

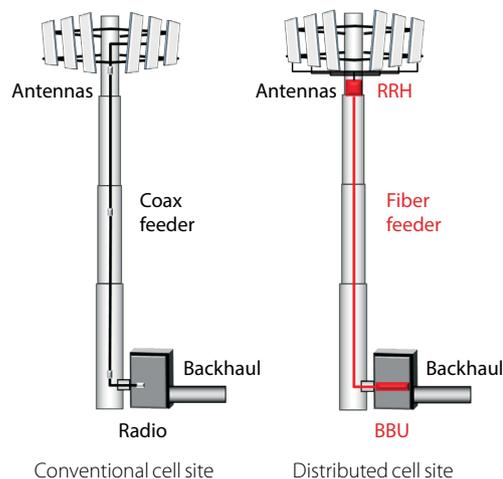
# Analyzing RFoCPRI™ at Fiber-Based Cell Sites

## Introduction

Conventional cell sites have radio equipment at the base of the tower transmitting RF signals via coax cables to antennas at the top of the tower. However, these coax-based feeders produce the majority of problems in cell sites due to inherent loss, susceptibility to interference, and the deterioration of cables and connectors which create signal reflections and intermodulation.

Modern cell sites have a distributed architecture where the radio is divided into two main elements: the radio equipment control (REC) or base band unit (BBU) installed at the bottom of the tower, and the radio equipment (RE) or remote radio head (RRH) installed at the top of the tower. These two elements communicate via the common public radio interface (CPRI) protocol over fiber links.

This distributed architecture provides the benefit of replacing coax-based feeders with fiber-based feeders, significantly reducing the problems of signal loss and reflections. However, since all the RF interfaces reside on the RRH, any RF maintenance or troubleshooting requires climbing to the top of the tower to access the RRH, increasing operational expenses and unnecessary safety issues.



## CellAdvisor RFoCPRI Technology

JDSU has developed RFoCPRI technology for its CellAdvisor JD780B/JD740B analyzers, allowing RF maintenance and troubleshooting activities to be performed on the ground via the fiber interfaces at the BBU, significantly reducing maintenance time and operational expenses.

RFoCPRI technology verifies the CPRI control signals and extracts the RF (IQ) data transmitted between the BBU and RRH, permitting the monitoring and analysis of the interference of mobile terminals (uplink) as well as the radio's signal analysis (downlink).

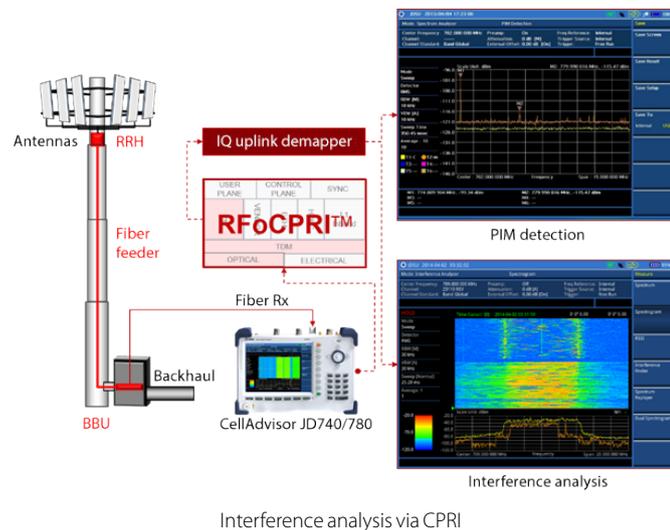
RFoCPRI technology provides the following benefits:

- Interference analysis, performing spectrum and spectrogram analysis in the uplink for intermittent interferences, as well as the detection of passive intermodulation (PIM)
- Signal analysis, performing conformance verification of the signal transmitted by the radio, including its RF profile and signal quality assessment in terms of modulation performance and MIMO transmission

### Interference Analysis via CPRI

RF interference mainly affects the transmitting signals of mobile terminals (uplink) due to their limited transmission power, and this interference might be generated from external sources or internally to the cell site as intermodulation products (PIM) generated from the radio's signal (downlink).

The CellAdvisor JD780 series with RFoCPRI technology provides an automated test sequence to analyze interference and detect PIM through CPRI links on the associated fiber without having to climb the tower.

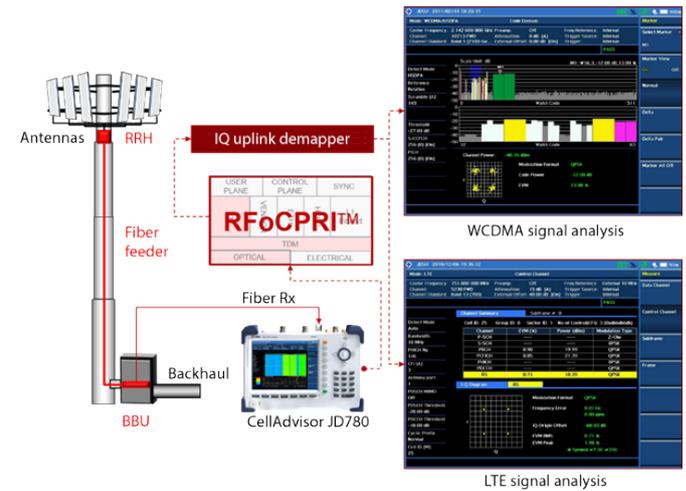


Interference analysis via CPRI

### Signal Analysis via CPRI

Cell-site technicians also need to accept and verify the signal transmitted by the radio (downlink) for RF integrity and proper modulation quality. These tests can be done from the ground at the BBU thanks to the CellAdvisor with RFoCPRI technology. It extracts RF information (IQ data) and demodulates it to obtain the power and modulation performance of control signals such as pilot channels, cell identifiers, and data channels.

In addition, RFoCPRI technology performs Layer 1 measurements of CPRI, such as optical wavelengths and transmission rates as well as Layer 2 maintenance tests of CPRI, as specified by the CPRI standard. These include loss of frame (LOF), loss of signal (LOS), remote alarm indication (RAI), and SAP defect indication (SDI). These capabilities provide a comprehensive assessment of a CPRI's control plane and user plane.



Signal analysis via CPRI

### The Optimal Cell Site Testing Solution

CellAdvisor analyzers are complete test solutions for cell site technicians and engineers. They provide unique RFoCPRI de-mapping, RF coax and fiber inspection, RF and optical power measurements, spectrum and interference analysis, PIM detection, and signal analysis for all cellular technologies. In addition, CellAdvisor can be controlled remotely via Bluetooth, LAN, or USB and supports JDSU StrataSync™ cloud-based asset management, data management, and dynamic notifications.



CellAdvisor JD740B/JD780B



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