



ORAN ODU Emulation

OneAdvisor 800

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1. Scope

This document describes how to configure the OneAdvisor for ORAN ODU Emulation, including:

- O-RU Connectivity
- M-Plane Results
- S-Plane Results
- VSWR Results

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

Description	Diagram
OneAdvisor with the following functions: - ONA-800 mainframe equipped with the following module/Firmware/Licenses: - o SPA06MA-O: SPA Module with Optical Board - o Firmware version 4.2.1 - o ODU-E Licenses	 ONA Front View.
SFP+ for 10GBPS	 SM SFP+
Duplex Singlemode Fiber cable (potentially using the existing cable that connects to the RU)	 Duplex SM Fiber

2. OneAdvisor Overview

The OneAdvisor is a portable instrument for Cell Site installation and maintenance, the main test functions of OneAdvisor for cell site installation include:

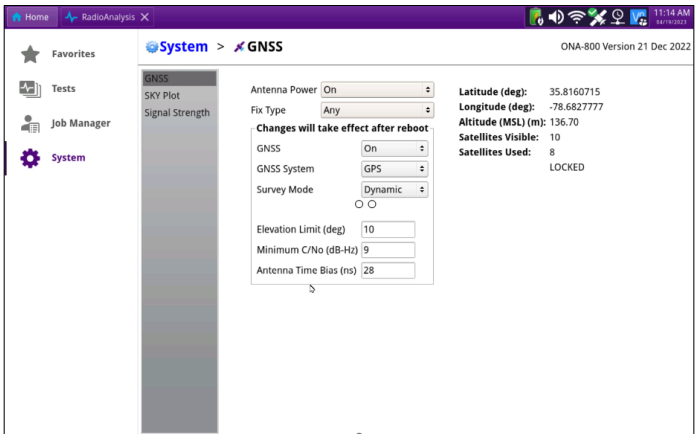
- Cable and antenna analysis up to 6GHz
- Fiber Inspection verification and Fiber validation (OTDR)
- Ethernet/VLAN testing
- ODU Emulation

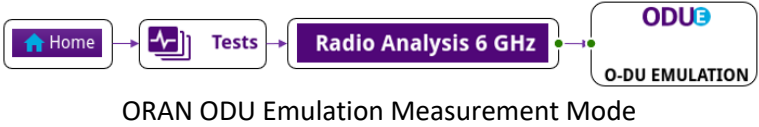
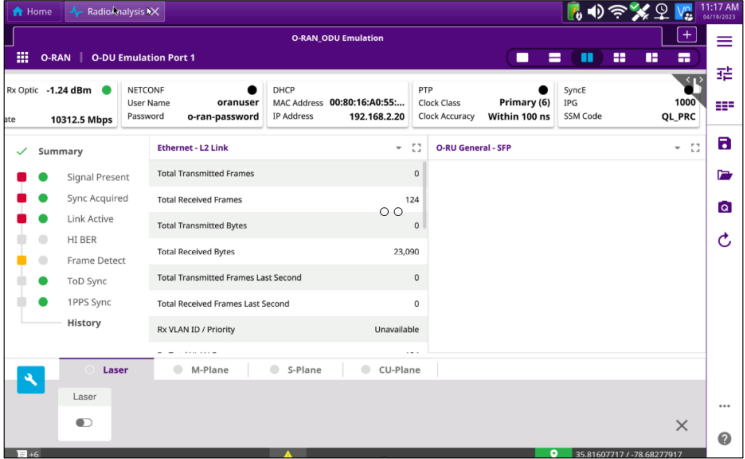
2.1 ORAN ODU Emulation

The following procedure describes the steps to perform ORAN ODU Emulation analysis with OneAdvisor800. Successful results of this test prove that the radio is powered, connected, and ready to communicate with the actual DU. If this process fails to reach that end, one can troubleshoot based on what phase the process could/could not achieve.

2.1.1 Initial Setup

The following procedure describes the initial setup of ODU Emulation analysis, including turn-up and connectivity.

