How to use optical splitters and transceivers



Overview

□□ FBT vs. PLC Splitters: Choosing the Right Type There are two main manufacturing technologies for optical splitters, each with its own advantages and ideal use cases.

Key Takeaways

Yes, transceivers can use optical splitters, but the transceiver's optical power budget must accommodate the splitter's insertion loss and split ratio to ensure reliable signal transmission.

How Optical Splitters Work

An optical splitter is a passive device that divides a single input optical signal into multiple outputs or combines multiple signals into one. It operates without power, using fused fibers or planar lightwave circuits (PLC) to distribute light efficiently among output fibers. Key parameters include split ratio (e.g., 1x4, 1x32, 1x64), insertion loss, and uniformity of output power across ports.

Higher split ratios increase insertion loss, which reduces the optical power available to each output.

Transceivers in PON Networks

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Optical transceivers are active devices that convert electrical signals to optical signals and vice versa. In a PON system, an OLT (Optical Line Terminal) transceiver sends downstream data through a splitter, while ONU/ONT transceivers at the user end receive the signal and send upstream data. The splitter introduces attenuation, so the transceiver must have a sufficient optical power budget to overcome this loss and maintain signal integrity.

Compatibility Considerations

Split Ratio: The number of outputs affects the signal strength at each port. For example, a 1x32 splitter divides the input signal among 32 outputs, increasing insertion loss compared to a 1x4 splitter. Insertion Loss: Transceivers must support the total loss from the splitter and fiber length.

Using low-quality transceivers with high-split-ratio splitters can cause network instability or data loss. Transceiver Type: SFP, SFP+, or other modules must match the network wavelength and power requirements.

PL

C splitters are preferred for large splits due to uniform distribution and reliability.

Practical Deployment

In FTT

H networks, splitters allow a single OLT port to serve multiple subscribers, reducing fiber and equipment costs. Centralized or distributed splitter architectures can be used depending on network design, but in all cases, transceivers must be selected to handle the expected optical losses. Proper planning ensures that the combination of transceivers and splitters delivers stable, high-quality service.

Conclusion: Transceivers can indeed use optical splitters, but careful attention to split ratio, insertion loss, and transceiver power budget is essential for reliable network performance. Choosing compatible components ensures efficient signal distribution and scalability in PON and FTTH deployments.

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