Transmission distance of ordinary single-mode optical fiber

Overview

Single-mode fiber is the best choice for long-distance data transmission, such as 100 kilometers (60 miles), due to the small signal attenuation caused by a single optical mode. Dispersion limits fiber optic transmission distance by causing signal distortion and is classified into chromatic dispersion, modal dispersion, and polarization mode dispersion (PMD). For example, a fiber optic cable with a distance of 1km supports a bandwidth of 500MHz, while a fiber optic cable with a distance of 2km can only support a bandwidth of 250MHz. There are three main reasons for this: First, high-bandwidth. There are two primary types of optical fiber cable: single-mode fiber and multimode fiber. This guide dissects their technical nuances, evolution, and real-world applications.

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