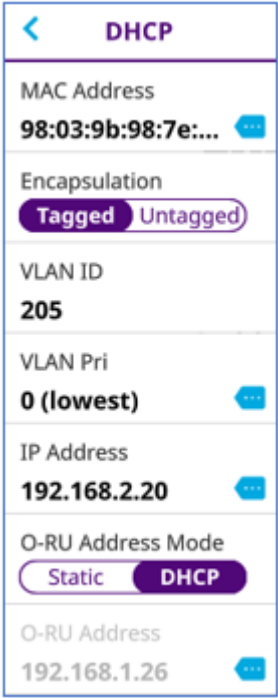
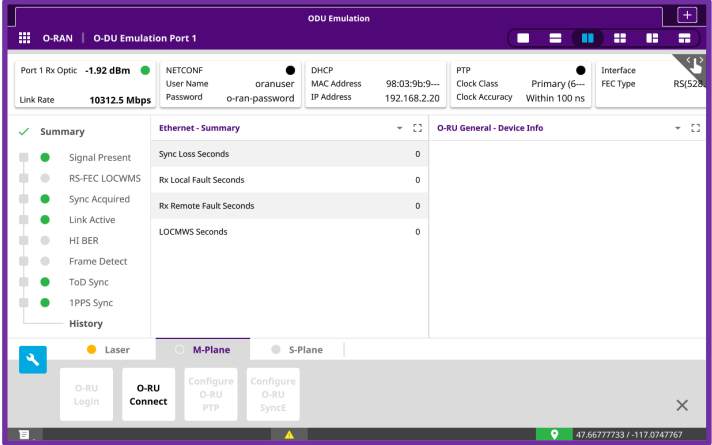
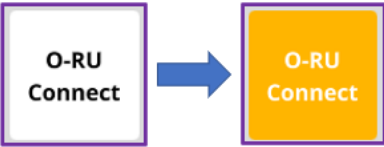
Step	Action	Description
1	Power ON OneAdvisor	Press and hold the ON/OFF button for 3 seconds to power on the One Advisor 
2	Connectivity: - Insert the SFP+ into Port 1 on the optical board - Inspect, Clean, and connect a duplex fiber between the ONA and the RU under test	 ONA Front View. RU ORU Example
3	Enable GPS: - Connect the GPS antenna to the SMA port - Select {Home}, {System}, {GNSS} - Set Antenna Power to: ON - Ensure the OneAdvisor gets a lock and displays Lat/Long	

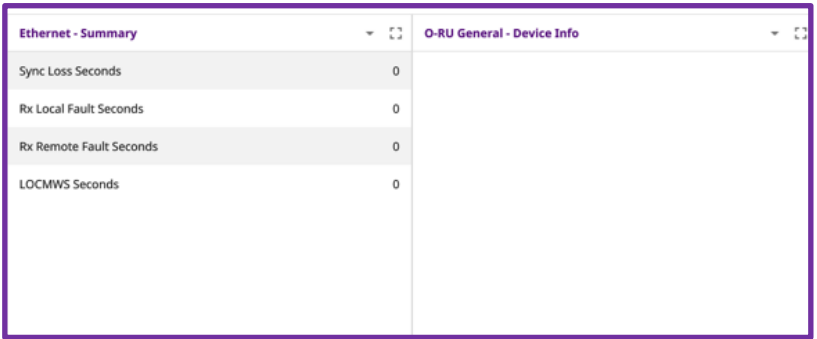
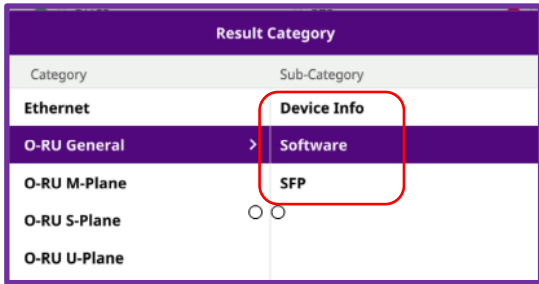
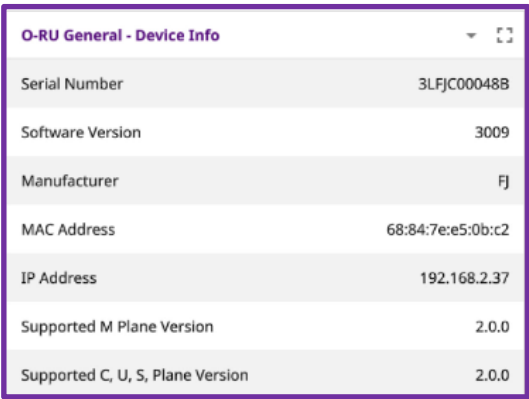
Step	Action	Description
4	ORAN ODU Emulation mode: - Select {Home}, {Tests}, {Radio Analysis}, {O-DU Emulation}	 ORAN ODU Emulation Measurement Mode  ORAN ODU Emulation Measurement Screen

