

This Former Spirent Business is Now Part of VIAVI

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Spirent AION

Spirent TestCenter 5G Fronthaul Bundle O-DU and O-RU Device Emulation with O-RAN & eCPRI

Overview

Open Radio Access Network (O-RAN) is being adopted by service providers and equipment manufacturers to reduce infrastructure deployment cost and lower the barrier to entry for new product innovation.

The O-RAN Alliance is committed to evolving radio access networks with its aim to drive the mobile industry toward an ecosystem of innovative, multi-vendor, interoperable, and autonomous RAN, with reduced cost, improved performance, and greater agility.

Virtualized Radio Access Network

Virtualization entails the migration from custom-built network nodes to network functionality implemented in software running on generic hardware compute platforms. Virtualization for communications service providers began with the core network and subsequently cloud technologies have been evolving at a rapid rate.

In the RAN domain, vendor agnostic commercial off-the-shelf (COTS) hardware has the potential to enable innovation across a range of software ecosystems.

O-DU and O-RU Device Emulation with O-RAN and eCPRI

For full–stack RAN virtualization, the DU (Distributed Unit) is connected to the radio via a packet fronthaul interface known as enhanced Common Public Radio Interface (eCPRI), with multiple ways of dividing functions between the DU and the RRU (Remote Radio Unit).

eCPRI enables efficient and flexible radio data transmission via a packet based fronthaul transport network. eCPRI defines a protocol layer which provides various—mainly User Plane data specific – services to the upper layers of the protocol stack.

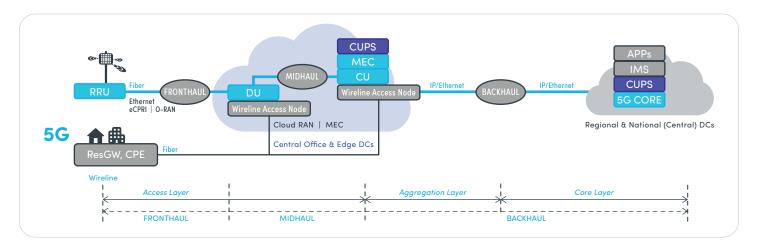
Spirent TestCenter O-DU and O-RU Device Emulation with O-RAN helps ensure the success of O-RAN adoption and deployment by enabling equipment manufacturers and service providers to test and integrate virtualized open radio access network in a true multi-vendor environment through comprehensive test methodologies.

5G Fronthaul Bundle is a comprehensive protocol package for Spirent TestCenter that includes eCPRI and O-RAN, enabling Network Equipment Manufacturers, Service Providers and chipset vendors to quickly evaluate and troubleshoot functionality, performance, and scalability of 5G fronthaul.



- Fronthaul Validation—in-depth and complete testing of Fronthaul O-RAN and eCPRI
- Elaborate O-RAN Message
 Analysis—actionable analytics & intuitive conformance summary reports via TestCenter IQ
- Comprehensive Test
 Methodologies—leverage readyto-use methodologies for testing
 various bandwidth and subcarrier
 space
- Multiple Vendor Interoperability emulate true multi-vendor environments to verify and ensure interoperability





