



Deploying and managing new cell sites with FTTA - RFoFiber Interference Test

Telecom Infra Event March 2015

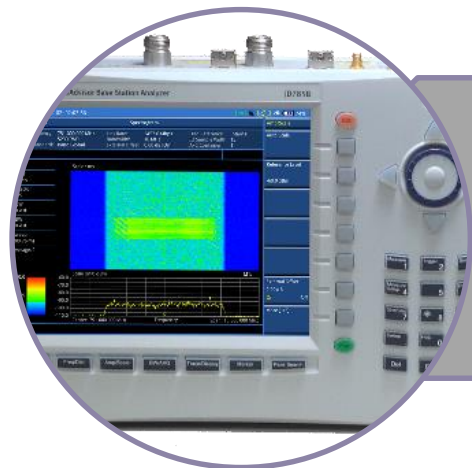
Ulrich Müller

ulrich.mueller@jdsu.com





Introduction to Distributed Cell Sites

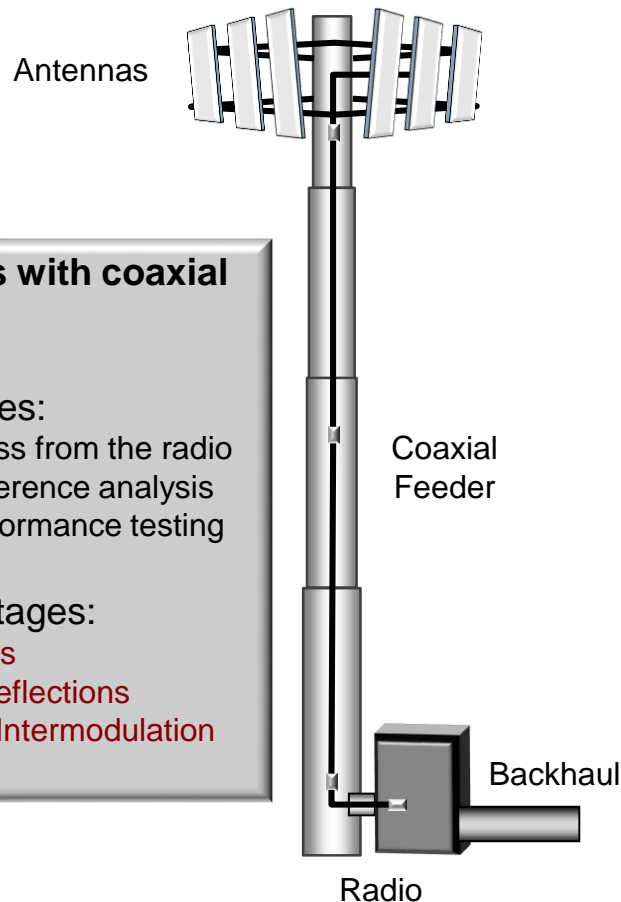


RFoCPRI™ Technology Overview

Distributed Cell Sites

Introduction to Distributed Cell Sites (CPRI/Fiber)

Conventional Cell Site



Cell Sites with coaxial feeders:

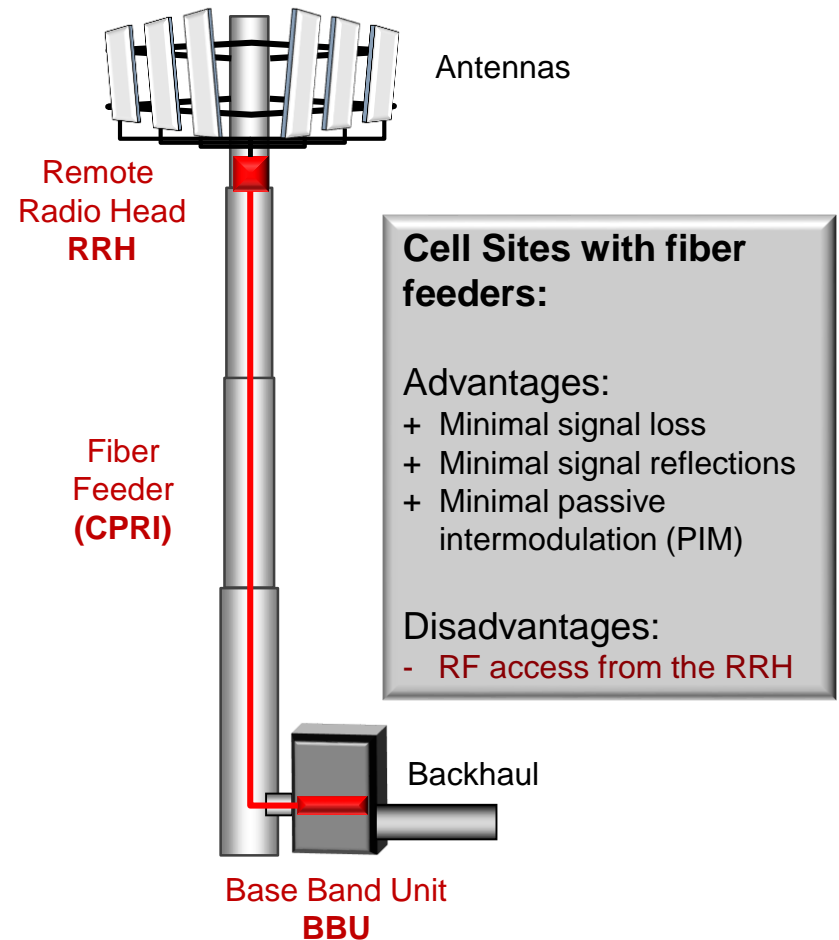
Advantages:

- + RF access from the radio for interference analysis and conformance testing

Disadvantages:

- High Loss
- Signal Reflections
- Passive Intermodulation (PIM)

Distributed Cell Site



Cell Sites with fiber feeders:

Advantages:

- + Minimal signal loss
- + Minimal signal reflections
- + Minimal passive intermodulation (PIM)

Disadvantages:

- RF access from the RRH

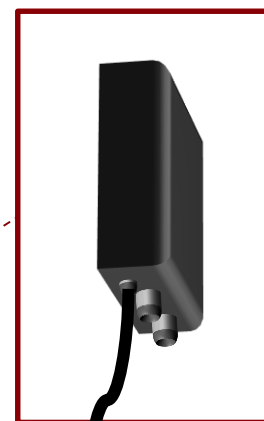
Distributed Cell Site Interference Analysis