2.1.2 ORAN ODU Emulation Testing – M-Plane RU Query

The following procedure describes the steps to perform ODU Emulation tests with OneAdvisor.

Step	Action	Description
1	ODU Emulation Link Rate: - Set the Optical Link Rate to 10312.5 Mbps. <i>Note: If testing a 25Gbps RU, use an SFP28 and set the link rate to 25781.5 Mbps</i>	 SFP+ Optical Link Rate
2	Set the Master (ONA) IP Address and VLAN ID : - Select the DHCP field and set the IP Address to 192.168.2.20 - Set the VLAN to a value between than 200 and 210 (i.e., 205) - Verify the Encapsulation is set to Tagged	 Top bar DHCP group Side-bar configuration icon

Step	Action	Description
	Verify the O-RU Address Mode is set to DHCP	 Setting IP Address and VLAN Information
3	Start the ODU Emulation Process: - Turn ON the ONA Laser - Select the M-Plane tab - If the RU is powered and connected there will be green lights on the Summary area of the screen	 
4	Connect to the RU: Press the O-RU Connect button to start the communications with the RU	

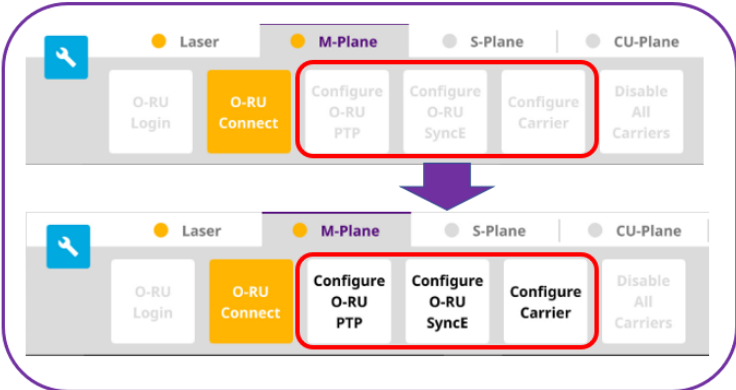
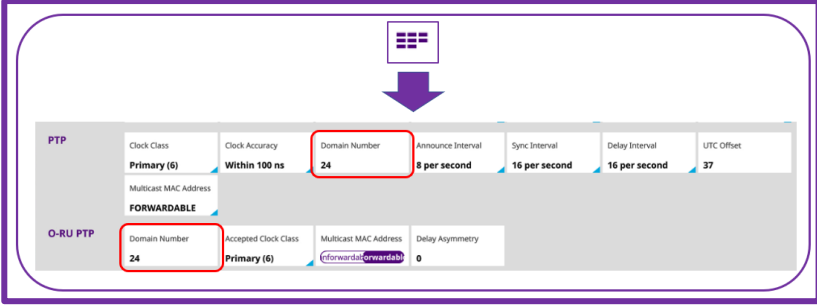
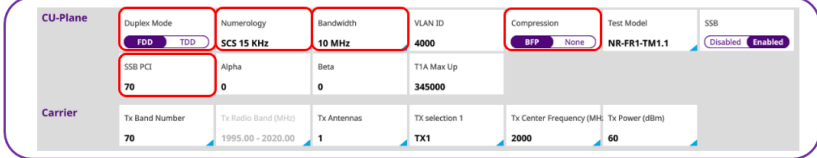
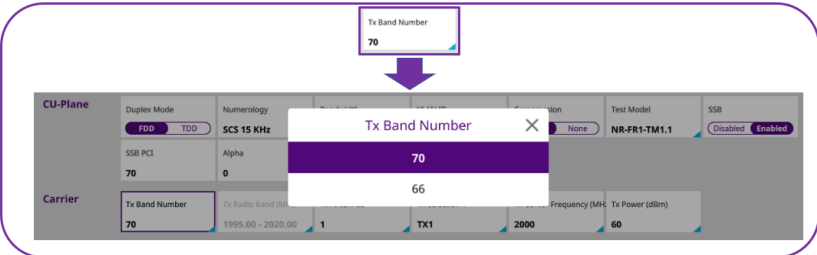
Step	Action	Description
5	Reading the RU Data: - If operating properly, the radio should be attempting to communicate through VLAN IDs 201 to 210. - Once the radio wraps around to the VLAN set on the OneAdvisor (205), the initial connection will be made. - This could take up to 3 minutes. - The following screens are available from the O-RU M-Plane	The User Interface has two results screens that can be changed as desired. Click in the header to change either screen.  Results Categories and Sub-Categories  O-RU General > Device Info (below)  O-RU General > Software Information (below)