Features / Support

- · Ability to emulate O-DU and O-RU with user and control plane messages
- User configurable subcarrier spacing (15, 30, 60, 120KHz)
- User configurable bandwidth (20, 25, 40, 50, 60, 80, 100, 200, 400MHz)
- User configurable number of PRBs (pseudorandom binary sequence) to be requested in downlink & uplink messages
- IQ data compression using Block Floating Point, Mμ-Law, Block Scaling and Selective RE compression algorithm and 1 to 16 bit IQ width
- · Custom slot format by importing symbol map file
- · Respond to incoming eCPRI messages from DUT with user defined conditions and messages
- User configurable gap time between uplink and downlink messages
- · Interworking with PTP for time synchronization
- Configurable slot ID, section ID, reMask and RB parameter values
- · Analysis of the incoming messages for conformance to O-RAN specification
- · Checks for the validity of CC (Component Carrier) ID, number of PRBs
- · Checks if uplink and downlink messages are received in correct sub-frame, slot, and Symbol ID
- Respond to incoming O-RAN messages from DUT with user defined conditions & messages
- Timing accuracy of ±5us for every Radio Frame of 10ms
- Jumbo frame support for user plane and application-level fragmentation
- · Configurable slot ID incremental step
- · Comparing received IQ data with uploaded standard file
- Configurable reMask parameter for DL and UL allocation
- · Beam forming Ext 1 and 11 mixed
- User configurable control message processing time based on radio unit capabilities
- Raw PDU template to construct any O-RAN packet and transport over eCPRI
- Generate O-RAN messages over eCPRI based on IQ vector input file for both downlink and uplink
- Sending user plane messages at 10/25/50/100G line rate
- Next Generation Fronthaul Interface (NGFI) and Radio over Ethernet (RoE) emulation
- · eCPRI message concatenation
- User configurable eCPRI common header, PC ID, sequence ID, app header (payload size is auto calculated)
- eCPRI services: One-way delay measurement, Remote Reset, Remote Memory Access
- Delay measurement with Request/Request with Follow up, Remote request, Remote request with Follow up (delay measurement to the accuracy of 1µs)
- · Event Indication including Fault Notification, Notification Indication and Synchronization Request
- Facilitate multiple measurement tests and calculates min, max and average delay
- Simulate failures with user configurable success rate for the Remote memory access message
- Continuous RF generation and up to 8 O-RU/O-DU per port on hardware module FX3-100GD, FX3-100GQ, FX3-100GQF32, MX3-100GD, MX3-100GQ, MX3-100GQF32, FX3-25GD, FX3-25GD, MX3-25GD, MX3-25GD



Technical Specifications

ORAN w64.CUS.o-vol.00 0-PAN Fronthaul Working Groups Central, User and Synchronization Plane Specification ORAN packet Generation from IQ samples / captured file - Uplink Control and Data message - Uplink Control Message	ameter De	escription						
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- Synchronization Request								
Wireshark decoder • Wireshark decoder for all eCPRI message types	ashark dacadar							

Technical Specifications (cont'd)

Parameter	Descripti	Description				
Next Generation Fronthaul Interface (N	GFI)					
Emulate RoE		Support control plane and data plane, like to configure the P counter, and Q counter, TLV for RoE OAM messages				
Bit Rate	Rate	•	Word Length (Bytes)	Rate	e	Word Length (Bytes)
	Rate 1	1x	1	Rate 6	10x	10
	Rate 2	2x	2	Rate 7	16x	16
	Rate 3	4x	4	Rate 8	20x	20
	Rate 4	5x	5	Rate 9	24x	24
	Rate 5	8x	8	Rate 10	48x	48
ETSI TS 138 211 V15.2.0 (2018-07)						
5G NR Frame and Sub-Frame Structure	Sub Carr	ier Spo	ıcing 15KHz, 30KHz, 60KHz, 1	20KHz		
5G NR						

5G NR				
Slot Configurations	μ	N slot symbol	N frameµ slot	N subframeµ slot
	0	14	10	1
	1	14	20	2
	2	14	40	4
	3	14	80	8

5G Fronthaul Supported Platforms and Modules

Recommend Spirent FX3 and MX3 Test Modules and TestCenter Virtual (refer to Customer Support Center for latest supported hardware).

Ordering Information

Product Number	Description
AON-PB-5GFH*	AION 5G Fronthaul Bundle

^{*}Bundles are available in different number of seats, contact your Spirent Sales Representative to find the right combination for your testing needs.

About AION

Spirent AION is a flexible delivery platform that enables users to achieve improved deployment and provisioning for all their cloud and network testing needs. It is designed to deliver ultimate flexibility in how Spirent TestCenter platforms are purchased and utilized.

The extended platform combines a wealth of industry-leading test solutions with a flexible licensing architecture to support a wide range of next-generation solution-based domain applications.

AION offers a centralized management hub to help leverage software and hardware functionalities across all lab users and locations for a simplified management and decision-making process:

- Flexible purchasing options available via subscription, consumption-based, and perpetual plans, with the ability to license different bandwidth, scale, and protocol bundles.
- Flexible deployment options offered include cloud-delivery, on-prem, and laptop-hosted licensing services.

Enhanced user serviceability delivers always-on platform services from auto-discovery and inventory management to user and workspace administration, notifications, and log aggregation.

