RFoCPRI Interference Analysis
OneAdvisor 800

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1. Overview

This procedure describes an alternate PIM troubleshooting methodology centered on using RFoCPRI analysis with the cell site receiver in real-time. Advantages include:

- Intrusive test access to RF connections is not required. Breaking and making these connections puts the sector out of service and may not find PIM generated by the radio and incur in unnecessary costs due to tower climbs.
- Work can be performed during regular service hours with very small interruption of service (only to insert/remove the optical tap between the BBU and the RRU)
- Minimal customer impact during test process. All carriers are up, and the site processing calls.
- No 'waiting time' on communications with Integrator contractor as RRUs can be put into full power mode and remain in that mode during entire detection / mitigation process
- Improves the effectiveness of PIM hunting and mitigation efforts through immediate feedback from the site's receive path with uplink real-time spectrum.
- Less time and expense will be spent fixing PIM sources that do not reach the site's receiver.
- Uplink monitoring is performed under peak Tx power load from one or all carriers at site whereas PIM testers might be stimulating one or two duplexed ports at a time. See the effect of multiple RRH and carriers (multiband PIM) on the affected uplink Rx
- Validate various power levels and tilts and their effect on PIM, if necessary.
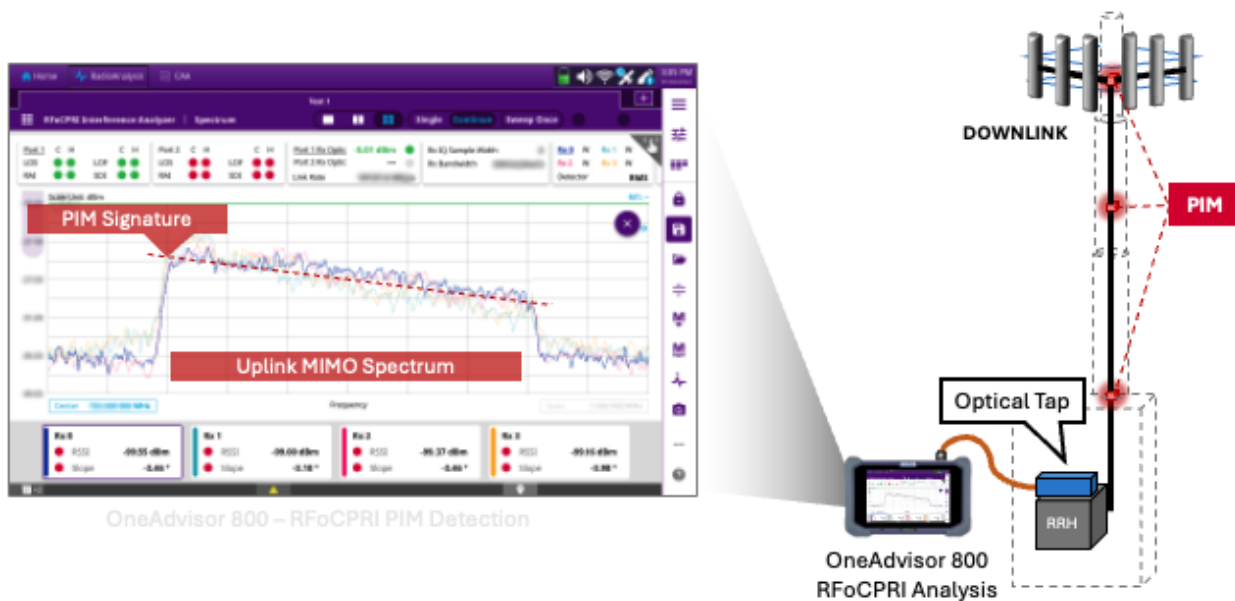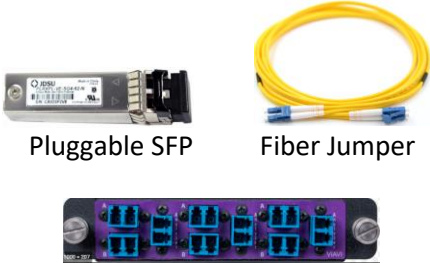

OneAdvisor 800 – RFoCPRI Analysis (PIM Detection)

2. Scope

This document describes how to configure the OneAdvisor 800 for RFoCPRI interference analysis.