RF access at Remote Radio Heads

- Long Resolution Time (Tower Climb)
- High Maintenance Cost
- Safety Concerns



Remote Radio Head

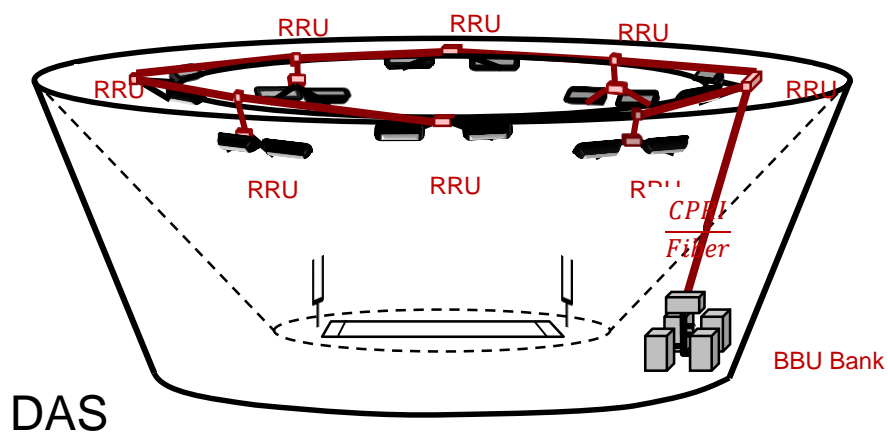
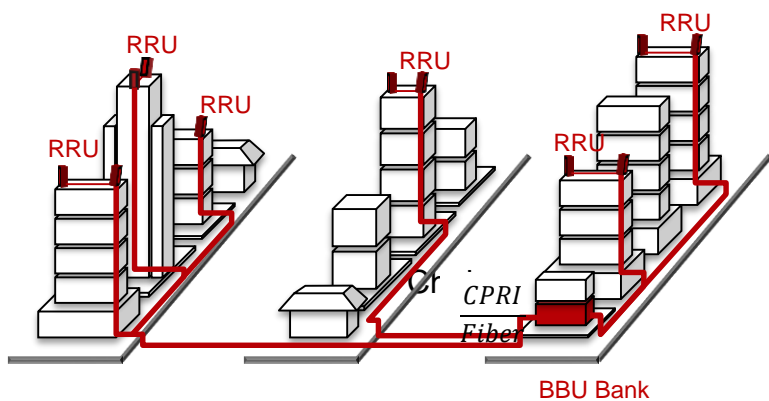
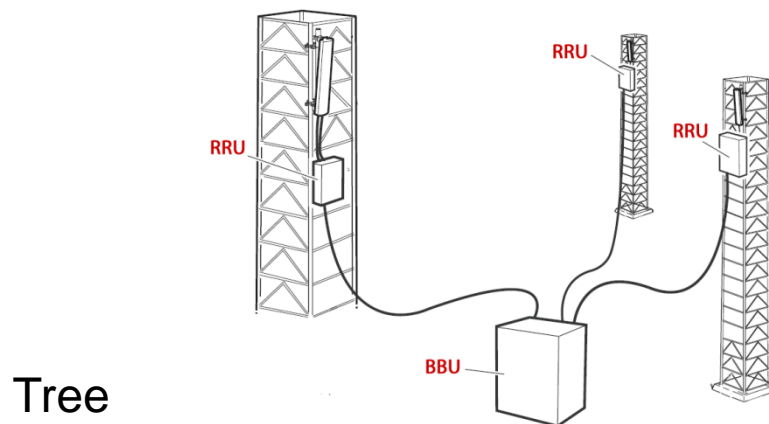
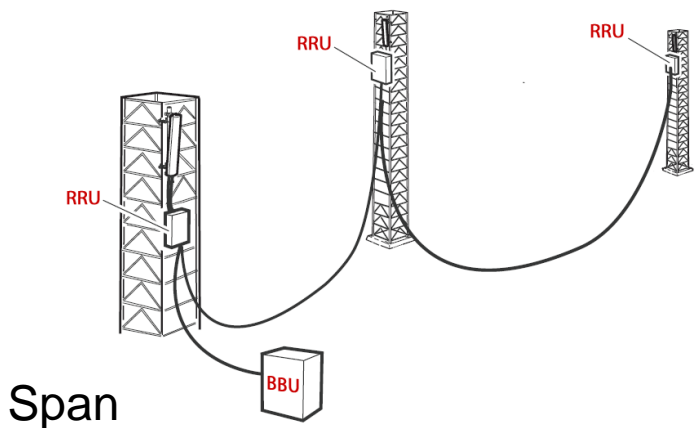


Spectrum Analysis

Distributed Cell Sites

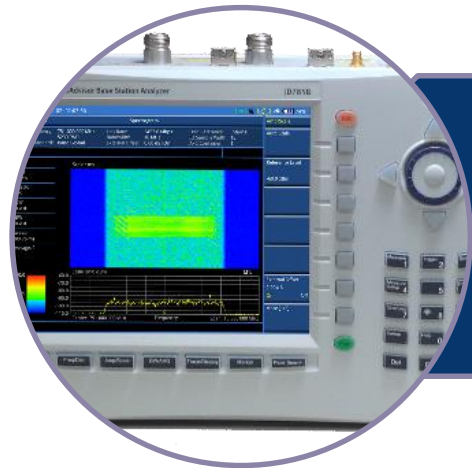
Topologies

CPRI Topology Scenarios





Introduction to Distributed Cell Sites

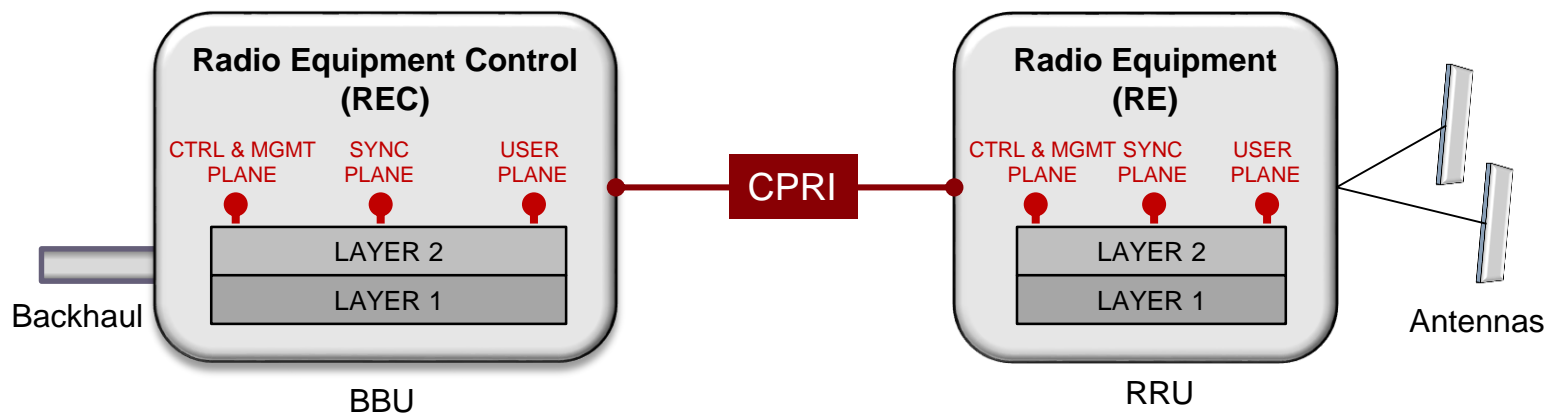


RFoCPRI™ Technology Overview

CPRI Technology Overview

Information Flows

- CPRI is an industry cooperation defining a specification for the interface between the Radio Equipment Control (REC) or BBU and the Radio Equipment (RE) or RRU.
 - Three different information flows (User Plane data, Control and Management Plane data, and Synchronization Plane data) are multiplexed over the interface.



Control and Management Plane: The control data flow used for call processing and management data is for the operation, administration and maintenance of the CPRI link and its nodes.