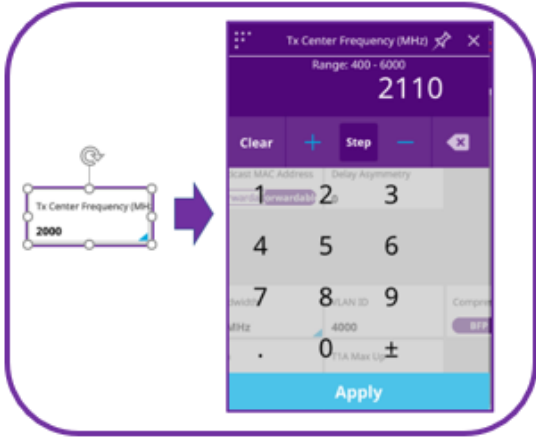
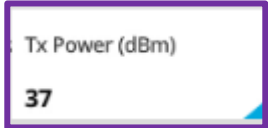
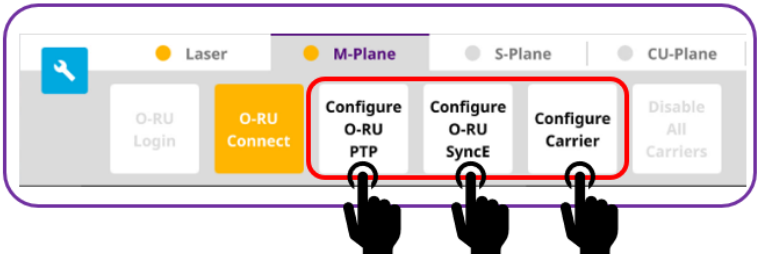
Step	Action	Description																																																												
		O-RU General - Software <table><tr><td>Slot 1</td><td>slot0</td></tr><tr><td>Status 1</td><td>0</td></tr><tr><td>Product Code 1</td><td>N712926R</td></tr><tr><td>Vendor Code 1</td><td>FJ</td></tr><tr><td>Build ID 1</td><td>5021</td></tr><tr><td>Build Name 1</td><td>FJ-RU-RTB-----3009.FGF</td></tr><tr><td>Build Revision 1</td><td>3009</td></tr><tr><td>Slot 2</td><td>slot1</td></tr><tr><td>Status 2</td><td>0</td></tr><tr><td>Product Code 2</td><td>N712926R</td></tr><tr><td>Vendor Code 2</td><td>FJ</td></tr></table> O-RU General > SFP Information (below) O-RU General - SFP <table><tr><td>SFP 1 Interface Name</td><td>fheth0</td></tr><tr><td>SFP 1 Port Number</td><td>0</td></tr><tr><td>SFP 1 Vendor Name</td><td>000000SFP-10GS</td></tr><tr><td>SFP 1 Rx Power (dBm)</td><td>-5.2</td></tr><tr><td>SFP 1 Tx Power (dBm)</td><td>-1.8</td></tr><tr><td>SFP 1 Bias Current (mA)</td><td>6.4</td></tr><tr><td>SFP 1 Voltage (mV)</td><td>3,340.8</td></tr><tr><td>SFP 1 Temperature (C)</td><td>54.7</td></tr></table> O-RU M-Plane > Capability (below) O-RU M-Plane - Capability <table><tr><td>Supported Category</td><td>Category A</td></tr><tr><td>Supported Number of Ports</td><td>8</td></tr><tr><td>Number of Spatial Streams</td><td>4</td></tr><tr><td>Max Power per PA Antenna (dBm)</td><td>49.0</td></tr><tr><td>Min