The required products and parts to complete this procedure are as follows:

Description	Diagram

OneAdvisor 800 with the following functions:
- OneAdvisor 800 platform equipped with the following modules and options:
  o Any radio analysis module with optical hardware:
    ▪ SPA06MA-O: Spectrum up to 6 GHz and Optical HW
    ▪ RA18MA-O: Spectrum up to 18 GHz and Optical HW
    ▪ RA32MA-O: Spectrum up to 32 GHz and Optical HW
    ▪ RA44MA-O: Spectrum up to 44 GHz and Optical HW
  o Any of RFoCPRI option:
    ▪ ONA-SP-CPRI17: RFoCPRI line rates 1 to 7 for interference analysis
    ▪ ONA-SP-CPRI8: RFoCPRI line rate 8 for interference analysis
    ▪ ONA-SP-CPRI18: RFoCPRI line rates 1 to 8 for interference analysis
	
	OneAdvisor-800

Fiber accessories
- Pluggable SFP (it is recommended to use same type as BBU or RRH), alternatively:
  o CSFPPLUS-1G-10G-3-1: 1310 SFP+ supporting 1G to 10G all rates CPRI.
- Fiber jumpers:
  o EPCSM10M-LC-LC: 10M SM Patch-cord LC/PC to LC/PC
- Any optical tap:
  o TOT1-SM-LC-55-K: Optical nTAP one channel SM-LC 50/50 split ratio
  o TOT3-SM-LC-55-K: Optical nTAP three channels SM-LC 50/50 split ratio
	
	Pluggable SFP Fiber Jumper
	
	Optical tap

3. OneAdvisor 800 Overview

The OneAdvisor-800 are portable instruments for radio access installation, maintenance, and optimization. Their main test functions include:

- Realtime Spectrum Analysis

- Interference Analysis
- LTE-TDD and LTE-FDD Signal Analysis
- 5GNR Signal Analysis
- NSA Signal Analysis (multi-carrier LTE and 5G)
- DSS Signal Analysis (co-channel LTE and 5G)
- Blind Scanner (DSS, LTE and 5G)
- RFoCPRI Interference Analysis
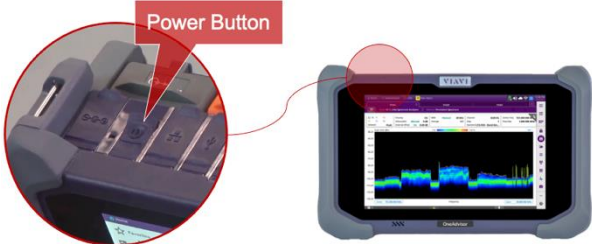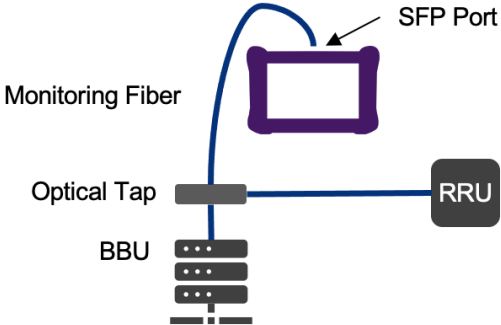
3.1 RFoCPRI Interference Analysis

