Motivation
To design optical demultiplexers based on Arrayed Waveguide Gratings (AWGs) the various photonic tools are commercially available on the market. Although the design procedures are very similar to each other the obtained simulation results can vary strongly from one tool to another. Therefore, the design optical demultiplexers based on Arrayed Waveguide Gratings (AWGs) the various photonic tools are commercially available on the market.

Design of 8-channel 100 GHz AWG
When designing AWGs a set of geometrical parameters must be first calculated from input design parameters. These parameters were calculated using AWG-Parameters tool.

Input design parameters:
Technological parameters are taken to design AWG waveguide structure:
- waveguide size: waveguide structure is 6 µm x 6 µm
- refractive index of the core, n₁ = 1.456
- refractive index of the cladding, n₂ = 1.445

AWG type parameters:
- number of output waveguides (channels) N = 8
- AWG centre wavelength, \( \lambda_c = 1.55012 \) µm
- channel spacing, \( df = 100 \) GHz

Transmission parameters:
- adjacent channel crosstalk between output waveguides (channels): \( CR = 30 \) dB
- adjacent channel crosstalk between arrayed waveguides: \( CRaw = 10 \) dB
- uniformity over all the output channels (also called non-uniformity): \( Lu = 0.7 \) dB

Transmission characteristics
All transmission characteristics were evaluated using our in-house developed software tool called AWG-Analyzer tool. The calculated transmission parameters show very similar results however, the best agreement was achieved between the measurement and the Optiwave simulation.

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\text{Transmission parameters} & \text{Measurement} & \text{Optiwave} & \text{Apollo} & \text{R-Soft} \\
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\text{AWG central wavelength (} \lambda_c \text{)} & 1547.50 \text{ nm} & 1549.00 \text{ nm} & 1550.12 \text{ nm} & 1550.70 \text{ nm} \\
\text{Insertion loss} & 6.438 \text{ dB} & 2.624 \text{ dB} & 2.306 \text{ dB} & 2.000 \text{ dB} \\
\text{Insertion loss uniformity (} Lu \text{)} & 0.694 \text{ dB} & 0.520 \text{ dB} & 0.760 \text{ dB} & 0.529 \text{ dB} \\
\text{Adjacent channel crosstalk (} CR \text{)} & 32.476 \text{ dB} & 42.024 \text{ dB} & 50.426 \text{ dB} & 50.264 \text{ dB} \\
\text{Background crosstalk (} BX \text{)} & 54.793 \text{ dB} & 49.458 \text{ dB} & 71.050 \text{ dB} & 73.309 \text{ dB} \\
\text{Channel spacing (} df \text{)} & 100 \text{ GHz} & 100 \text{ GHz} & 100 \text{ GHz} & 100 \text{ GHz} \\
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