

Tender Specifications

SFP Module Requirements

Overview

This document outlines the technical specifications for SFP modules required as part of the tender. The SFP modules should provide flexible, high-speed connectivity for various network applications, including copper and fibre optic connections. The modules must meet the performance, reliability, and compatibility standards necessary for integration into a robust network infrastructure.

1. General Requirements

- **Form Factor:** Small Form-factor Pluggable (SFP) and SFP+ modules.
- **Compatibility:** Must be compatible with standard SFP/SFP+ slots and support both 1 Gbps and 10 Gbps data rates.
- **Hot-Swappable:** The modules should be hot-swappable to allow for easy installation and maintenance without network disruption.
- **Certifications:** Must comply with IEC/EN 60825-1:2014 for laser safety and other relevant safety and performance standards.

2. Copper SFP Modules

- **Supported Media:** Copper (Twisted Pair, Cat 5e/6/6A).
- **Connector Type:** RJ45.
- **Data Rate:**
 - Up to 1 Gbps for standard modules.
 - Up to 10 Gbps for high-speed modules.
- **Max. Power Consumption:**

- Up to 3W for 10 Gbps modules.
- Up to 1.2W for 1 Gbps modules.
- **Cable Distance:**
 - Up to 100 meters for 1 Gbps over Cat 5e cable.
 - Up to 30 meters for 10 Gbps over Cat 6A cable.
- **Operating Temperature:** 0° C to 70° C (32° F to 158° F).

3. Optical SFP Modules

Multi-Mode Fiber SFP Modules

- **Supported Media:** Multi-Mode Fiber.
- **Connector Type:** LC (Duplex).
- **Data Rate:**
 - 1.25 Gbps for standard modules.
 - 10 Gbps for high-speed modules.
- **Wavelength:**
 - **TX/RX Wavelength:** 850 nm.
- **Max. Power Consumption:**
 - Up to 0.66W for 1 Gbps modules.
 - Up to 0.8W for 10 Gbps modules.
- **Cable Distance:**
 - Up to 550 meters for 1 Gbps.
 - Up to 300 meters for 10 Gbps.
- **Operating Temperature:** 0° C to 70° C (32° F to 158° F).

Single-Mode Fiber SFP Modules

- **Supported Media:** Single-Mode Fiber.

- **Connector Type:** LC (Duplex or Simplex).
- **Data Rate:**
 - 1 Gbps for standard modules.
 - 10 Gbps for high-speed modules.
- **Wavelength:**
 - **TX Wavelength:** 1270 nm, 1310 nm, or 1330 nm.
 - **RX Wavelength:** 1270 nm, 1310 nm, or 1330 nm.
- **Max. Power Consumption:** Up to 1W for 10 Gbps modules.
- **Cable Distance:**
 - Up to 10 km for 10 Gbps modules.
 - Up to 3 km for 1 Gbps modules.
- **Operating Temperature:** 0° C to 70° C (32° F to 158° F).

4. Bi-Directional (BiDi) SFP Modules

- **Supported Media:** Single-Mode Fiber.
- **Connector Type:** LC (Simplex).
- **Data Rate:**
 - 1.25 Gbps for standard modules.
 - 10 Gbps for high-speed modules.
- **Wavelength:**
 - **TX Wavelength:** 1270 nm/1330 nm or 1310 nm/1550 nm (paired configuration).
 - **RX Wavelength:** 1330 nm/1270 nm or 1550 nm/1310 nm (paired configuration).
- **Max. Power Consumption:** Up to 1W for 10 Gbps modules.
- **Cable Distance:**
 - Up to 10 km for 10 Gbps modules.

- Up to 3 km for 1 Gbps modules.
- **Operating Temperature:** 0° C to 70° C (32° F to 158° F).

5. Environmental & Mechanical Specifications

- **Operating Humidity:** 5% to 95% non-condensing.
- **Storage Temperature:** -40° C to 85° C (-40° F to 185° F).
- **Enclosure:** Durable housing to protect against electrostatic discharge and environmental factors.

6. Additional Requirements

- **Diagnostic Features:**
 - Digital Diagnostics Monitoring (DDM) for real-time monitoring of key parameters like optical output power, optical input power, temperature, and supply voltage.
- **Power Budget:**
 - Modules must have a sufficient power budget to support the intended transmission distances and link requirements.
- **Eye Safety:**
 - Must comply with Class 1 laser safety standards to prevent eye injuries during handling and operation.

Conclusion

The SFP modules procured through this tender must meet the outlined specifications to ensure reliable and high-performance network operations. These modules should provide flexible connectivity options, including support for both copper and fibre connections at varying data rates. The specified features ensure compatibility with existing and future network infrastructure while adhering to safety and performance standards.