The following procedure describes the steps to perform RFoCPRI Interference Analysis with the OneAdvisor 800.
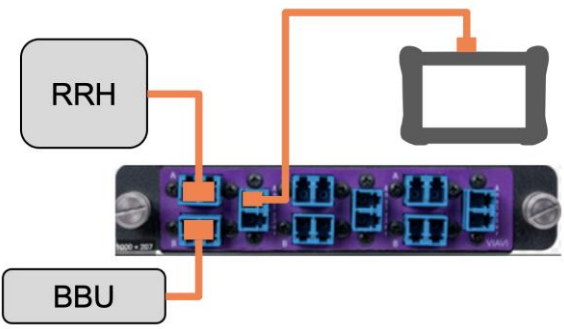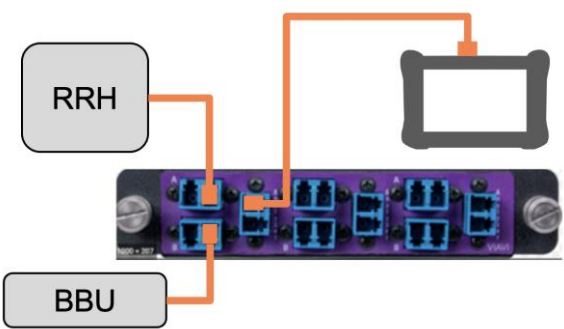The following information is required to complete the test:
- Active frequencies/bands at site to be tested
- RRH NEM Vendor (Ericsson/Nokia/Samsung)
- Carrier center frequency / Channel BW / MIMO config for RX antennas.