Power per PA Antenna (dBm)</td><td>37.0</td></tr><tr><td>IQ Sample Dynamic Compression Supported</td><td>false</td></tr><tr><td>IQ Sample Realtime Variable Bitwidth Supported</td><td>false</td></tr><tr><td>IQ Sample Count of Supported Compression Methods</td><td>1</td></tr><tr><td>IQ Compression Method 1 IQ Bitwidth</td><td>9</td></tr><tr><td>IQ Compression Method 1 Compression Type</td><td>Static</td></tr><tr><td>IQ Compression Method 1 Compression Format Exponent</td><td>4</td></tr></table>	Slot 1	slot0	Status 1	0	Product Code 1	N712926R	Vendor Code 1	FJ	Build ID 1	5021	Build Name 1	FJ-RU-RTB-----3009.FGF	Build Revision 1	3009	Slot 2	slot1	Status 2	0	Product Code 2	N712926R	Vendor Code 2	FJ	SFP 1 Interface Name	fheth0	SFP 1 Port Number	0	SFP 1 Vendor Name	000000SFP-10GS	SFP 1 Rx Power (dBm)	-5.2	SFP 1 Tx Power (dBm)	-1.8	SFP 1 Bias Current (mA)	6.4	SFP 1 Voltage (mV)	3,340.8	SFP 1 Temperature (C)	54.7	Supported Category	Category A	Supported Number of Ports	8	Number of Spatial Streams	4	Max Power per PA Antenna (dBm)	49.0	Min Power per PA Antenna (dBm)	37.0	IQ Sample Dynamic Compression Supported	false	IQ Sample Realtime Variable Bitwidth Supported	false	IQ Sample Count of Supported Compression Methods	1	IQ Compression Method 1 IQ Bitwidth	9	IQ Compression Method 1 Compression Type	Static	IQ Compression Method 1 Compression Format Exponent	4
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2.1.3 ORAN ODU Emulation Testing – S and CU-Plane RU Transmit

