



Orion Labkit O-RAN

*OPEN SOURCE & OPEN RAN 5G LAB NETWORK
FOR INDOOR DEVELOPMENT AND TESTS **



Orion Labkit O-RAN

Indoor open source and Open RAN 2x2 MIMO 100 MHz 5G network, packaged in a compact kit with a smartphone and SIM card, for development and tests

Fit for research and development

Orion Labkit O-RAN is a perfect fit for research centres, R&D labs and universities who want to develop and test innovative use-cases in their premises with a real 5G network.

Orion Labkit O-RAN can be used to :

- Build and run small demonstrations and proof of concepts using 5G
- Connect 5G smartphones, tablets, industrial routers, cameras and other devices, using 100% of the capacity of a 5G 2x2 MIMO network
- Kick start research on 5G network protocols, thanks to an all-in one, plug & play package
- Develop extensions or integrate third party software
- Analyse and robustify 5G security protocols
- Train teams and students to configure and troubleshoot a real 5G network

Open source

Orion Labkit O-RAN is based on the open source OpenAirInterface (OAI) 5G Core and Radio Access Network (RAN) software.



OAI is the fastest growing community and software assets in 5G wireless. It is backed by over 200 industry and academic members, including Qualcomm, Fujitsu, Orange and Meta. With **Orion Labkit 100**, you can not only benefit from the ongoing developments of OAI, but also extend the code with your own software.

Support from experts

Orion Labkit O-RAN comes with online access to source code and documentation. You also get access to the Firecell Customer Service portal, where you can raise questions and submit issues.

With **Gold** Support, our experts will guide you through the configuration and operation of **Orion Labkit O-RAN** and the provided smartphone, or any 5G device validated by Firecell.

If your objective is to integrate **Orion Labkit O-RAN** with third party software or with devices not yet validated by Firecell, or to develop your own software extensions, Firecell's **Platinum** Support is just what you need to help you reach your goal.

Quarterly releases

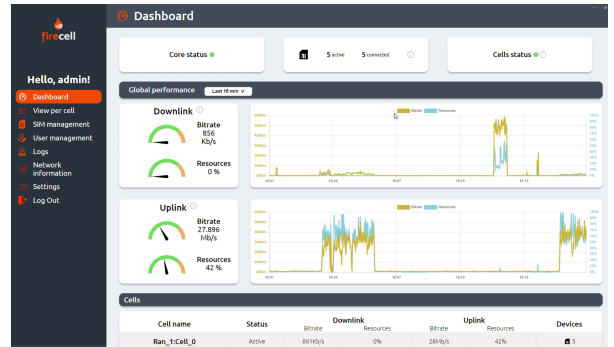
Firecell publishes software releases 4 times a year, with new features, enhancements and bug corrections. You can upgrade your software version from Firecell’s online repository using a simple command.

As long as you are subscribed to Firecell’s **Gold** or **Platinum** Support & Maintenance, you will get access to Firecell’s latest software releases.

What you get

Orion Labkit O-RAN is composed of :

- 1 PC containing :
 - PTP Grand Master Clock
 - 5G Core Network software
 - 5G Radio Access Network software
 - 5G Network Management System
 - Wireshark software
 - configuration files
 - scripts for starting, stopping and checking the status of the cellular network
- 1 Open RAN Radio Unit (O-RU) running at 100 MHz, 2x2 MIMO
- 2 SFP+ multimode transceivers and 1 optical cable (10m), 1 RJ45 cable (2m)
- 1 indoor GPS antenna (7m) for time synchronisation
- 1 rugged 5G smartphone with a Firecell SIM card

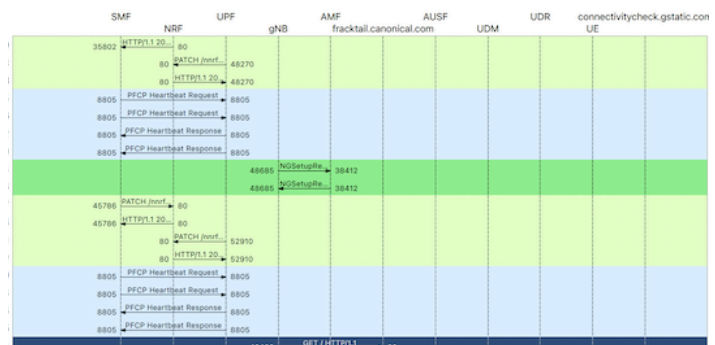


What you can do

Orion Labkit O-RAN has the latest software installed, configured and ready to use. Simply assemble the hardware components to get your 5G network on air in less than 15 mn.