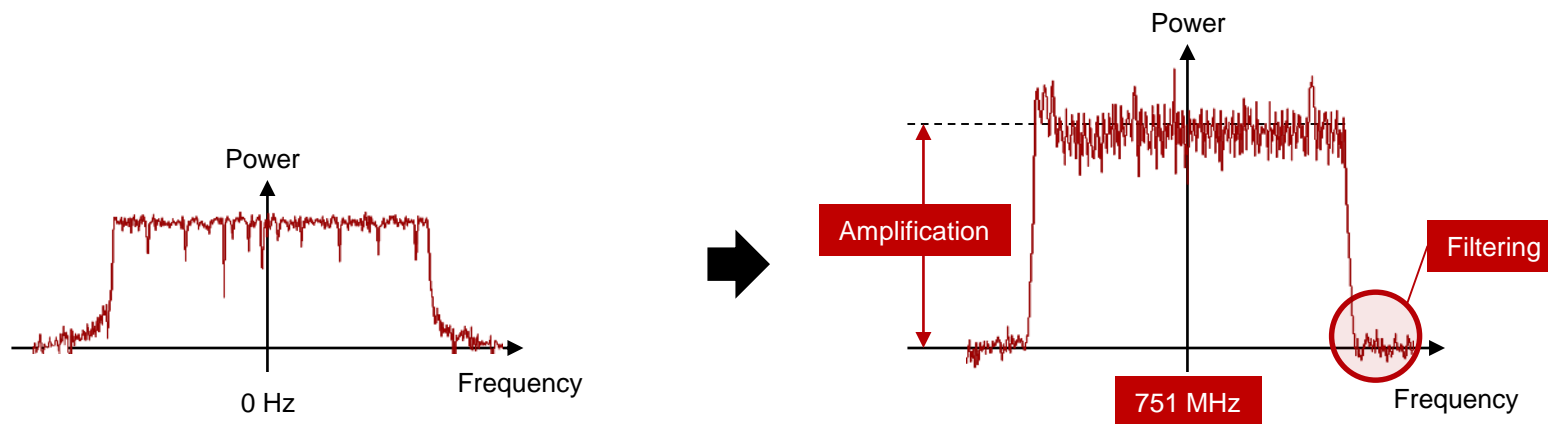
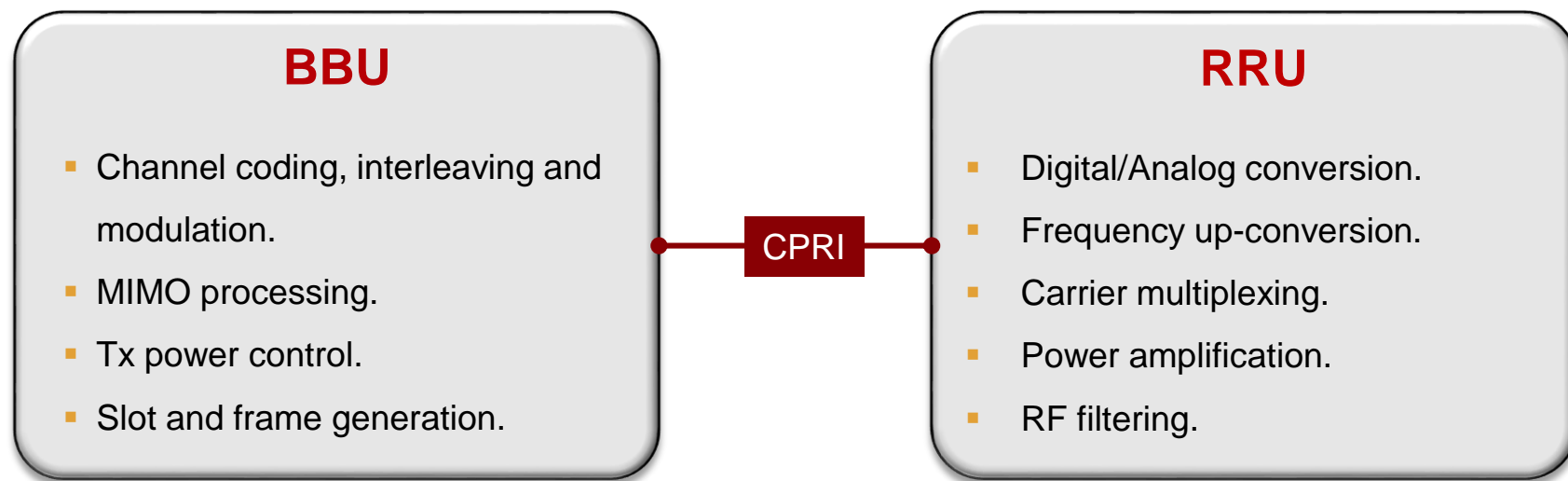
Synchronization Plane: Data flow which transfers frame and time alignment information between nodes.

User Plane: user plane data is transported in the form of IQ data flows which reflects the data of one antenna for one carrier, the so-called antenna-carrier (AxC).

CPRI Technology Overview

LTE Downlink Signal Processing of BBU and RRU

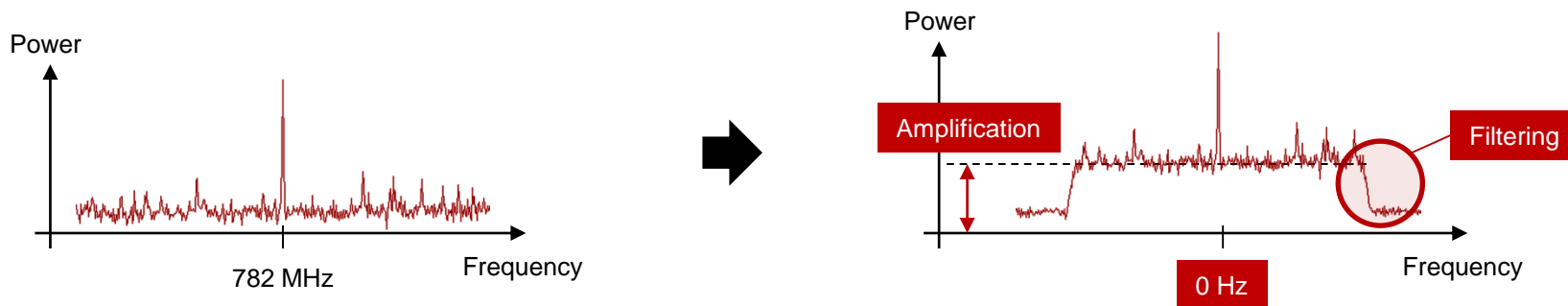
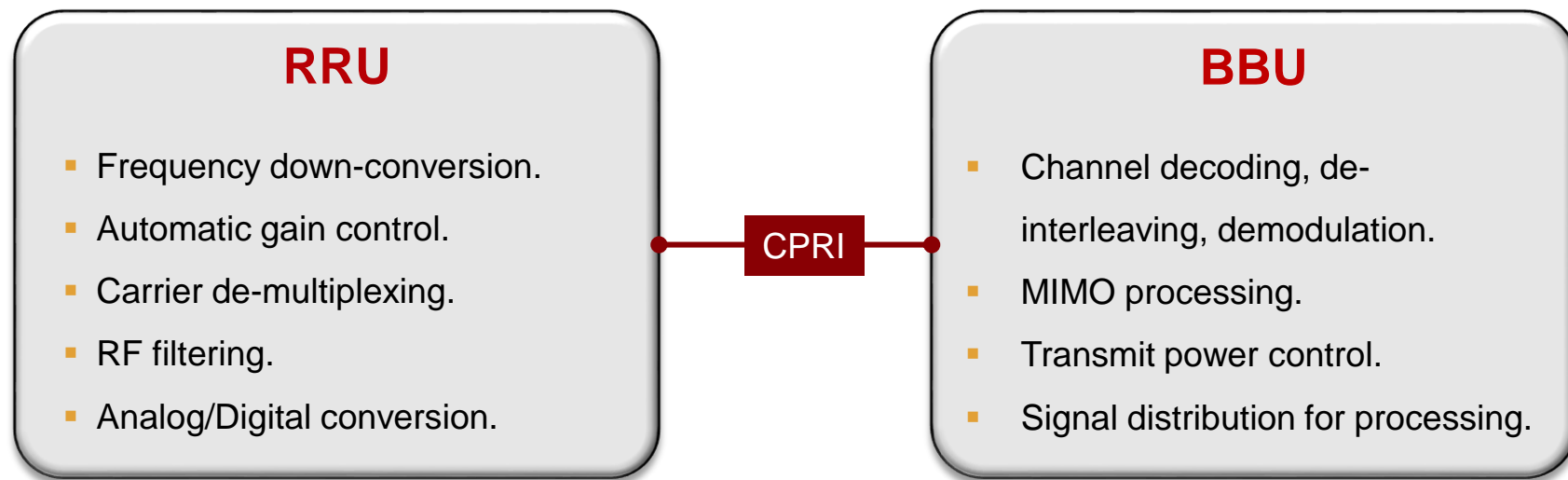
■ LTE Downlink Signal Processing