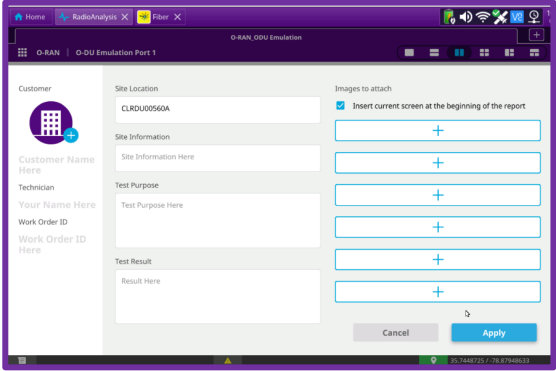
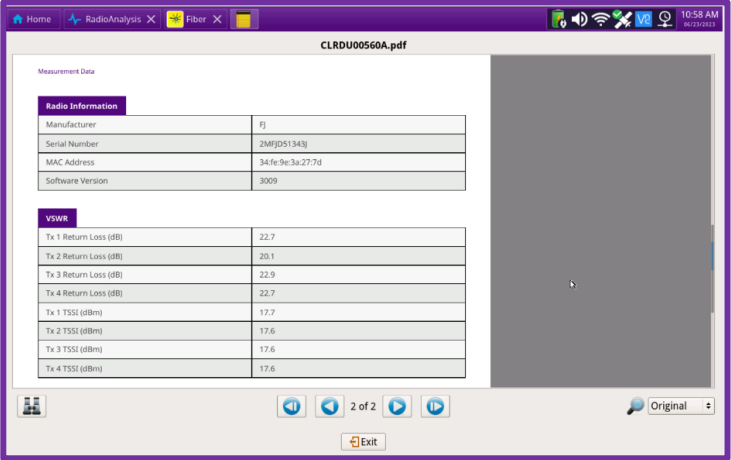
The following procedure describes the steps to perform O-DU Emulation tests with OneAdvisor.

Step	Action	Description
1	Reading the RU Data: - After about 3 minutes the RU will respond to the ONA - The PTP and SyncE buttons will activate when the RU is ready	 Wait for the Configuration Buttons to become Active
2	Configuring PTP, and CU Plane - Set the Domain Number to 24 for BOTH the ONA AND the O-RU!	 PTP Setting
3	CU-Plane Settings - Duplex = FDD - Numerology = 15 kHz - Bandwidth = RU Band Dependent - Compression = BFP - Set the PCI to 104	
4	RU Carrier Settings - Select the Tx Band Number (this will depend on the radio's capabilities) - Enter the Center Frequency of the Band (the available range will depend on the radio's capabilities)	 Band Number

Step	Action	Description
	capabilities. Always transmit in Dish owned spectrum)	 Center Frequency of Carrier
5	RU TX POWER - Set TX Power to lowest allowed by the RU - Press the menu button to exit	 Carrier Power  Exit Settings
6	Push Configurations to the RU - Press the PTP button to push the config to the RU - Press the SyncE button to push the config to the RU - Press the Configure Carrier button to push the config to the RU NOTE – The Configure Carrier configuration takes several seconds to finish	 Press Each button once
7	Turn on PTP - Press the SyncE and the PTP buttons NOTE - PTP takes 2 minutes to connect and turn green	 Timing Buttons

