

Neutral
Wireless
spectrum. unleashed.



Private Mobile Networks
Live Broadcast Connectivity
FPGA, SDR & RFSoc Consultancy
Professional Training Courses

About us

Neutral Wireless is a multi award-winning mobile communications company with extensive experience in the design & deployment of Private Mobile Networks, and in FPGA and Software-Defined Radio (SDR) development. The team has worked together for over a decade, and has a proven track-record of delivering projects across the globe.



Our Mission

To provide our clients with end-to-end wireless network solutions that are innovative, secure by design, and cost-effective.

Our Heritage

Neutral Wireless maintains a strong relationship with its co-founding partner, the University of Strathclyde, and continues to work in close collaboration with the Strathclyde software-defined radio research laboratory and team, StrathSDR.



Our Team

Our experienced engineers operate at the forefront of mobile & wireless communications. The Neutral Wireless senior team has worked together for over a decade, with many of our engineers holding PhDs in communication systems, advanced digital signal processing, FPGA and related System-on-Chip (SoC) architectures, and performance optimisation of FPGA and SDR designs.

Engineering Excellence

Neutral Wireless strives always to deliver engineering excellence through services in consultancy, design, and implementation of deployable 5G radio access networks, FPGA custom designs, product development of the next generation RFSoc enabled SDR solutions, and world-class training courses and upskilling.

What we do

Neutral Wireless engineers are experts at delivering deployable solutions with next-generation mobile wireless, SDR, and FPGA technology.



Private Mobile Networks

Our private 5G networks provide dedicated & secure mobile/wireless coverage for a variety of user equipment. Our solutions are suitable for portable or permanent installs, and can provide robust connectivity for HD video/security cameras, microphones, industry 4.0 style sensors, handsets, and more.



Live Broadcast Connectivity

We have been facilitating live-to-air broadcasts over our 5G networks since 2021. Since then, we have provided connectivity for broadcasters in several countries, working with partners such as the BBC, RTÉ, BT Sport, RAI, the Olympic Broadcasting Services, and IBC.



FPGA & SDR Consultancy

Our experienced team undertakes engineering across many specialised design areas involving FPGAs and SDR systems. From bespoke RFSoc and embedded system design to the creation of rapid development workflows for streamlined system integration.



Training & Short Courses

We deliver professional short courses on DSP, SDR, FPGA and RFSoc design, and wireless/mobile RAN design. Our on-site courses cover advanced communications systems design, as well as events presented in an accessible style for management staff and those at the start of their careers.

Private Mobile Networks

Neutral Wireless offer what we like to call ‘truly mobile’ private networks. Our ultra-configurable portable private 5G solutions are designed to be equally at ease in permanent or pop-up scenarios. Robust and reliable performance with rapid set-up.

Flexible & Configurable

Our private 5G solutions are a reflection of our heritage. We combine high performance software-defined radios and a 3GPP Release 18 aligned virtualised RAN software stack to deliver agile connectivity, rapidly tailored to an array of applications.

Built to be flexible, Neutral Wireless’ networks deliver enhanced performance and increased commercial value through targeted, user-driven configuration. Easily optimised for high uplink or downlink traffic, and/or for ultra-low latencies.

Our networks are backhaul WAN agnostic. Connect the N6 interface of the mini 5G core to whatever facilities you have on-site: be that the video decoder LAN in the back of an OB van, or a LEO satellite system such as Starlink.

Neutral Wireless can also supply a range of pre-provisioned, secure 5G SIM cards to give you a complete, end-to-end private 5G network solution.



Private 5G Solutions

The Neutral Wireless Etive

The **NW Etive** is a complete, portable, private 5G network ecosystem. It is the perfect, pop-up solution for providing 5G connectivity to sporting events, festivals, conferences, research labs, and more.

Featuring a modular design, the **NW Etive** solution consists of an NW Ness compute platform (with Release 18 aligned vBBU software stack and integrated mini 5G Core), a software-defined radio head, and your choice of antenna. All packaged in rugged transport cases.

Our briefcase-style radio hardcase can be directly pole mounted alongside the antenna for a rapid, compact deployment. The compute platform can then be housed wherever is convenient – whether in a server room, an outside broadcast van, or in a portable rack case solution.

Inherently Scalable

A single NW Ness can run up to four cells, each of which can be easily optimised for uplink or downlink traffic via our accessible **nibOS** network management interface. Multiple NW Ness platforms can be connected together to build larger and more complex 5G solutions.

Beyond this, Neutral Wireless can design bespoke private 5G networks tailored for your applications and premises, along with valuable services such as RF planning, deployment support, licence acquisition, and expert consultancy.



