



Orion Network

*OPEN SOURCE PRIVATE 5G LAB NETWORK
FOR INDOOR AND OUTDOOR DEVELOPMENT AND TESTS*



Orion Network

Outdoor and large indoor up to 100 MHz private 5G network for development and tests

Fit for research and development

Orion Network 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 Network can be used to :

- Build and run large demonstrations and proof of concepts using 5G
- Connect smartphones, tablets, industrial routers, cameras and other devices, using up to 100% of the capacity of a 5G Standalone 2x2 MIMO network
- Kick start research on 5G network protocols thanks to an open source solution
- Develop extensions or integrate third party software
- Analyse and robustify 5G security protocols

Open source

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



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

Support from experts

Orion Network 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 Network** and any 5G device validated by Firecell.

If your objective is to integrate **Orion Network** 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

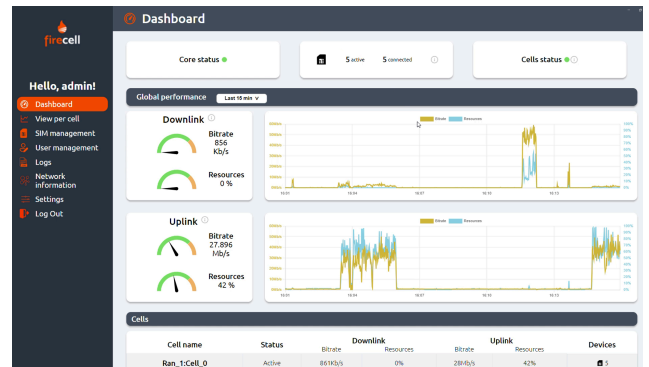
Firecell publishes software releases 4 times a year, with new features, enhancements and bug corrections. You can upgrade your software version from Firecell’s online repository using a simple command.

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 Network is composed of :

- 1 hardware server with :
 - Firecell 5G Core software
 - Firecell Network Management System
- 1 to 10 gNodeBs :
 - Mid, High power radios, with hardware server containing Firecell RAN software and high-gain antennas
 - Low power Open-RAN indoor radios with external antennas

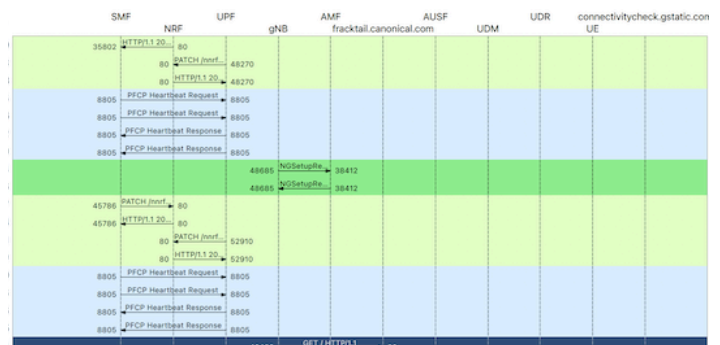


What you can do

Orion Network has the latest software installed, configured and ready to use. Simply assemble the hardware components to get your 5G network on air.

With **Orion Network**, you can :

- Deploy and update your 5G network with Firecell’s command line scripts
- 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



Orion Network requires 5G spectrum to be acquired from the country’s frequency regulator.

Features

Orion Network supports:

- 5G in Standalone (SA) mode
- 100 MHz bandwidth in SISO and 2x2 MIMO
- from 30 to 5000m coverage, depending on the selected radios
- up to 800 Mbps downlink and 80 Mbps uplink bit rate
- up to 64 connected devices at 100 MHz
- NMS with Real-time visualisation of bit rates, consumed resources, number of connected devices
- SIM card and eSIM support
- Quality of Service (QoS) support : configure which stream have higher priority
- REST API for remote monitoring and control

Pricing

Contact **Firecell** to get a quote for the **Orion Network** solution adapted to your needs.

Support & Maintenance

Orion Network comes with either **Gold** or **Platinum** support & maintenance. Platinum support is dedicated for people interested in integrating with 3rd party equipment and modifying the source code.