Step	Action	Description																																										
		PTP Clock ClassPrimary (6--- Clock AccuracyWithin 100 ns PTP Sync Status																																										
8	Turning on the Carrier When you have your measurements Turn Off the carrier	CU-Plane Start DL Test Vector Gen Stop DL Test Vector Gen TX OFFTX ON																																										
9	The following screens are available from the RU	ORAN Results Categories and Sub-Categories Result Category <table><thead><tr><th>Category</th><th>Sub-Category</th></tr></thead><tbody><tr><td>Ethernet</td><td>Capability</td></tr><tr><td>O-RU General</td><td>Bands</td></tr><tr><td>O-RU M-Plane</td><td>Interfaces</td></tr><tr><td>O-RU S-Plane</td><td>DHCP</td></tr><tr><td>O-RU U-Plane</td><td>Performance Config</td></tr><tr><td></td><td>Performance Stats</td></tr><tr><td></td><td>Delay Profile</td></tr></tbody></table> O-RU S-Plane – SyncE (Below) O-RU S-Plane - SyncE <table><tbody><tr><td>SyncE Lock</td><td>LOCKED</td></tr><tr><td>SyncE Reporting Period</td><td>10</td></tr><tr><td>SyncE Sources Count</td><td>1</td></tr><tr><td>SyncE Source 1 Local Port Number</td><td>0</td></tr><tr><td>SyncE Source 1 State</td><td>0</td></tr><tr><td>SyncE Source 1 Quality Level</td><td>2</td></tr><tr><td>SSM Timeout (s)</td><td>5</td></tr></tbody></table> O-RU S-Plane – PTP (Below) O-RU S-Plane - PTP <table><tbody><tr><td>PTP Lock</td><td>LOCKED</td></tr><tr><td>Profile</td><td>G.8275.1</td></tr><tr><td>Domain Number</td><td>24</td></tr><tr><td>Accepted Clock Classes</td><td>Primary</td></tr><tr><td>G.8275.1 Delay Asymmetry (ns)</td><td>0</td></tr><tr><td>G.8275.1 Multicast MAC Address</td><td>Forwardable (01-1B-19-00-00-00)</td></tr></tbody></table> O-RU U-Plane > Tx Array Carriers (below)	Category	Sub-Category	Ethernet	Capability	O-RU General	Bands	O-RU M-Plane	Interfaces	O-RU S-Plane	DHCP	O-RU U-Plane	Performance Config		Performance Stats		Delay Profile	SyncE Lock	LOCKED	SyncE Reporting Period	10	SyncE Sources Count	1	SyncE Source 1 Local Port Number	0	SyncE Source 1 State	0	SyncE Source 1 Quality Level	2	SSM Timeout (s)	5	PTP Lock	LOCKED	Profile	G.8275.1	Domain Number	24	Accepted Clock Classes	Primary	G.8275.1 Delay Asymmetry (ns)	0	G.8275.1 Multicast MAC Address	Forwardable (01-1B-19-00-00-00)
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SyncE Reporting Period	10																																											
SyncE Sources Count	1																																											
SyncE Source 1 Local Port Number	0																																											
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PTP Lock	LOCKED																																											
Profile	G.8275.1																																											
Domain Number	24																																											
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G.8275.1 Delay Asymmetry (ns)	0																																											
G.8275.1 Multicast MAC Address	Forwardable (01-1B-19-00-00-00)																																											

Step	Action	Description
		O-RU U-Plane - Tx Array Carriers Tx Array Carrier 1 Name txarraycarrier0 Tx Array Carrier 1 Gain (dB) 37.0 Tx Array Carrier 1 Abs Radio Freq Channel 422000 Tx Array Carrier 1 Center Freq of Channel (MHz) 2,110.0 Tx Array Carrier 1 Carrier Channel BW (MHz) 10.0 Tx Array Carrier 1 Active Type ACTIVE Tx Array Carrier 1 Carrier State READY O-RU Specific > VSWR (below) O-RU Specific - VSWR Tx 1 TSSI (dBm) 17.7 Tx 1 Return Loss (dB) 22.7 Tx 2 TSSI (dBm) 17.6 Tx 2 Return Loss (dB) 20.1 Tx 3 TSSI (dBm) 17.6 Tx 3 Return Loss (dB) 22.9 Tx 4 TSSI (dBm) 17.6
10	Save a Report Press Save Enter a file name Select Report as the File Type and then click on Report Set-up Add any additional descriptive information to the fields available here Click Apply Then Click Save Home > System > Files and open the report From here you can also copy to a USB Drive	Save Event Save Quick Save Create Favorite File Name CURDU00560A File Type ☐ Result ☒ Result as JSON ☐ Screen ☐ IQ Capture ☐ Result as CSV ☒ Report ☐ Logging ☐ Setup Color Inversions On Off Report Report Setup Close Save

Step	Action	Description
		 

3. 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 CellAdvisor 5G are released and it is recommended to keep the instrument in the latest firmware to provide all the enhancements and bug fixes.

- For additional information of cell site test go to:
<http://www.viavisolutions.com/en/products/network-test-and-certification/cell-site-test>