CPRI Technology Overview

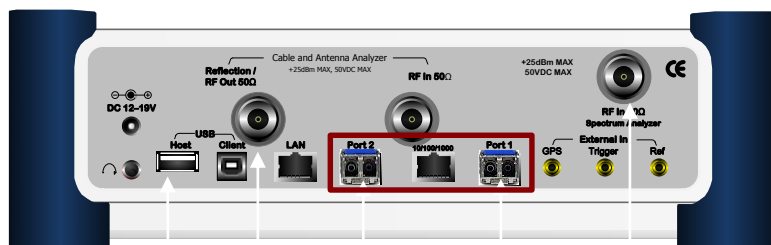
LTE Uplink Signal Processing of BBU and RRU

■ LTE Uplink Signal Processing

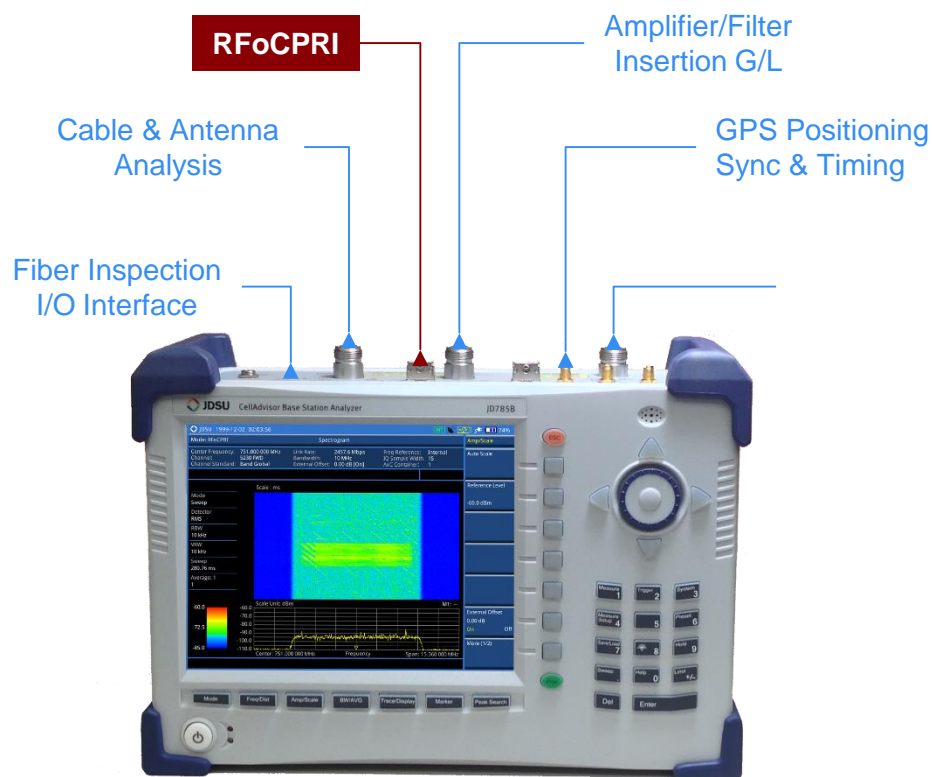
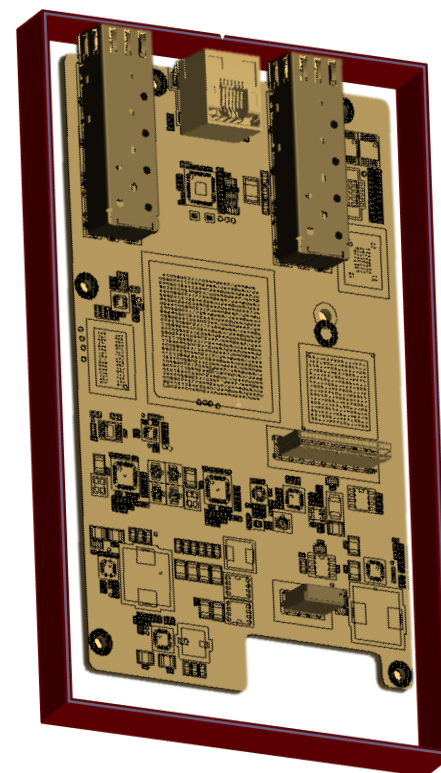


