S5040A Open RAN Studio Player and Capture Appliance

Hardware platform for O-RU conformance test and design validation with Open RAN Studio

The S5040A Appliance is an instrument grade, test and measurement appliance, designed to operate with Keysight's PathWave Signal Studio and Open RAN Studio to emulate a Distributed Unit (O-DU), which is used to capture O-RAN uplink communications and perform the measurements necessary to validate the functional operation and performance of a Radio Unit (O-RU).

The S5040A Appliance incorporates UltraScale FPGA hardware to accelerate five powerful tools to construct, play, capture, measure, and extract IQ vectors for split option 7.2x O-RAN traffic.

KEYSIGHT

Open RAN Studio for 5G O-RAN Radio Unit (O-RU) Testing

The S5040A Appliance, along with Open RAN Studio software suite, provides a test environment that integrates with Keysight tools, in both RF and protocol domains, to completely exercise an O-RAN CUS compliant O-RU. The S5040A Appliance, with Open RAN Studio, emulates an O-DU and generates test vectors for an O-RU. Bidirectional eCPRI messages that flow between the O-DU and O-RU over the O-RAN interface can be captured and analyzed.

Timestamps, decode and visualization of O-RAN protocol information is provided using the Open RAN Studio software.

Open RAN Studio also integrates with Keysight RF tools such as signal generators and signal analyzers, along with PathWave Signal Generation software and PathWave VSA Analysis software, to completely exercise the O-RU.

To ensure measurement consistency between both RF and baseband sides of the O-RU, Open RAN Studio software leverages the same industry leading 5G signal generation and measurement science used in Keysight spectrum analyzers and signal sources. This tight coupling ensures CU-Plane messages and baseband information match exactly with the signals captured on the RF side of the O-RU.