Network	5G NR SA (Release 18 aligned)
MIMO	Single 4x4 , or Dual 2x2
Bandwidth	Up to 100 MHz
Bands	n77, n78, n40 (others on request)
Latency	10-20 ms
Throughput (Mbps)	1,500 DL, 400 UL (DL-Bias) 400 DL, 750 UL (UL-Bias)
Radio	4TRx RFSoc
(Case dimensions)	540 x 350 x 135 mm (14.5 kg)
NW Ness	1U server in shock-mount case
(Case dimensions)	580 x 620 x 190 mm (22 kg)
Example Antenna	13 dBi, 65° H / 20° V beamwidth
(Case dimensions)	460 x 230 x 350 mm (14.5 kg)

Private 5G for Live Events & Broadcast

Since 2021, Neutral Wireless has been providing wireless connectivity to some of the largest live sporting and civic events in the world via our broadcast-optimised private 5G solutions. Our 5G SA networks can handle up to 750 Mbps uplink traffic (per cell), and can carry any form of IP video traffic.



Tried and Tested for Live Broadcasting

Neutral Wireless is a world-leader in Private 5G for broadcasting, having facilitated HD video broadcasts across four continents. In excess of one billion viewers have watched live-to-air footage enabled by our networks – including for events such as His Majesty King Charles III's Coronation, international summer sports in Paris and Marseille, MotoGP, Premiership rugby and football, national election coverage, music festivals, local cultural events, and more.

Our private 5G products are designed to meet the requirements of our partners and customers in the broadcast and live production industry, with an emphasis on being rapidly deployable, ultra-low latency, and can be integrated into existing live production workflows.

Private 5G for Live Events & Broadcast

What are the Benefits?

Neutral Wireless Private 5G can offer significant time, labour, and cost savings when compared to fibre installations, traditional COFDM wireless, or other forms of cellular connectivity such as bonded public 4G/5G or network slicing. Our high-performance networks can also allow a greater degree of creative expression – giving you the wide-area connectivity you need to realise those shots that no-one has seen before.

Congestion Free

Our networks operate on shared spectrum, meaning that there is no need to compete with large crowds or stadiums full of sports fans for bandwidth. Our private 5G SA solutions can provide high-capacity dedicated wireless connectivity capable of handling data streams from several HD cameras connected at once. Our record so far? Just over 200 simultaneous streams at 1080p, 50 fps.

Rapid Set-Up

No need to lay miles of cabling or fibre to every camera. Our **NW Efive** networks can fit in the back of a car, and can be set up and operational within 30 minutes. Just plug it together, add power and backhaul, and from there the rest is all wireless.

Inherently Scalable

5G cellular networks are built to be scalable, and our products bring those advantages to the broadcast sector. Double or quadruple your coverage area (and uplink capacity!) through the addition of extra 5G cells, and take advantage of seamless handover for your wireless cameras.

Ultra-Configurable

Broadcast is all about the uplink, meaning that downlink-biased offerings from public mobile network operators are often unsuitable. We give you the ability to configure your network in a manner optimised to your operational needs – **High uplink throughput and low latency.**

Native IP Networking

Our IP-based network can provide bi-directional connectivity, facilitating auxiliary services such as remote camera control, tally, return video, and intercom for multiple cameras at once. All under a single spectrum licence.

