How to match optical modules for BBU and RRU

Article Overview

To match optical modules for BBU and RRU, ensure compatibility in data rate, protocol (CPRI/eCPRI), fiber type, and environmental tolerance for reliable fronthaul transmission.

Key Considerations for Matching Optical Modules

1. Data Rate Compatibility Optical modules must support the same data rate on both BBU and RRU ends. Common rates for 4G networks include 1.25G, 2.5G, 6G, and 10G, while 5G networks may require higher rates like 10G, 25G, or 50G depending on the fronthaul bandwidth requirements . Mismatched data rates can cause transmission errors or link failure. 2. Protocol Support Ensure the modules support the CPRI or eCPRI protocol used in your network. CPRI modules perform E/O/E conversion (electrical-to-optical-to-electrical) to transmit digitized baseband signals over fiber, maintaining synchronization between BBU and RRU . eCPRI modules are Ethernet-based and allow statistical multiplexing for multiple RRUs, reducing fiber usage. 3. Fiber Type and Wavelength Use single-mode OS2 fiber for long-distance fronthaul links. For networks with limited fiber resources, CWDM (Coarse Wavelength Division Multiplexing) can be used with color-coded optical modules to transmit multiple signals over a single fiber . Ensure the BBU and RRU modules are compatible with the chosen wavelength plan. 4. Environmental Tolerance BBUs are typically indoors with controlled temperatures, while RRUs are outdoors and exposed to extreme temperatures. Optical modules for RRUs must support industrial temperature ranges (e.g., -40? to +85?) to ensure reliable operation in harsh environments . 5. Connector and Form Factor Modules should have compatible form factors (e.g., SFP, SFP+, SFP28, SFP56) and connectors to fit the BBU and RRU slots. Using mismatched form factors can prevent physical installation or degrade signal quality. 6. Redundancy and Fiber Count For high reliability, RRUs often use 2-6 fiber cores. Serial networking with CWDM modules can reduce fiber usage while maintaining redundancy . Ensure the optical modules support the required number of channels and redundancy schemes.

Practical Steps for Matching

o Identify the fronthaul protocol (CPRI or eCPRI) and required data rate.

o Select optical modules that support the protocol and data rate on both BBU and RRU.

o Verify fiber type and wavelength compatibility, especially if using CWDM.

o Check environmental specifications for outdoor RRUs.

o Confirm form factor and connector compatibility with the equipment.

o Test the link for signal integrity, latency, and error rates before full deployment. By following these guidelines, you can ensure that the optical modules between BBU and RRU are properly matched, providing stable, high-speed, and reliable fronthaul connectivity for 4G and 5G networks .

How to match optical modules for BBU and RRU

Refreshing some basic concepts. BBU (Baseband Unit): manages the whole base station, including operating

I"m trying to get a handle on the specifics of RRU-BBU connections. Ultimately I care about the number of SFP/SFP+

BBU also known as base band unit, whose working details and function is to process,

Difference Between AAU, RRU, and BBU AAU, RRU, and BBU are key components in a telecom network,

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Explore the ultimate guide to optical modules. Learn types, functions, performance metrics

5G Fronthaul Connectivity Solution - As large data traffic, high speed and low latency requirements for 5G implementation, the

In this blog,ETU-LINK will talk about 4G base stations and common types of optical modules. The base station can be divided into

CPRI modules are designed exclusively for the fronthaul link between a BBU and an RRU in a wireless base station. Their entire

Fiber Based Fronthaul Connectivity: Linking BBU and RRU with CPRI and eCPRI High Speed Fiber Optic Links in

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Unveil the core components of cellular tower technology in this educational video: the Remote Radio Unit (RRU) and the Baseband

Telecom Network Components: BBU, RRU, and AAU Explained Understanding the key components of a modern telecom network is

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Compared with the 4G base station mainly composed of baseband unit (BBU), remote radio unit (RRU), feeder and

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