With **Orion Labkit O-RAN**, you can :

- Deploy and update your 5G network with Firecell’s command line scripts
- Configure the network’s central frequency band, bandwidth, TDD mode and attenuation
- Observe protocol messages between network elements using Wireshark
- Inspect extensive log files and view the detailed list of network events
- Modify and recompile the source code



Features

Orion Labkit O-RAN supports:

- 5G in Standalone (SA) mode
- 100 MHz bandwidth in SISO and 2x2 MIMO
- 30-100m coverage
- up to 800 Mbps downlink and 80 Mbps uplink bit rates
- real time visualisation of bit rate, consumed resources, number of connected devices
- SIM cards and eSIMs
- Quality of Service (QoS) : configure higher priority streams
- REST API for remote monitoring and control
- RAN composed of Central Unit (O-CU), Distributed Unit (O-DU)
- Open-RAN split 7.2 interface between O-DU and O-RU
- Precision Time Protocol (PTP) synchronisation (IEEE 1588)

Price

Orion Labkit O-RAN is priced at € 22,900, including delivery in most countries.

It must be purchased with either **Gold** or **Platinum** support & maintenance :

SUPPORT & MAINTENANCE	GOLD	PLATINUM
1 year subscription	€ 5,580	€ 9,840
3 years upfront	€ 11,160	€ 19,680
5 years upfront	€ 16,740	€ 29,520
Firecell User Manuals	✓	✓
Firecell Customer Service	✓	✓
Support for configuration and operation	✓	✓
Software upgrades	✓	✓
Access to Core and RAN source code	✓	✓
Support for integration of 3rd party devices or radios		✓
Support for source code modification & compilation		✓

Bands

Orion Labkit O-RAN is available in the following bands : n48, n77, n78 low, n78 high or n79.

Invoicing and Payment Terms

Invoicing Terms

- 100% invoice at order

Payment Terms

- 30 days net from date of invoice

Delivery and Warranty

Delivery Duty Paid (DDP)

- 8-12 weeks

Warranty

- 1 year

Technical Specifications

Hardware

PC	
Dimensions H x W x D / weight	430 mm x 200 mm x 377 mm / 6.8 kg
CPU	AMD Ryzen 9 7950X (4.5 GHz / 5.7 GHz)
RAM	64 GB
Storage	SSD 500 GB
Network connectivity	1 x 2.5 GbE, Wifi 6 Intel NIC 810-XXVDA4 with 4 x 25GbE SFP28 slots, embedded GPS receiver 1x 10GbE SFP+ multimode transceiver
USB	1 x USB 3.2 Gen 2x2 port (1 x USB Type-C®), 4 x USB 3.2 Gen 2 ports (3 x Type-A + 1 x USB Type-C®), 5 x USB 3.2 Gen 1 ports (5 x Type-A)
Power supply voltage input	100 - 240V AC
Operating system	Linux Ubuntu 22.04 LTS with 5.4.0-126-lowlatency kernel
Synchronisation	PTP (IEEE 1588)

