

Using High-Power Pluggable Coherent Modules in the VIAVI ONT-800 Test Set

Getting the best from VIAVI ONT 800G FLEX Test Modules for development, debugging and validation of coherent and ZR optical modules.

Introduction

The [VIAVI ONT-800 family](#) has been supporting pluggable digital coherent optics module (DCO) development from early 100G CFP through to the very latest 800G ZR pluggables. The VIAVI ONT 800G FLEX family supports coherent ZR module development and evaluation – from 100G ZR to 800G ZR. The information contained in this Application Note is to help you get the very best from your ONT and understand the power limitations for each module form factor.

A wide range of test applications, covering the physical layer through to multi-services such as FlexO, are integrated with advanced tools covering pluggable module management including C-CMIS debugging. This close integration of traffic and data with module management and performance monitoring is key to successful and accelerated DCO development, integration and validation.

Of course, at the most basic level, the demanding power and cooling requirements of pluggable coherent and ZR are key elements of successful and stable test and measurement. The [VIAVI ONT 800G FLEX test module](#) (DCO shown below) is designed from the ground up for development, validation and debugging.



ONT-800 FLEX DCO Module

Supporting the high-power requirements of coherent ZR pluggables needs to be the core of any test and measurement design, it cannot be an afterthought.

Requirements for Operating High-Power Pluggables Inside an ONT-800 Tester

Every aspect of safely and stably running high-power modules has been carefully engineered into the ONT-800 Test Modules. This includes thermal management, careful design of power supply and close engagement with the module connector vendor.

Environment	Lab environment with ambient temperature below 25 °C
ONT Test Set placement	Clear and unobstructed air flow around ONT with a gap of at least 30 cm on every side
Pluggable module connector	Ensure module connector is capable of handling the current required. Pluggable module and the connector must be clean and undamaged. The high current must be equally shared across all power pins.
Pluggable module surface	Ensure the module top surface (mating with riding heatsink) is coplanar and clean, with the appropriate finish to ensure minimum thermal resistance. The vast majority of the heat from the module is extracted via the riding heatsink so the maximum contact area with lowest thermal resistance is critical for optimal cooling.
Pluggable module firmware	The pluggable module firmware must be able to manage the power requirements and capabilities of a module. Thermal management is a combination of the module firmware reporting module parameters including temperature and the ONT thermal management application setting fan speeds.

When these basic guidelines are met, the ONT 800G FLEX Test Modules must be used within the limits listed below. This is an important requirement for high-power modules often found in the earliest stages of development and validation.

Specific Form Factors

Other members of the ONT family may also support the power and cooling requirements of coherent modules if the general guidelines are followed. The table below gives guidelines of what can be expected for other ONT modules and form factors.

Product	Form factor and slot	Power limit with suitable transponder and ONT environment. General guidelines as above.
ONT Flex	QSFP-DD	25W
ONT N-port	QSFP28	6W
ONT Flex	QSFP28	6W
ONT DCO	CFP2	32W
ONT XPM	OSFP800 PIM	30W
ONT XPM	QSFP-DD800 PIM	30W

The ONT XPM uses PIM modules to allow support of both QSFP-DD800 and OSFP800. The use of an external bench fan directing air on the bottom of the PIM module can help with cooling, especially with modules above 30W.

Summary

Coherent/ZR pluggable modules are far more complex and have far more demanding requirements for cooling and powering than standard pluggables, especially during the development and validation phase.

The VIAVI ONT 800G FLEX Test Modules combine a range of integrated applications (including many unique module management tools) with highly optimized module power and cooling. By following a few simple best practice guidelines, the engineers can focus on using the ONT Test Set tools to debug hardware and software issues and not worry about cooling and power impacts on their DUT.

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