RFoCPRI Technology Overview

Architecture



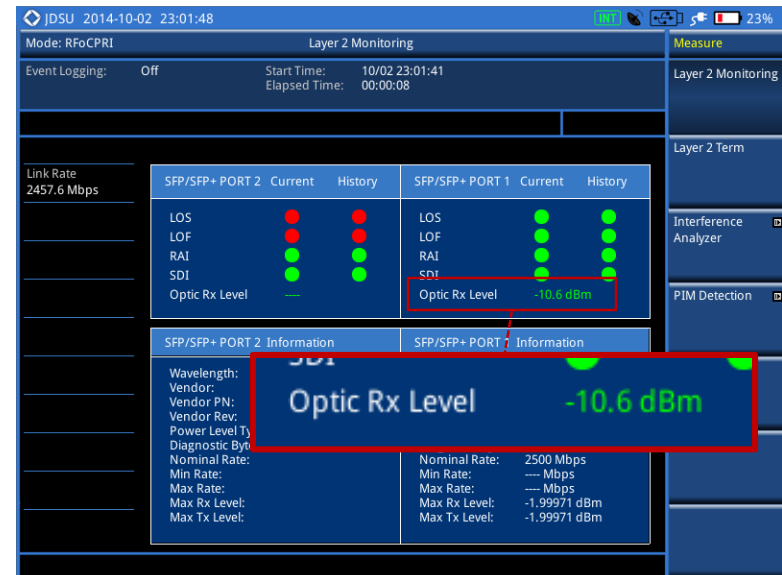
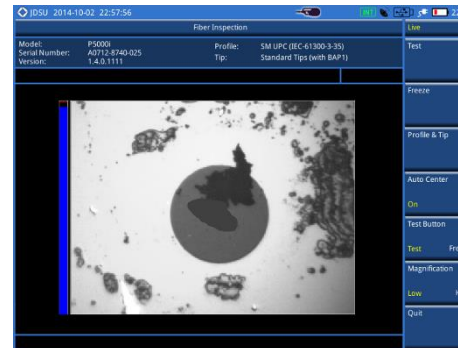
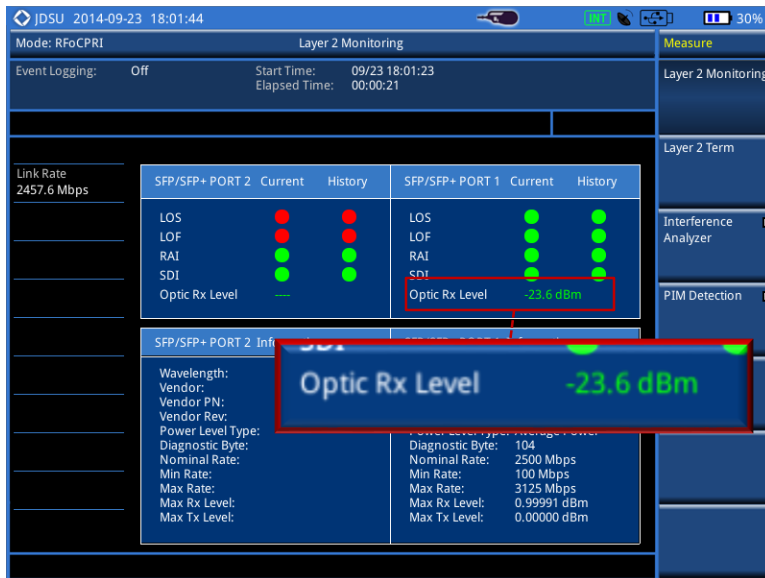
RFoCPRI™ Option Board