3.1.1 RFoCPRI Connectivity
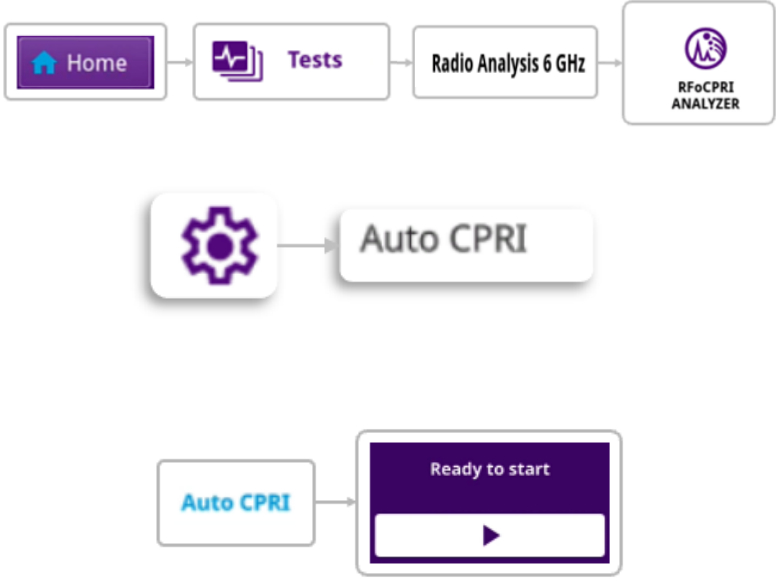
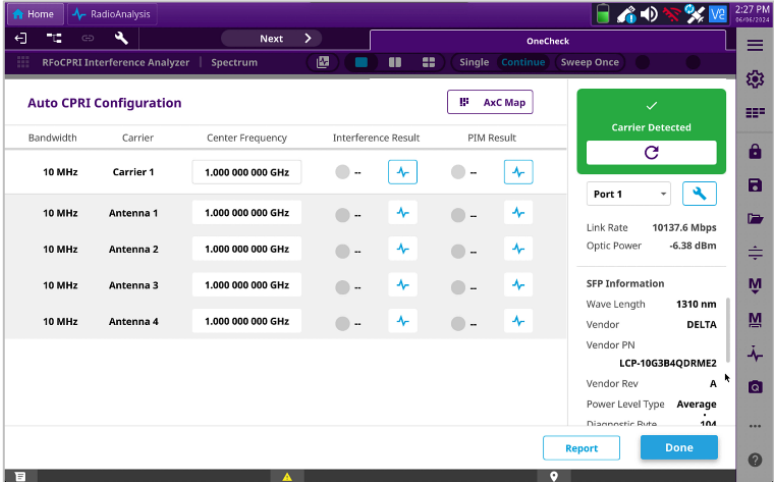The following procedure describes the initial setup of cable and antenna analysis, including turn-up and connectivity.
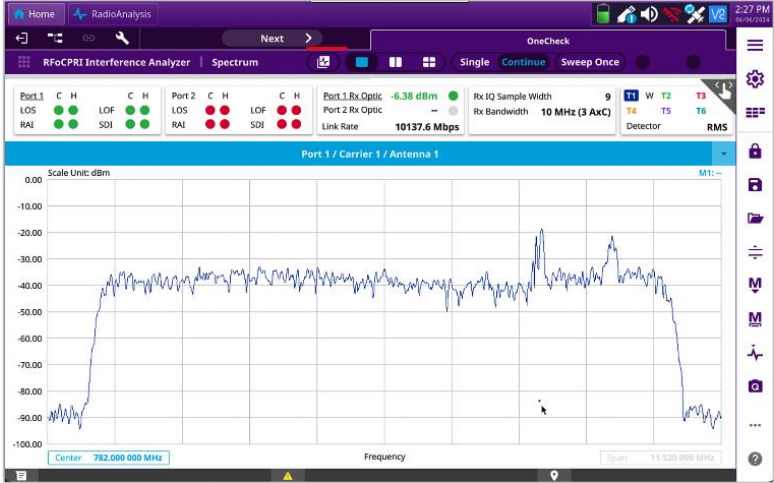
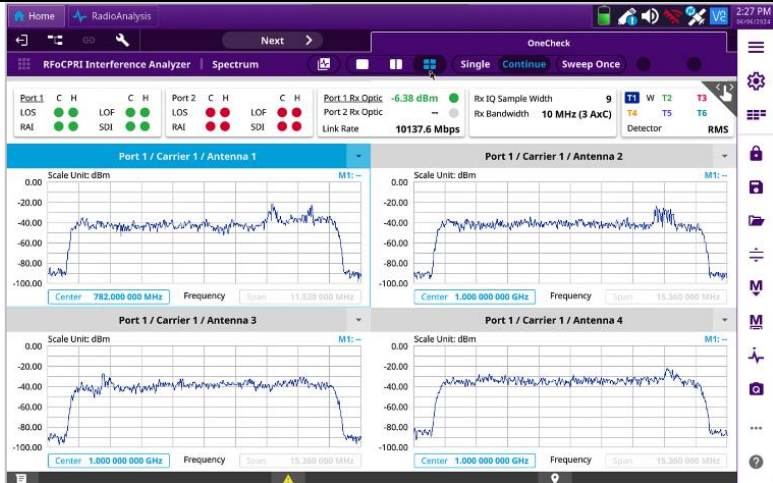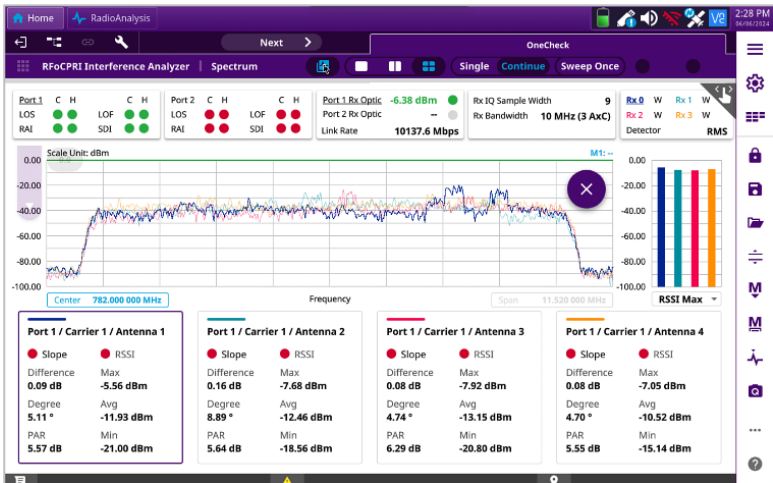| Step	Action	Description
1	Power ON OneAdvisor-800	Press and hold the ON/OFF button for 3 seconds OneAdvisor-800
2	Inspect and clean fiber endpoints, including SFP, fiber jumpers and Tap ports Using fiber jumpers connect the optical tap between the BBU and RRH with fiber jumpers; and from the optical tap to the instrument's SFP.	Fiber Connectivity (BBU-Tap-RRH and Tap-Instrument)

Step	Action	Description
		Duplex Fiber Connection to Optical Splitter Simplex Fiber Connections to Optical Splitter

3.1.2   RFoCPRI Analysis – Auto CPRI

The following procedure describes the steps to perform RFoCPRI Analysis with Auto CPRI Configuration.