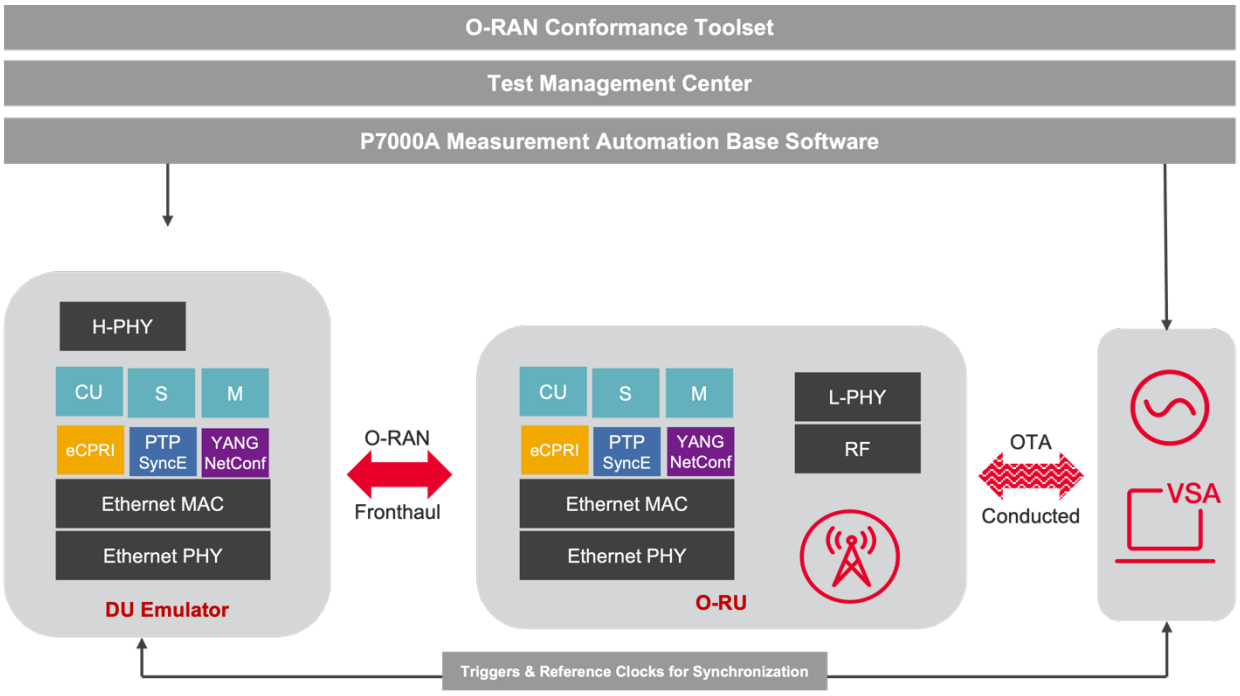

Figure 1. O-DU Emulator Protocol Layers

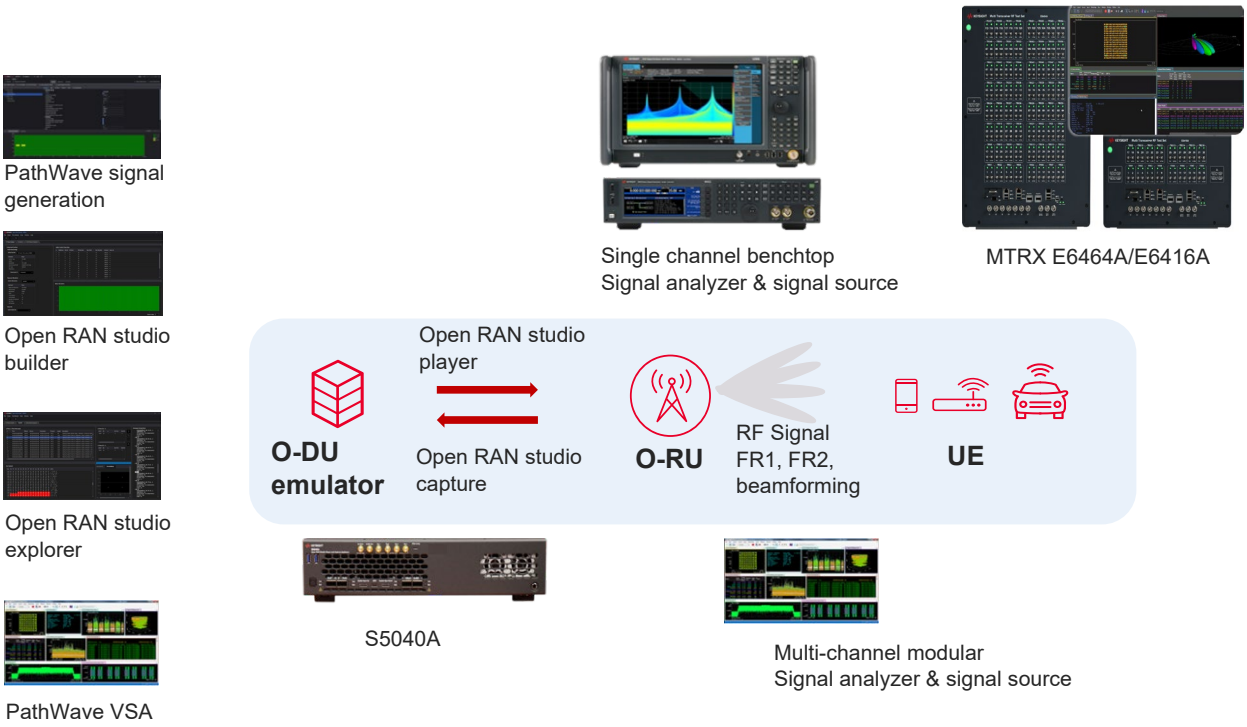

Figure 2. O-RU Test Set-up

S5040A Appliance Specifications

Part number	Description
S5040A	Open RAN Studio Player and Capture Appliance
N7046A-001	Upgrade from single link to dual-link
N7046A-003	Upgrade from single O-RU to dual O-RU support on fronthaul

Feature	Description
Interface	Single port 10 Gbps to 25 Gbps Ethernet interface
	SFP or QSFP support (Quad QSFP Cage)
	DIMM 1: 16 GB RDIMM DIMM 2: 16 GB RDIMM
	Timing: SEP Trigger board (ACC-XPR-SEPTRIG)
Protocol support	Ethernet, VLAN, eCPRI and O-RAN
Synchronization	PTP Master emulation Configurable to start playing frames on next 10 ms boundary
Stimulus memory depth	3.5 GBytes Uplink and 3.5 GBytes Downlink
Playout features	Reconfigurable DUT destination MAC address
	Real-time CRC calculation
	Dynamic frame and sequence numbering during playout
	Play Stimulus PCAP file once or repetitively
Interface	10 Gbps, 25 Gbps, and 50 Gbps Ethernet interface SFP or QSFP support (Quad QSFP Cage)
Number of ports (configurable)	Single Port in base configuration, upgradable to two 10 G / 25 G ports with : Option N7046A-001
Protocol support	Ethernet, VLAN, eCPRI, and O-RAN
M-plane	Embedded M-plane support Pass through mode to external M-Plane client (1 Gbps)
Synchronization	PTP Master emulation SyncE ESMC Message support Configurable to start playing frames on next 10 ms boundary
Playout features	Reconfigurable DUT destination MAC address Real-time CRC calculation Dynamic frame numbering during playout Play Stimulus PCAP file once or repetitively
Cross trigger	Configurable Trigger output
Ref clock	Ref Clock input 10 MHz, 100 MHz; Ref Clock output: 10 MHz
Weight	Frame: 8.165 kg (18.0 lbs.) Shipping: 14.67 kg (32.34 lbs.)
Dimensions (LxWxH)	Frame: 505x490x110 mm Shipping: 687x677x315 mm

For more information

For more insights on O-RAN test solutions throughout the development, conformance, deployment lifecycle, and end-to-end performance verification of 5G networks, check the following links:

Open RAN Solutions

Open RAN Studio

Keysight enables innovators to push the boundaries of engineering by quickly solving design, emulation, and test challenges to create the best product experiences. Start your innovation journey at www.keysight.com.

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