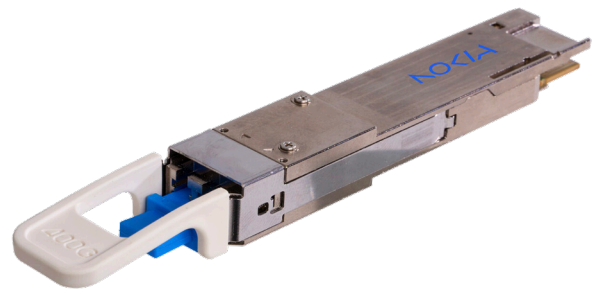


## Nokia 400ZR/ZR+ Coherent Modules

Nokia's 400G QSFP-DD coherent modules (QDDCO4Z/QDDCO4/QDDCO4H) provide the capacity and optical reach of coherent optics in flexible, small-sized QSFP-DD modules. Supporting 100G to 400G capacities, the Nokia coherent modules are ideal for 400ZR and 400ZR+ router DCI applications over metro and regional distances.

The advancements in coherent optics and digital signal processors has enabled 400ZR/ZR+ coherent line optics in small QSFP-DD sized pluggable optics. The QSFP-DD is ideal for carriers who want to install coherent line optics directly into their router line cards for metro to regional data center interconnect (DCI) applications.



### Benefits

- Compact size, cost-optimized coherent WDM line interface
- Simplified integration of coherent WDM interfaces into routing interface cards
- Modular: can be installed and deployed as needed for the ultimate plug-and-play
- Flexible, coherent interface can be provisioned for capacity from 100G – 400G
- Efficient, cost-effective 400G coherent line optics
- Higher power version (+3 dBm) supports existing multi-haul ROADM networks

### Applications

- High-capacity metro and regional applications
- Data center interconnect (DCI) applications
- Cost-optimized n x 100G service aggregation
- Applicable for both fixed and flex-grid WDM line systems
- Modules options available supporting OIF 400ZR and OpenZR+ (400ZR+) standards, along with high output power (+3 dBm) applications

## Product description

The Nokia 400ZR/ZR+ modules provide 400G (400ZR) and 100G to 400G (400ZR+) coherent WDM line interfaces in a compact, QSFP-DD pluggable module.

Incorporating the latest generation Nokia optical technology, the 400ZR/ZR+ modules provide plug-and-play options supporting coherent WDM line optics router and switch interface cards

Integration of coherent digital signal processors (DSPs) into optical modules has long been an industry objective, but only recently become viable with the introduction of low-power 7nm CMOS technology.

The small size and lower power consumption of 400ZR modules enable a wide array of applications, including coherent router DCI applications. Coupling with Nokia 1830 WDM line systems and ILA nodes provides an efficient, seamless network, all managed by Nokia WaveSuite network management and controller platforms.

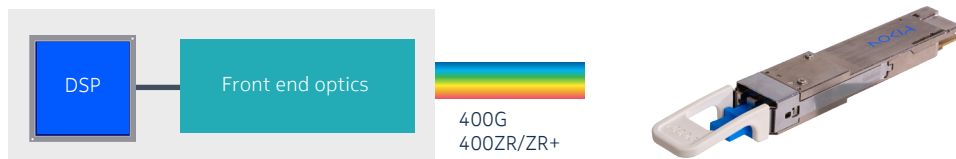
The Nokia QDDCO4Z 400G ZR module supports 400G applications up to 120 Km, compliant to Optical Interworking Forum (OIF) 400ZR standards.

The QDDCO4 400G ZR+ module can be provisioned for 100G to 400G capacities using QPSK, 8QAM, or 16QAM modulation formats and is compliant to industry OpenZR+ standards. The provisioning flexibility ensures the QDDCO4 supports optimum capacity over any metro, regional, or long-haul route.

The new high power QDDCO4H 400ZR+ module supports up to +3 dBm transmit output power, enabling direct connection to existing multi-haul metro, regional, and long-haul ROADM networks.

The Nokia 400ZR/ZR+ modules are ideal for DCI applications using router integrated coherent optics. They support direct 400 GbE clients as well as aggregation of n x 100 GbE clients.

Figure 1. Nokia 400ZR/400ZR+ module



| 400ZR/ZR+ | Part number | Description                                    |
|-----------|-------------|------------------------------------------------|
| QDDCO4Z   | 3AL82199AA  | 400ZR QSFP-DD module, 400G                     |
| QDDCO4    | 3AL82213AA  | 400ZR+ QSFP-DD module, 100G – 400G             |
| QDDCO4H   | 3AL82261AA  | 400ZR+ QSFP-DD module, 100G – 400G, High Power |



## Technical specifications

| Specifications      | QDDCO4Z                                                         | QDDCO4                                                                                                   | QDDCO4H                                                                                                 |
|---------------------|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| Application         | 400ZR                                                           | 400ZR+                                                                                                   | 400ZR+ Hi power                                                                                         |
| Line port           | 1 x QSFP-DD WDM line port<br>400G<br>16QAM<br>60 Gbaud          | 1 x QSFP-DD WDM line port<br>100G - 400G<br>QPSK/8QAM/16QAM<br>60 Gbaud (200G - 400G)<br>30 Gbaud (100G) | 1 x QSFP-DD WDM line port<br>100G - 400G<br>QPSK/8QAM16QAM<br>60 Gbaud (200G - 400G)<br>30 Gbaud (100G) |
| Tx power            | -10 dBm                                                         | -10 dBm                                                                                                  | +3 dBm                                                                                                  |
| Supported clients   | 400 GbE<br>4x100 GbE                                            | 400 GbE<br>4x100 GbE                                                                                     | 400 GbE<br>4x100 GbE                                                                                    |
| FEC options         | cFEC                                                            | oFEC/cFEC                                                                                                | oFEC/cFEC                                                                                               |
| OIF 400ZR compliant | Yes                                                             | —                                                                                                        | Yes                                                                                                     |
| OpenZR+ compliant   | —                                                               | Yes                                                                                                      | Yes                                                                                                     |
| Power (typ)         | 17.5 W                                                          | 20.9 W                                                                                                   | 23.5 W                                                                                                  |
| Size                | QSFP-DD                                                         | QSFP-DD                                                                                                  | QSFP-DD                                                                                                 |
| Case temp           | Normal    -5°C to 75°C (23°F to 167°F)<br>Humidity    5% to 85% |                                                                                                          |                                                                                                         |

### About Nokia

At Nokia, we create technology that helps the world act together.

As a B2B technology innovation leader, we are pioneering networks that sense, think and act by leveraging our work across mobile, fixed and cloud networks. In addition, we create value with intellectual property and long-term research, led by the award-winning Nokia Bell Labs.

Service providers, enterprises and partners worldwide trust Nokia to deliver secure, reliable and sustainable networks today – and work with us to create the digital services and applications of the future.

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