Step	Action	Description
1	RFoCPRI Analyzer After the instrument finishes its initialization process select: - Home - Tests - Radio Analysis - RFoCPRI ANALYZER From the test functions select: - Settings ⚙ - Auto CPRI - Press the Play Button ▶	

Step	Action	Description
	The AutoCPRI process might take a few minutes to detect the radio configuration which might be transmitting multiple carriers, at the end of the process it'll indicate Carrier Detected	
2	To perform interference or PIM detection measurements of multiple branches, select: - Quad-spectrum: - PIM Detection: 	

| Step	Action	Description
		RFoCPRI Quad-spectrum RFoCPRI PIM Detection

4. Annex

4.1 Save Measurement Results

The following procedure describes the steps to save measurement results with OneAdvisor 800

| Step	Action	Description
1	Saving measurements - Select the save icon and enter file name - Select the type of file to save: o Result (to be replayed or post-processed by the CellAdvisor 5G) o Result as CSV, to be post-processed by a PC application o Screen, as a picture - Select the destination to save the file - Select "Save"	 Save and File Name Sequence File Type as Result, Result as CSV or Screen Select the destination either Internal or USB Select Save

4.2 PIM Signatures

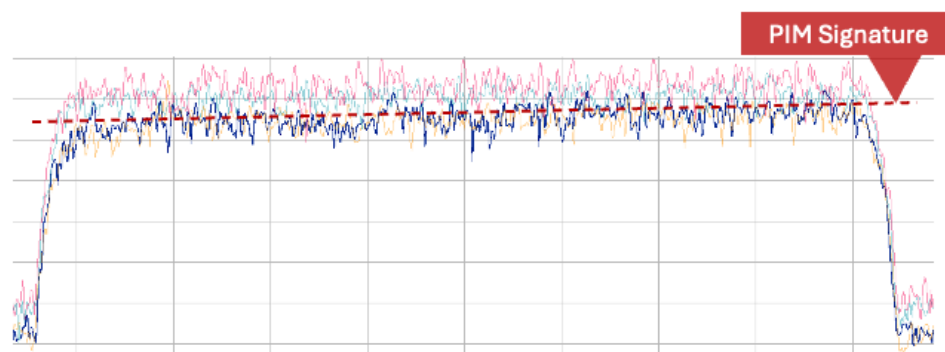The following are some examples of PIM signatures from RFoCPRI analysis.
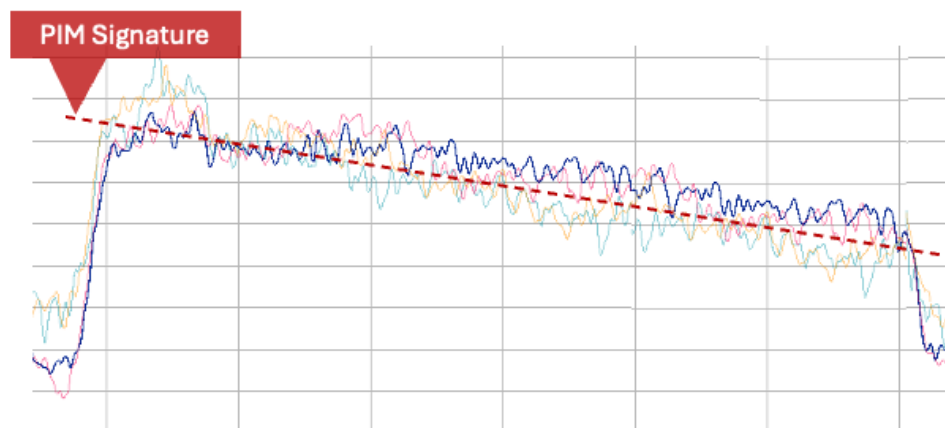
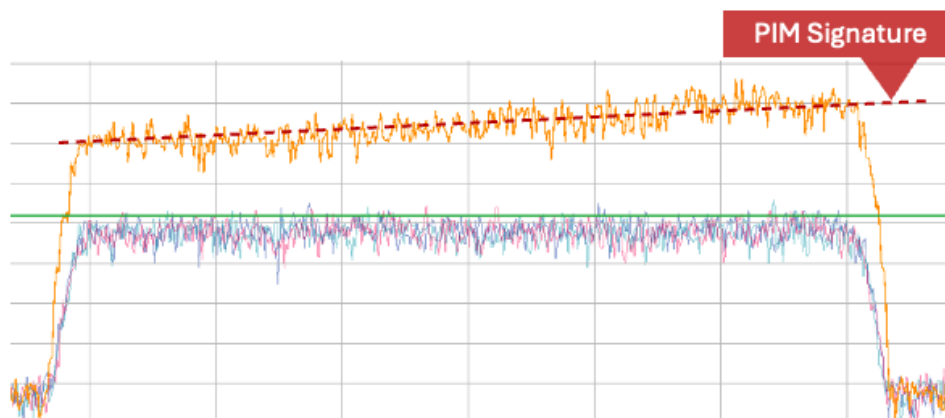RFoCPRI Spectrum – PIM is present in all 4 branches indicating **External PIM** (Band 13: 700MHz)
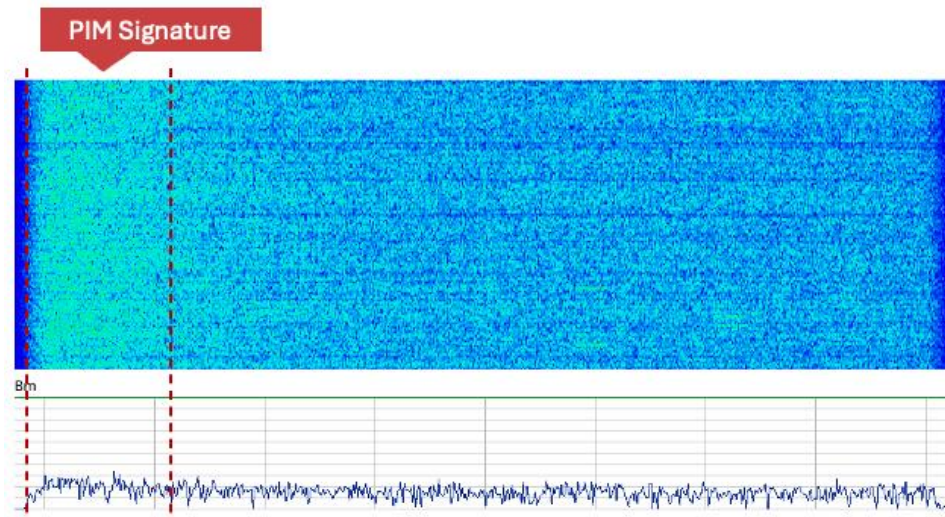
RFoCPRI Spectrogram – PIM is constantly present in uplink lower frequency (Band 13: 700MHz)

RFoCPRI Spectrum – PIM is present in all 4 branches indicating **External PIM** (Band 5: 850MHz)

RFoCPRI Spectrum – PIM is present in 1 branch indicating **Internal PIM** (Band 5: 850MHz)

5. Technical Support

Technical support is provided by:
- Phone: 1-844-GO-VIAVI (1-844-468-4284) options 3-2-3
- Email: diagnostics.tac@viavisolutions.com

Regularly new firmware updates for the OneAdvisor 800 are released and it is recommended to keep the instrument in the latest firmware to provide all the enhancements and bug fixes.

- For firmware updates go to: https://ona-800.updatemyunit.net
- For how-to-test videos go to: https://www.viavisolutions.com/en-us/products/oneadvisor-800-platform#resources_videos
- For additional information of cell site test go to: http://www.viavisolutions.com/en/products/network-test-and-certification/cell-site-test