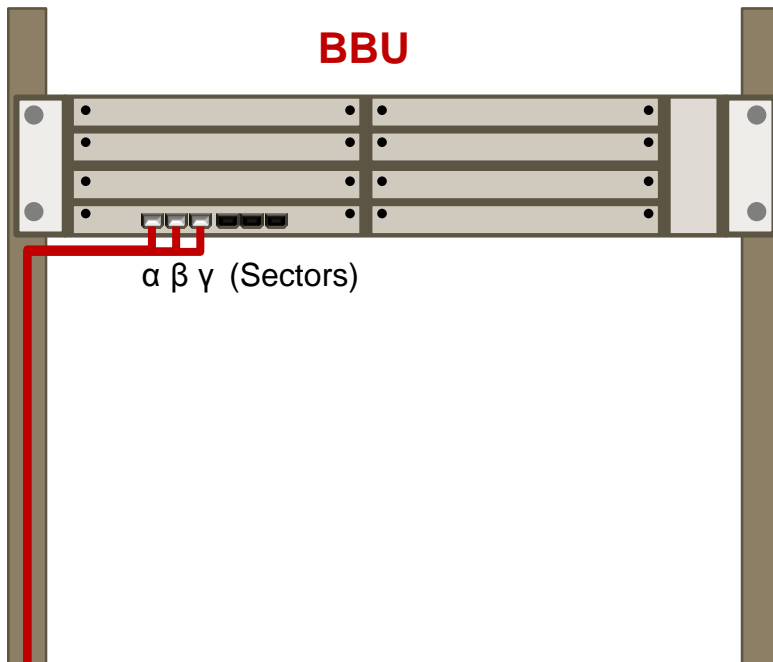
RFoCPRI Technology

Optical Power and Fiber Inspection

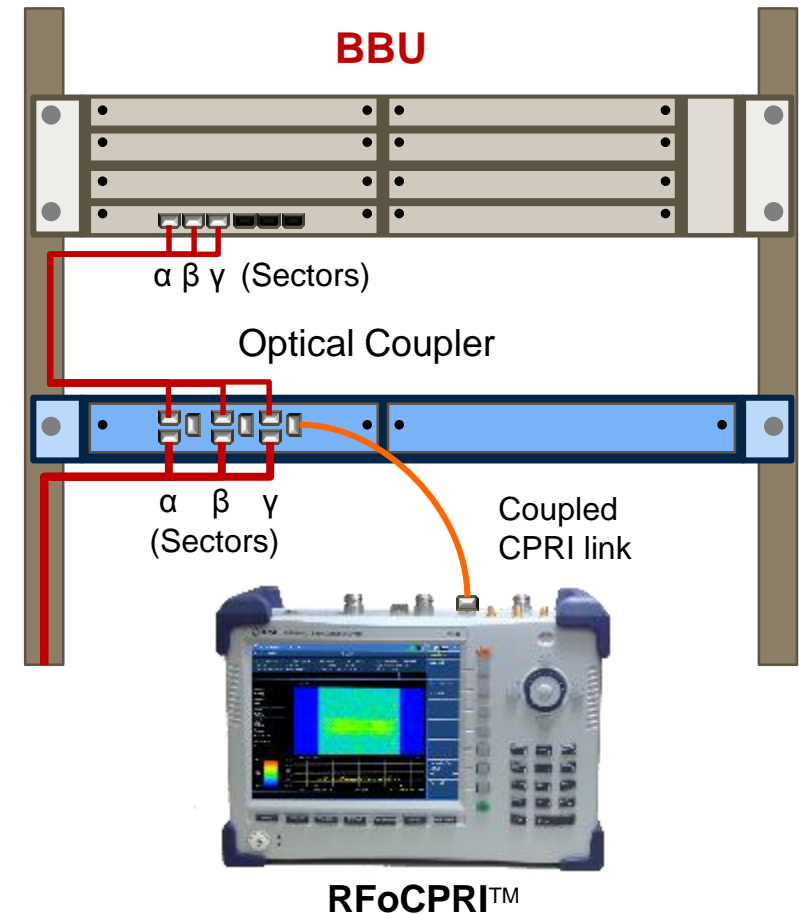
- Optical power level > -20dBm



Standard Cell Site Deployment



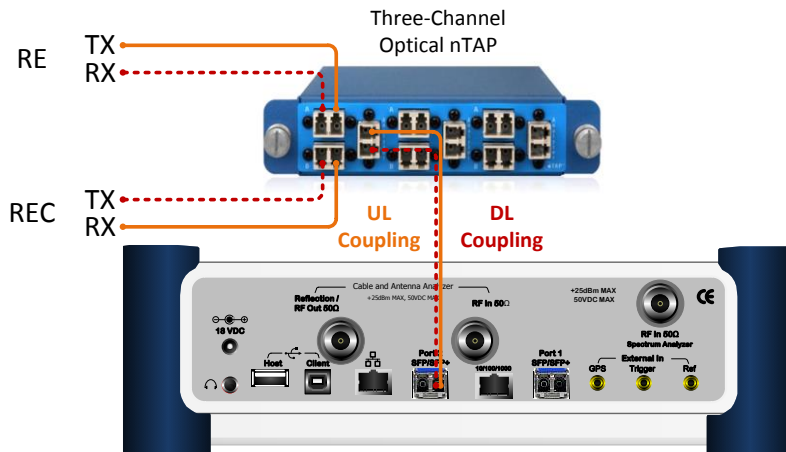
Cell Site with CPRI Monitoring



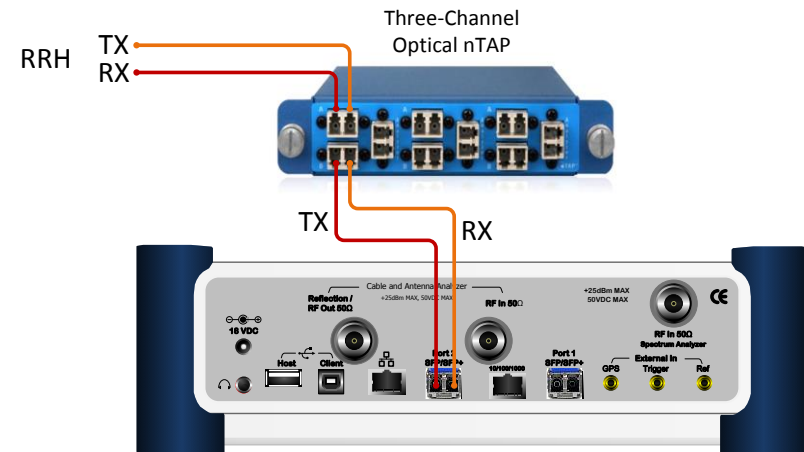
RFoCPRI Technology Overview

Fiber Connection

In Service



Out of Service

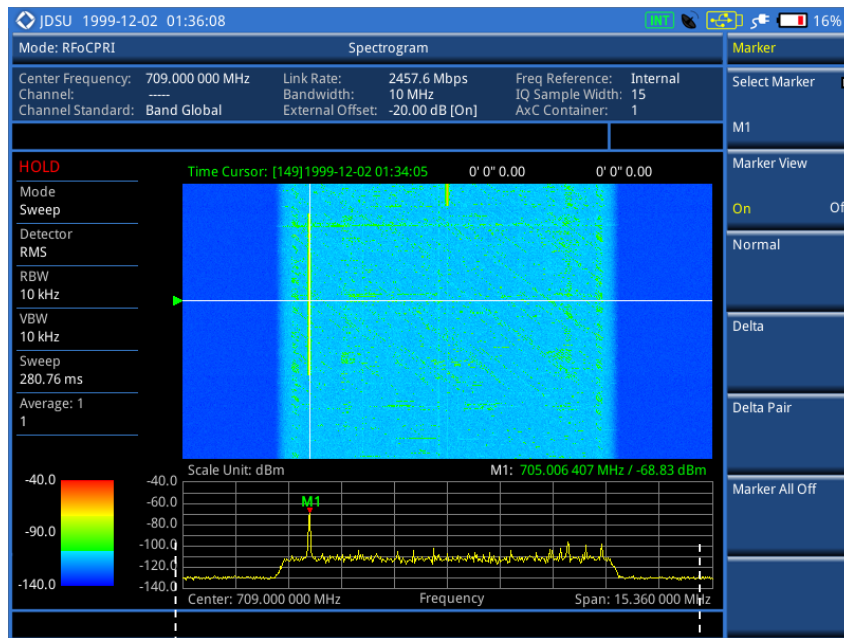


RFoCPRI Technology Overview

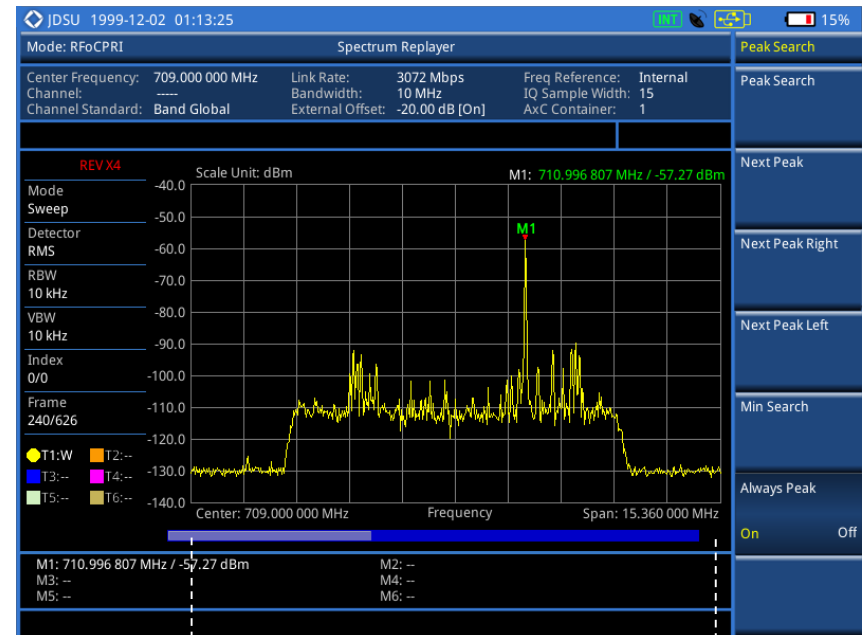
LTE Uplink Signal Processing of BBU and RRU

