



Orion v2

*OPEN SOURCE PRIVATE 5G NETWORK
FOR OUTDOOR TRIALS AND TESTS*



Firecell Orion v2

Firecell Orion is an open source 5G network for outdoor or large indoor trials and tests

Fit for all use cases

Firecell Orion is a perfect fit for enterprises, R&D labs and universities who want to demonstrate innovative use-cases with a real outdoor or large indoor private 5G network in their premises.

Firecell Orion can be used to :

- Build and run demonstrations and trials using an outdoor cellular network,
- Wirelessly connect your robots, AGVs, industrial routers, cameras, smart tools, barcode readers and other devices within your campus, factory or warehouse,
- Kick start your research on the 5G network protocols thanks to an all-in one setup,
- Cover up to 25 square kilometres with a single 5G radio.

Open source

Firecell Orion is the only commercial cellular network solution provided as open source.



Based on the **OpenAirInterface (OAI)** Core network and Radio Access Network (RAN) software, backed by over 200 industry and academic members, including Qualcomm, Fujitsu, Orange and Meta. With **Firecell Orion**, you can extend the OAI code with your own development, and, should you wish to contribute back to the OAI community, we will gladly accompany you.

Support from experts

Firecell Orion comes with online access to Firecell's source code and documentation. You also get access to a support page dedicated to you, where you can raise all your questions and issues.

With Firecell's **Gold** Support, our experts will provide you guidance for the configuration and operation of your network.

If your objective is to integrate Orion with third party software, use devices not validated by Firecell, or develop your own code, then Firecell's **Platinum** Support is what you need to help you reach your goal.

Quarterly releases

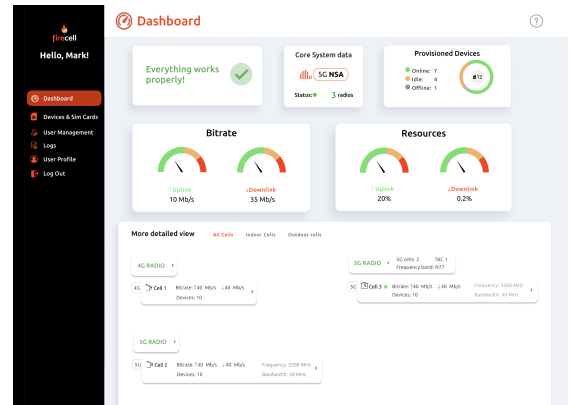
Firecell publishes software releases 4 times a year, with new features, enhancements and bug corrections. You can upgrade your software version from Firecell’s online repository using a single command.

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

What you get

Firecell Orion is composed of :

- 1 server containing :
 - 5G Core software
 - gNodeB software
 - Wireshark software
 - configuration files
 - Firecell’s Network Management System (NMS)
 - scripts for starting, stopping and checking the status of the cellular network
- 1 rugged 4G / 5G smartphone with pre-configured SIM card
- 10 SIM cards
- 1 radio unit
- 1 medium-gain omnidirectional antenna
- power and network cables

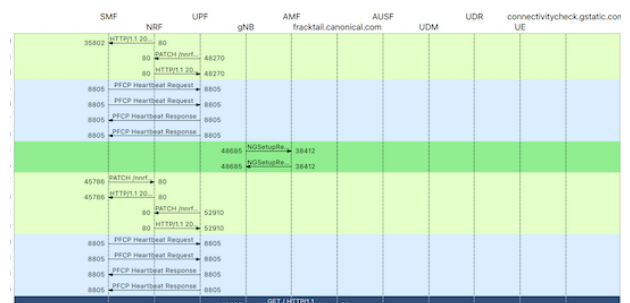


What you can do with Orion

Firecell Orion is pre-installed, pre-tested, pre-configured and ready to use? You can get your own end-to-end 5G cellular network on air in less than 2 hours.

With **Firecell Orion**, you can :

- Deploy and update a cellular network easily using Firecell’s command line scripts,
- Configure the central frequency band, bandwidth, modulation and coding scheme, attenuation,
- View the 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.



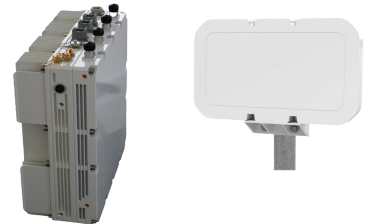
Orion models

Orion is available in the following flavours :

- **Orion 50** : supports 5G Standalone (SA) up to 50 MHz in 2x2 MIMO. Available for the following frequency bands : **n38, n40, n78 low** and **n78 high**.



- **Orion 100** : supports 5G Standalone (SA) up to 100 MHz in 2x2 MIMO¹. Available for the following frequency bands : **n77** and **n78**.



Firecell Orion supports most available 5G private network frequency bands. Simply choose the frequency band according to your country's private 5G network's regulations and the spectrum usage rights that you have acquired or plan to acquire.

