Brief Explanation of Automatic Wavelength Locking

The purpose for using wavelength locking in a WDM-PON is to **reduce the cost** associated with traditional DWDM sources such as wavelength-specific DFB lasers or tunable narrowband lasers.

Novera's automatic wavelength locking technology allows the use of **inexpensive** and identical **Fabry-Perot laser diodes** (FP-LDs) in all of the DWDM transceivers.

The basic operating principle is based on **injecting a narrowband seed signal into each FP-LD** forcing it to operate in a narrow wavelength range for transmission through the WDM-PON filters. The FP-LD basically operates as a **reflective modulator with optical gain**. Standard direct current modulation is used with each FP-LD. The amplified seed signal suppress lasing in the FP-LD which eliminates the mode-partition noise associated with laser mode-hopping.

The seed signals are generated by a BLS (**broadband light source**) located at the OLT (optical line terminal). This broadband unmodulated BLS signal is **spectrally sliced by** the remote node **AWG** (array waveguide) into multiple narrowband seed signals for each of the identical remote FP-based DWDM transceivers.

The two **AWGs** (one located at the OLT and the other at the remote node) are **periodic** (or cyclic) which allows two or more wavelengths to couple into each of its output ports. This allows each PON user a **dedicated downstream and upstream wavelength** on a single distribution drop fiber. The AWGs are designed to be **athermal** so that they can be used at a passive remote node location without the need for any electrical power.

For a more details relating to the operation of a wavelength-locked WDM-PON please see the white paper titled "WDM-PON for the Access Network."