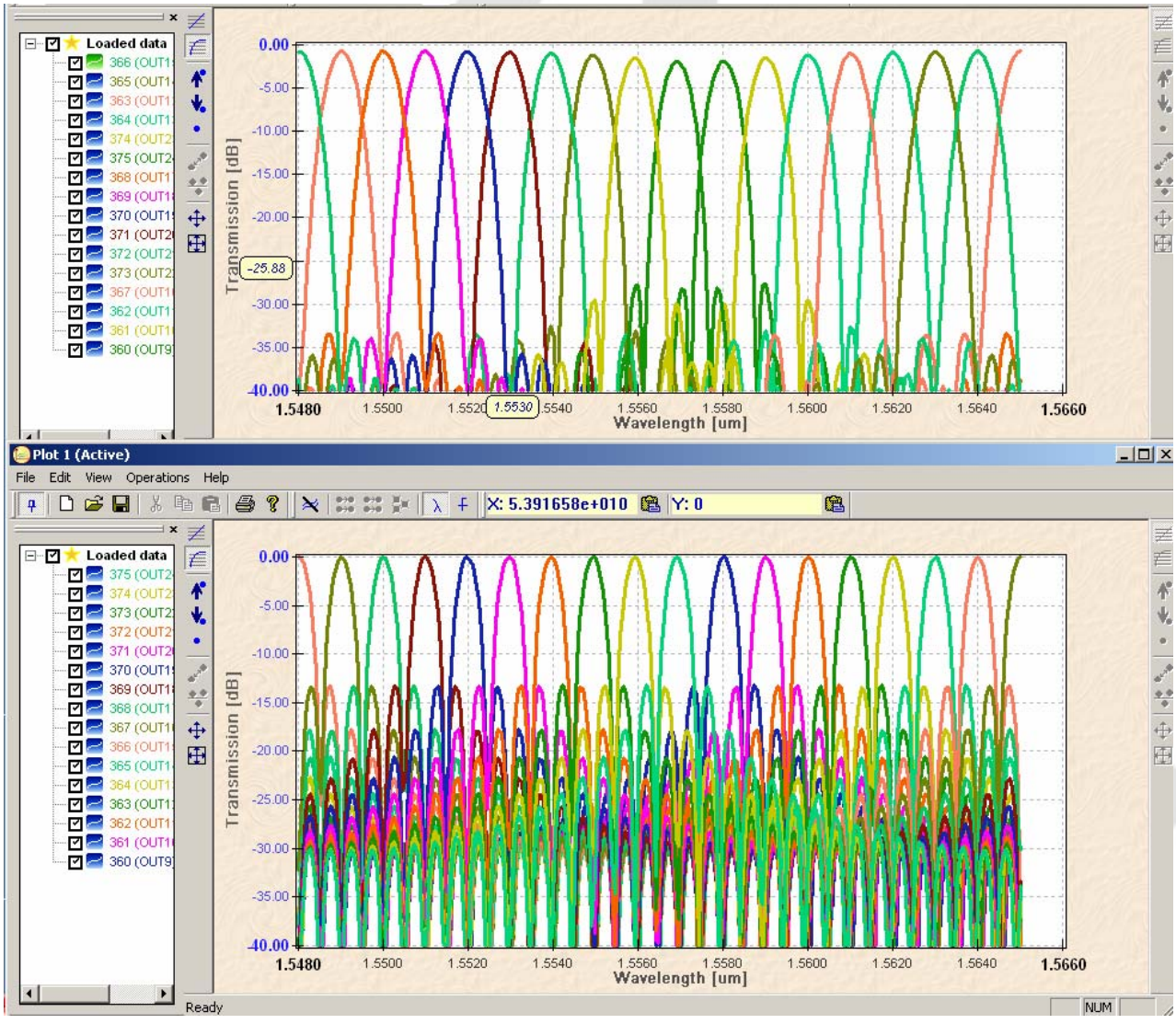

Fig. 3 – Transmission characteristics of the 16 channels for the AWG 16-32 circuit with uniform (ideal) and gaussian star couplers.