The characteristics of the different Orion models are summarised in the following table:

ORION MODEL	POWER	THROUGHPUT UL / DL	FREQUENCY BAND	COVERAGE
ORION 50 N38	2 x 20W	300 Mbps / 50 Mbps	France (40 MHz)	1000 - 5000 metres
ORION 50 N40	2 x 20W	300 Mbps / 50 Mbps	Finland, Spain	1000 - 5000 metres
ORION 50 N78 LOW	2 x 20W	300 Mbps / 50 Mbps	Netherlands, Croatia, Poland	1000 - 5000 metres
ORION 50 N78 HIGH	2 x 20W	300 Mbps / 50 Mbps	Germany, Sweden, Netherlands	1000 - 5000 metres
ORION 100 N77	4 x 2W	600 Mbps / 100 Mbps >1 Gbps in 2024	France (100 MHz), UK, Belgium, Norway, Canada	300 - 1000 metres
ORION 100 N78	4 x 2W	600 Mbps / 100 Mbps >1 Gbps in 2024	Netherlands, Croatia, Poland, Germany, Sweden, Netherlands	300 - 1000 metres

Performance measured in TDD Config DDSUUUUUUU. Other TDD configs are available, with higher UL performance

Multiple radio units and different types of antennas can be combined to deploy large 5G networks. Contact Firecell if you are interested in a quotation for your custom private network project.

¹ 4x4 MIMO upgrade planned in 2024

Pricing

ORION MODEL	PRICE, INCLUDING WORLDWIDE DELIVERY
ORION 50	\$ 26,900
ORION 100	\$ 32,900

SUPPORT & MAINTENANCE	GOLD	PLATINUM
1 year	\$ 6,000 / year	\$ 10,600 / year
2 years	\$ 10,200 / year	\$ 18,020 / year
3 years	\$ 13,500 / year	\$ 23,850 / year
Access to Firecell Open Source code	✓	✓
Access to quarterly Firecell software releases	✓	✓
Support for configuration and operation	✓	✓
Support for integration with 3rd party software or device		✓
Support for source code modification & extension		✓

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 warranty

Technical Specifications

Hardware

Server for Orion 50 / 100	
Dimensions H x W x D / weight	1 unit rack server
CPU	Intel Core i9-12900K (3.2 GHz / 5.2 GHz)
RAM	32 GB
Storage	SSD 500 GB
Network connectivity	1 x 2.5 GbE, 4x SFP+ 10 GbE
Power supply voltage input	00 - 240V AC
Operating system	Linux Ubuntu 20.04 LTS with 5.4.0-126-lowlatency kernel

Radio Unit for Orion 50	
Dimensions H x W x D / weight	148 mm x 200mm x 295 mm / 12 kg
Frequency bands	n38 (2570-2620 MHz), n40 (2300-2400 MHz), n78 low (3400-3600 MHz) or n78 high (3600-3800 MHz)
Bandwidth	up to 50 MHz SISO 1x1 and MIMO 2x2
Max transmitted power	2 x 20W
Operating Temperature Range	-40 °C to +55 °C
IP Rating	IP 67
Regulatory	CE (Europe), RoHS, WEEE, REACH (UK)

Radio Unit for Orion 100	
Dimensions H x W x D / weight	370 mm x 369.2 mm x 91.3 mm / 15 kg
Frequency bands	n77 (3800-4000 MHz) or n78 (3400-3800 MHz)
Bandwidth	up to 100 MHz SISO 1x1, MIMO 2x2 and MIMO 4x4 (available 2024)
Max transmitted power	4 x 2W
Operating Temperature Range	-40 °C to +55 °C
IP Rating	IP 66
Regulatory	CE (Europe), RoHS, WEEE, REACH (UK)

Antenna	
Dimensions H x W x D	221 mm (8.7") x 371 mm (14.6") x 40 mm (1.57")
Gain	1427-2700MHz : 5dBi / 3400-4200MHz : 6dBi / 4900-6000MHz : 7dBi
Type	omnidirectional
Capability	MIMO 4x4
Operating Temperature Range	-40 °C to +85 °C
IP Rating	IP 66
Fixing	Wall, Mast, Rail or Panel Mount

Crosscall Core-Z5 smartphone	
Dimensions H x W x D / weight	175 x 81 x 14 mm / 281 g
5G Frequency bands	NR-FDD n1 (2100MHz) / n3 (1800MHz) / n5 (850 MHz) / n7 (2600MHz) / n8 (900MHz) / n20 (800MHz) / n28 (700MHz) + NR-TDD n38 (2600MHz) / n40 (2300MHz) / n41 (2500MHz) / 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 Go
Flash	64 Go
IP Rating	IP 68
Resistance	salt water (2 m / 30 min), dust (IP 68), falls (6 faces, 2m on concrete)

Software

Core Network software	5G
3GPP release	Release 16
Modules	SMF, AUSF, UDM, AMF, UPF
Container	Docker

Radio Access Network software	5G
3GPP release	Release 16
Frequency bands	All FR1 (< 6 GHz) FDD & TDD bands
Bandwidth	up to 100 MHz
Transmission Modes	SISO 1x1 and MIMO 2x2 (Downlink) - MIMO 4x4(Downlink) in 2024
Modulation schemes	Up to 64QAM in DL and 16QAM in UL
Subcarrier spacing	30 kHz

Network Management System software

Capability	5G SA
Global network info	status, nb radios, total bit rate (UL/DL), % bandwidth used, nb of devices (online, offline, idle)
Radio info	location, bit rate (UL/DL), % bandwidth used, nb of devices (online, offline, idle)
SIM management	add, remove SIM, status (online, offline, idle)
NMS User management	add, remove, manage user profiles (Standard, Expert, Admin)
Logs	user logs, network logs