Open RAN Radio Unit	
Dimensions H x W x D / weight	250 x 213.5 x 92 mm / 5.3 Kg (with mounting bracket)
5G Frequency bands	Labkit O-RAN n48 : 3550-3700 MHz Labkit O-RAN n77 : 3800-4200 MHz Labkit O-RAN n78 low : 3400-3600 MHz Labkit O-RAN n78 high : 3600-3800 MHz Labkit O-RAN n79 : 4700-4900 MHz
Modulation schemes	QAM 256/64/16/QPSK
Subcarrier spacing	30 kHz
Bandwidth	100 MHz (SISO, MIMO 2x2)
Max transmitted power	24 dBm (250 mW)
Operating Temperature Range	-5 °C to +40 °C
IP Rating	IP 31
Regulatory	RoHS n78 high : CE (Europe)
Powering	PoE ++ Type 3 IEEE802.3bt or 12V/5A DC Adaptor
Max power consumption	51 W
Antenna	4 x omnidirectional antennas
Synchronisation	PTP (IEEE 1588)
Fronthaul / functional split	10GbE SFP+ / Split 7.2a

5G Smartphone	
Brand & Model	Crosscall Core-Z5
Dimensions H x W x D / weight	175 x 81 x 14 mm / 281 g
5G Frequency bands	n38 (2600MHz) / n40 (2300MHz) / n77 (3700MHz) / n78 (3500MHz)
Operating System	Android 12
Processor	Qualcomm® QCM6490
Head/Body SAR	1,5 W/kg - 1,03 W/kg
SAR Limbs	2,63 W/kg
RAM	4 GB
Flash	64 GB
IP Rating	IP 68
Resistance	salt water (2 m / 30 min), dust (IP 68), falls (6 faces, 2m on concrete)
SIM card	rewritable, unique IMSI, MILENAGE authentication algorithm, PLMN: 999.99

Software

5G Core Network software	
Network functions	SMF, AUSF, UDM, UDR, AMF, UPF, NSSRF, NRF, PCF
Container platform	Docker

5G Radio Access Network software	
Frequency bands	n38 (2600MHz) / n40 (2300MHz) / n77 (3700MHz) / n78 (3500MHz) / n79 (4800 MHz)
Bandwidth	40/100 MHz
Transmission Modes (downlink)	SISO, MIMO 2x2
Modulation schemes	Up to 256 QAM
Subcarrier spacing	30 kHz
Active users	32

5G Network Management System software	
Dashboard	Core & Cell status, global number of active / connected devices, global downlink & uplink bit rate / resource consumption, detailed list of cells
Cell metrics	Downlink & uplink bit rate / resource consumption, number of connected devices
SIM management	Add SIM, device status (online, offline)
User management	Add, remove, manage user profiles (Standard, Expert, Admin)
QoS management	Priority configuration of streams (IP / port range)
Logs	User connections

FCC NOTICE: This kit is designed to allow:

(1) Product developers to evaluate electronic components, circuitry, or software associated with the kit to determine whether to incorporate such items in a finished product and

(2) Software developers to write software applications for use with the end product. This kit is not a finished product and when assembled may not be resold or otherwise marketed unless all required FCC equipment authorizations are first obtained. Operation is subject to the condition that this product not cause harmful interference to licensed radio stations and that this product accept harmful interference. Unless the assembled kit is designed to operate under part 15, part 18 or part 95 of this chapter, the operator of the kit must operate under the authority of an FCC license holder or must secure an experimental authorization under part 5 of this chapter.

DISCLAIMER

Purchaser acknowledges that it may not operate the Device without first obtaining equipment authorization from the Federal Communications Commission. Upon request, Firecell will work with Purchaser to obtain the requisite equipment authorization for a flat fee.

Purchaser will not be required to obtain equipment authorization in the following circumstances:

- (1) The Device will be connected to wires or cable when operating; or
- (2) The Device will be operated in an anechoic chamber or a Faraday cage; or
- (3) The Purchaser holds a program experimental license that covers the frequency bands to be tested at the geographic location of the testing, and the Purchaser will comply with the reporting and operational requirements in its program experimental license; or
- (4) The Purchaser holds an experimental authorization to test the Device (as integrated); or
- (5) The Device is operated under Part 15 ["unlicensed" operations], Part 18 [industrial, scientific and medical equipment], or Part 95 [personal radio services] of the FCC's Rules; or

The Device will be operated under the authority of an FCC license holder, such as Verizon, T-Mobile or AT&T.