SUPPORT & MAINTENANCE (PER RADIO UNIT)	GOLD	PLATINUM
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 Network is available for deploying private 5G networks in the following countries:

- in band n38 (2570–2620 MHz) at 40 MHz in France
- in band n40 (2300–2400 MHz) at 40 MHz in Spain, Finland
- in band n77 (3800–4100 MHz) at 100 MHz in France, UK, Belgium, Norway, Australia
- in band n77 (3800–4100 MHz) at 20 MHz in Canada
- in band n78 (3400–3800 MHz) at 100 MHz Germany, Brazil, Switzerland
- in band n78 (3400–3800 MHz) at 80 MHz in Croatia
- in band n78 (3400–3800 MHz) at 60 MHz in Poland
- in band n78 (3400–3800 MHz) at 40 MHz in The Netherlands, Sweden
- in band n79 (4600–4900 MHz) at 100 MHz in Japan

Installation & integration

Orion Network will be installed and integrated at your premises with cables and routers by a System Integrator, after analysis and radio planning of the area to be covered.

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)

- 8-14 weeks

Warranty

- 1 year

Technical Specifications

Hardware

5G Core Network Server	
Dimensions H × W × D / weight	1U half-depth chassis (44 x 482 x 540.5 mm) / 7 kg
CPU	Intel Core i9 2.4 GHz
RAM	64 GB
Storage	SSD 500 GB
Network connectivity	1 x 2.5 GbE Intel NIC 710 with 4x SFP+ 10 GbE slots
Power supply voltage input	100 - 240V AC
Operating system	Linux Ubuntu 20.04 LTS with 5.4.0-126-lowlatency kernel

5G Radio Access Network Server	
Dimensions H x W x D / weight	1U half-depth chassis (44 x 482 x 540.5 mm) / 7 kg
CPU	Intel Core i9 2.4 GHz
RAM	64 GB
Storage	SSD 500 GB
Network connectivity	1 x 2.5 GbE, 4x SFP+ 10 GbE Intel NIC 710 with 4x SFP+ 10 GbE slots SFP+ CPRI interface with embedded GPS receiver 1x 10GbE SFP+ multimode transceiver
Power supply voltage input	100 - 240V AC
Operating system	Linux Ubuntu 20.04 LTS with 5.4.0-126-lowlatency kernel

Low Power 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

Mid Power Radio Unit	
Dimensions H x W x D / weight	72.5 mm x 369.2 mm x 404.6 mm / 7 kg
Frequency bands	n38 (2575-2615 MHz), n40 (2300-2400 MHz) n77 (3800-4100 MHz) or n78 (3400-3800 MHz)
Bandwidth	40/60/80/100 MHz
Transmission Modes (downlink)	SISO, MIMO 2x2, MIMO 4x4
Typical consumption	100W
Max transmitted power	4 x 5W (n38, n40, n78), 4 x 2W (n77)
Operating Temperature Range	-40 °C to +55 °C
IP Rating	IP 65
Regulatory	CE (Europe), RoHS, WEEE, REACH (UK)
Antenna ports	4x 4.3/10 DIN Female

Antenna - omni	
Dimensions H x diameter / weight	850 mm (33.5") x 220 mm (8.6") x 40 mm (1.57") / 6.5 kg
Band / Gain	3300-4200MHz : 11dBi
Type	omnidirectional
Capability	MIMO 4x4
Operating Temperature Range	-40 °C to +70 °C
Fixing	Mounting bracket (included)
Ports	4x 4.3-10 Female

Antenna – sector	
Dimensions H × diameter / weight	750 mm (29.5") x 280 mm (11") x 85 mm (3.3") / 4.3 kg
Band / Gain	3300–4200MHz : 18dBi
Type	sector (beamwidth : 65°)
Capability	MIMO 4x4
Operating Temperature Range	-40 °C to +70 °C
Fixing	Mounting bracket with variable tilt (included)
Ports	4x 4.3-10 Female

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	40/60 MHz
Transmission Modes (downlink)	SISO, MIMO 2x2
Modulation schemes	Up to 256 QAM
Subcarrier spacing	30 kHz
Active users	32 at 40 MHz /64 at 100 MHz

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