RFoCPRI™ Spectrum Analysis LTE Uplink 10 MHz

Spectrogram



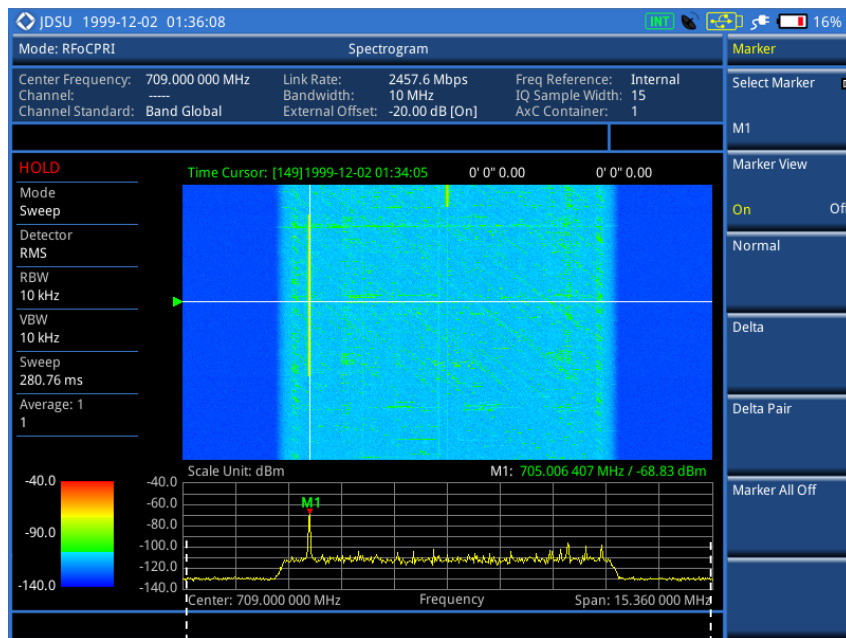
Spectrum Replay



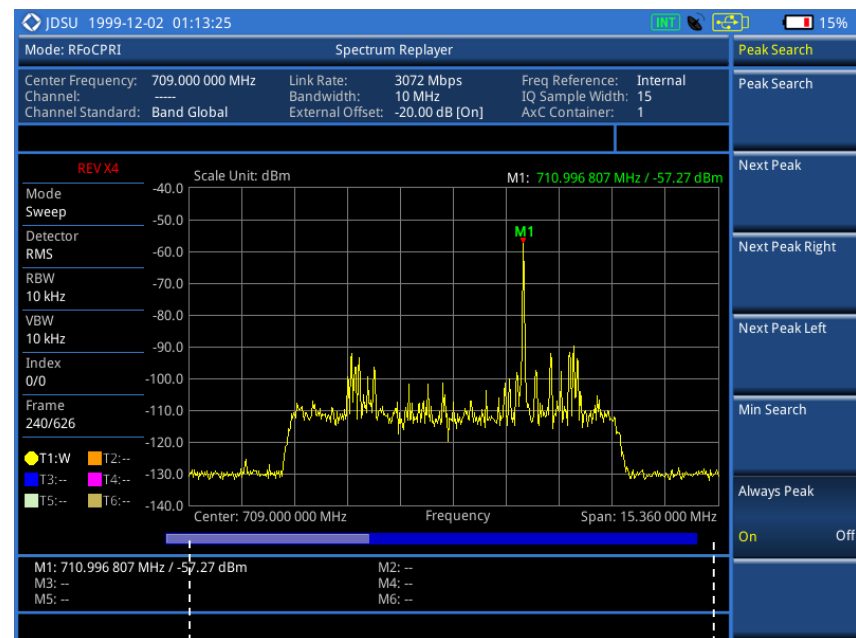
RfoCPRI Technology Overview

RFoCPRI™ Spectrum Analysis LTE Uplink 10 MHz

Spectrogram



Spectrum Replay



RFoCPRI Technology Overview

Dual Spectrum Measurement screen

- Monitor Antenna0 and Antenna1 simultaneously.



* Two spectrum should be in the same CPRI link

RFoCPRI Technology Overview

Dual Spectrogram Measurement screen

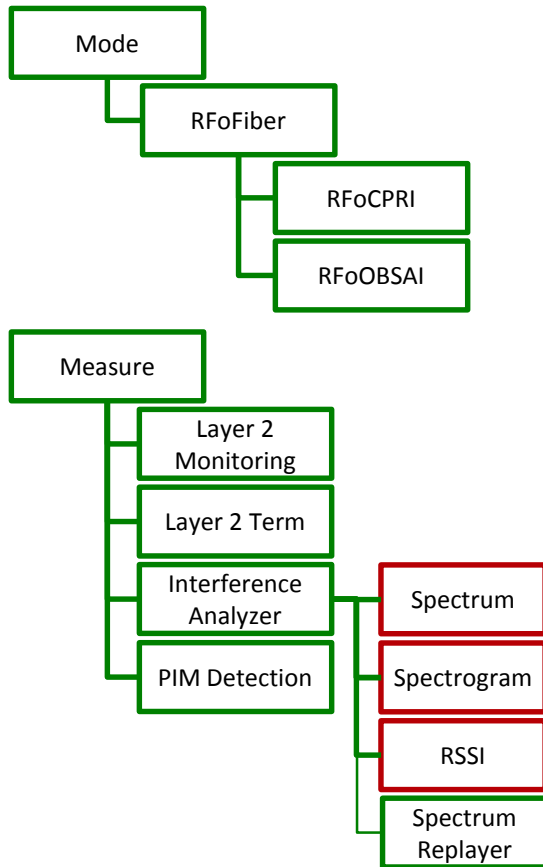
- Monitor Ant0 and Ant1 (MIMO) simultaneously.



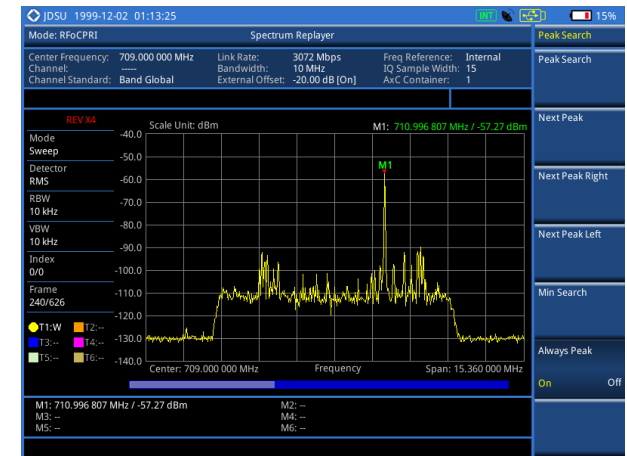
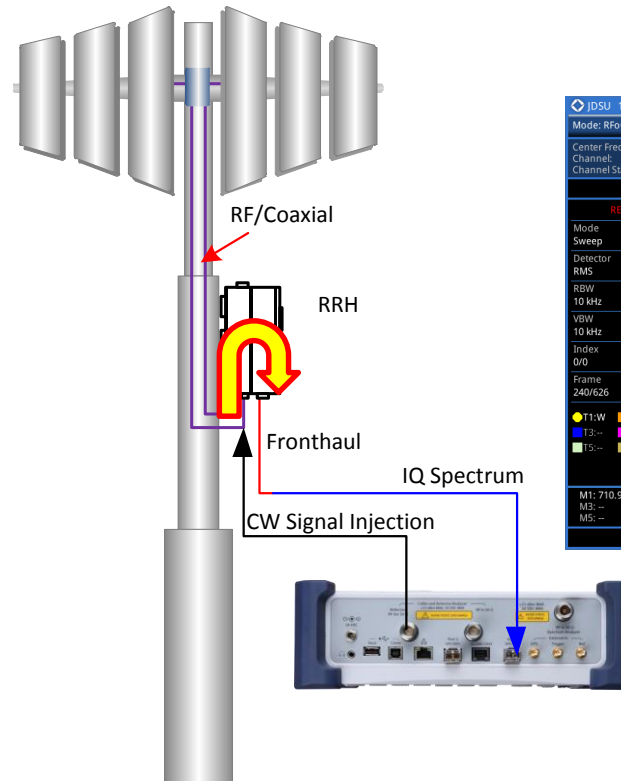
* Two spectrum should be in the same CPRI link

RFoCPRI Technology Overview

RF Source with RFoCPRI



Measurement modes that support RF source function

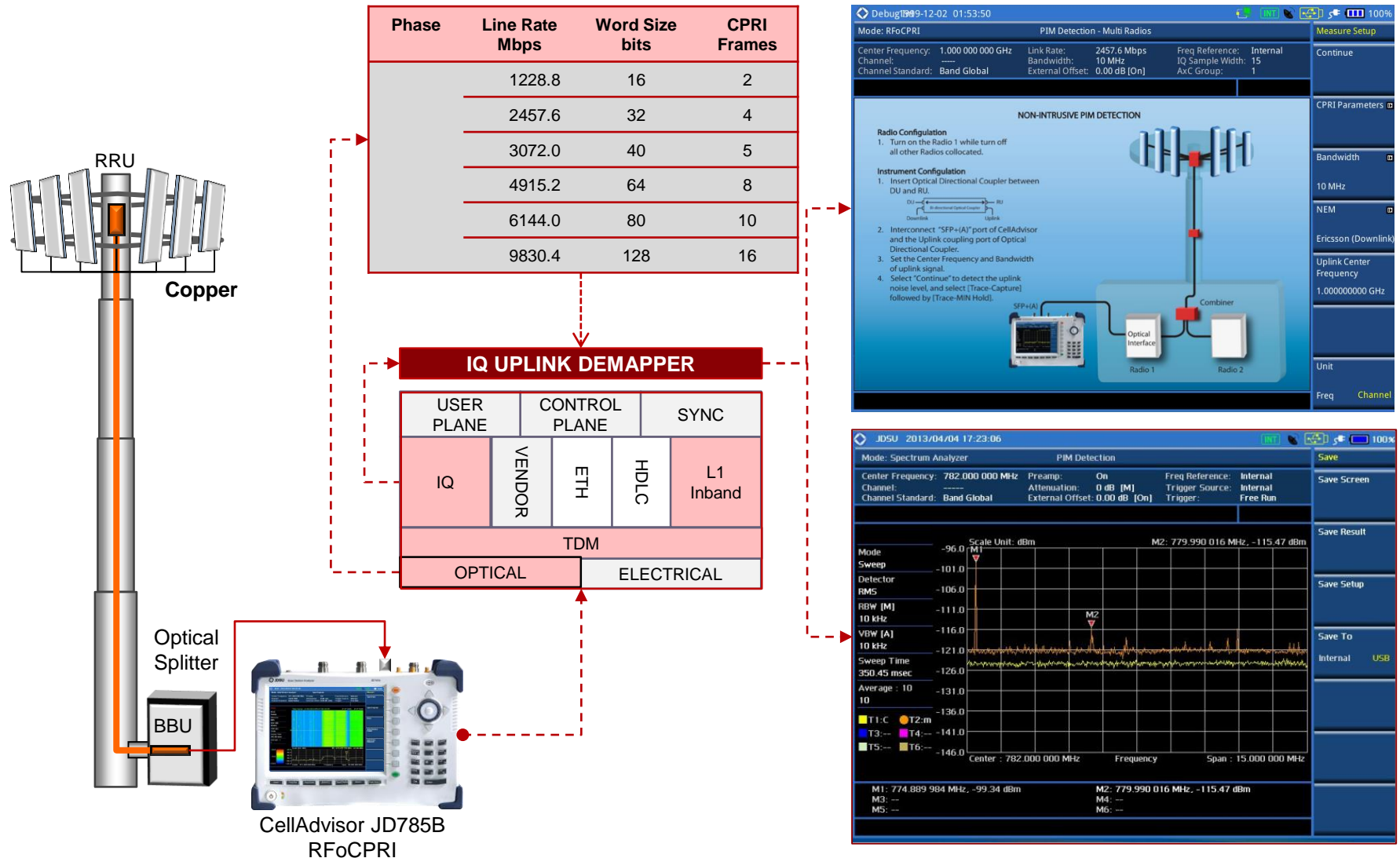


Application

- Uplink noise floor calibration at a given point
- Uplink gain / dynamic range check
- AxC configuration check

RFoCPRI Technology Overview

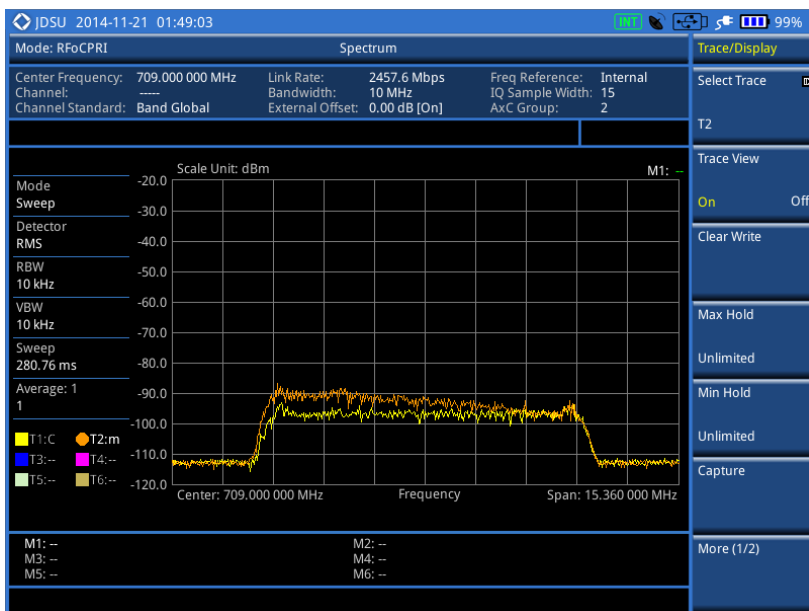
Uplink PIM Detection



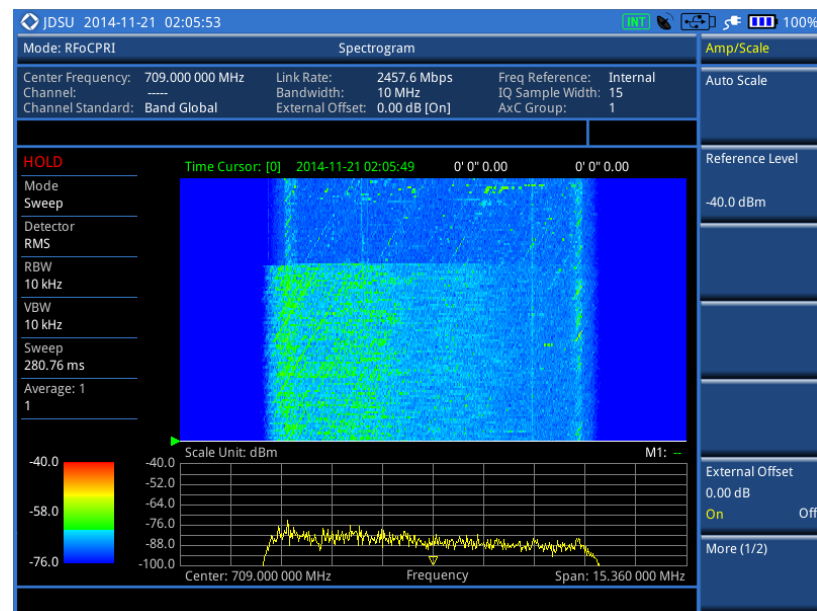
RFoCPRI Technology Overview

Passive Intermodulation

Spectrum (Ant. 1 & 2)



Spectrogram (Ant.1)





Thank you!

More info at:
Fomax Test & Connectivity B.V.
Versterkerstraat 3b
1322 AN Almere
036-7601023
06-55894451
info@fomax.nl

References:

1. Common Public Radio Interface (CPRI); Interface Specification V6.
2. Remote Radio Unit Description by Ericsson.
3. JDSU CellAdvisor JD785B.