Encoder-Friendly

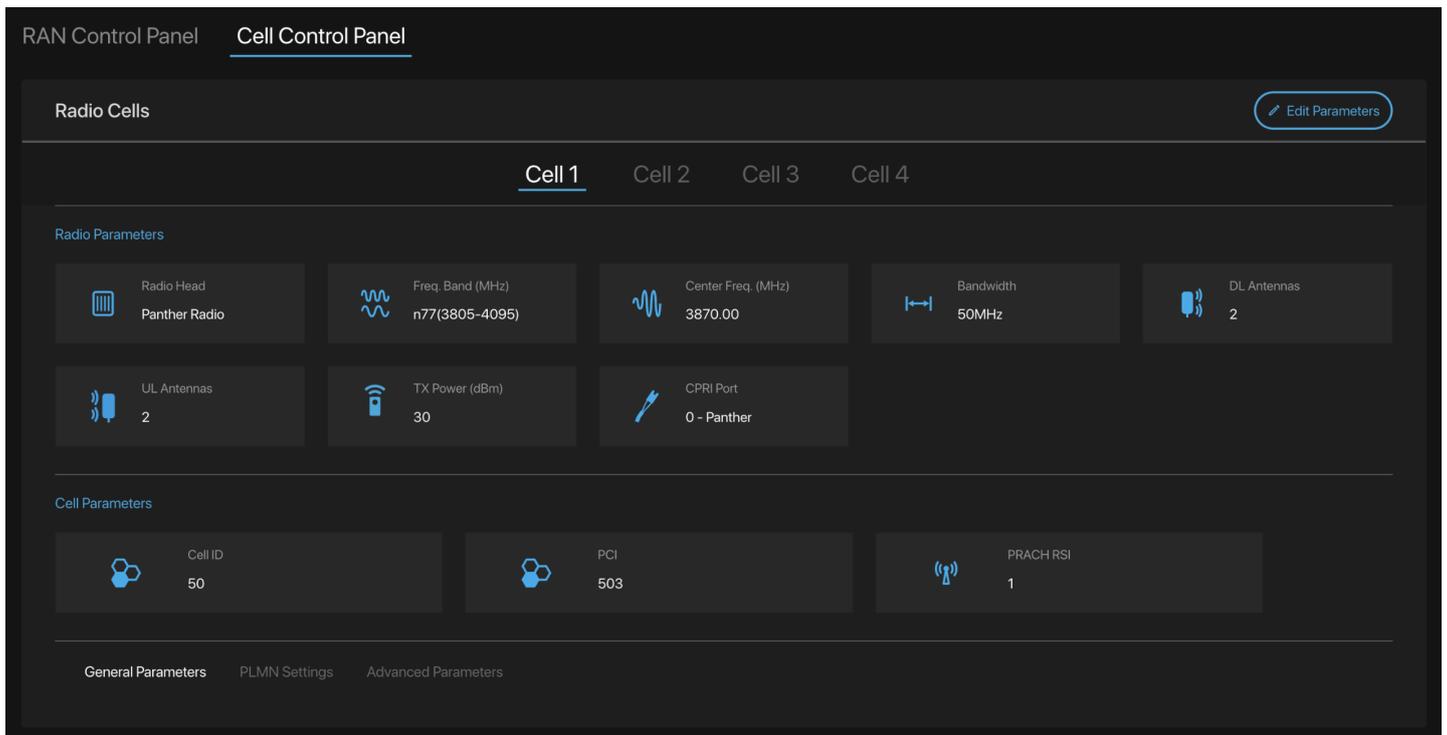
We have integrated and tested video streams using encoders from Haivision, LiveU, Sony, Vislink / Mobile Viewpoint, and OBS; and carried a mix of proprietary UDP and standardised transport protocols including Zixi and SRT. Several other non-5G-enabled encoders can be used on our networks using our 5G gateways.

HAIVISION  SONY

Intuitive Software & Documentation

Network Configuration & Monitoring

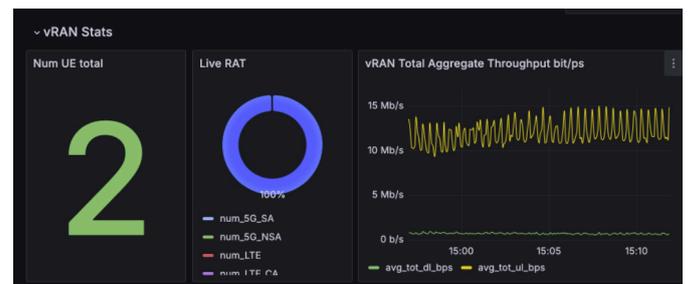
Neutral Wireless' **nibOS** network administration software provides our customers with an accessible and intuitive interface for configuring and monitoring network performance. Bundled with a comprehensive user manual and quick-start guide, nibOS gives you the power and the confidence to fine-tune your network to suit your particular use case, and to meet the parameters of your spectrum licence.



nibOS features an integrated KPI dashboard with at-a-glance health and performance monitoring and historical per-device network performance data capture.

Invaluable during live deployments, our operational dashboard allows our customers to monitor the performance of their 5G devices (such as video encoders or handsets) through metrics such as data throughput, channel quality, network status, path loss, and more.

nibOS has been built to lower the barrier to entry for private 5G network deployment and operation, and to simplify the performance monitoring process.



Training Short Courses

Hands-on Network Usage Training

To help set our customers up for success with their newly-purchased private 5G networks, Neutral Wireless offers hands-on training courses designed to get you up and running as quickly and comfortably as possible.

Delivered on your own equipment, our expert engineers will walk you through the set-up, usage, and troubleshooting procedures. We'll teach you the need-to-knows, with courses tailored to your existing knowledge level and your intended use case.



Our hands-on training courses can be delivered in our labs prior to equipment delivery, or alternatively can be delivered on-site at customer premises. We offer 1-day and 2-day variants of this course, depending on your experience level.

Professional Engineering Short-Courses

Neutral Wireless offers intensive 1-3 day courses delivered by our expert engineers in the fields of DSP, software defined radio, FPGA and RFSoc design, and wireless and mobile (5G) RAN design.

Neutral Wireless can deliver custom and concise primer courses and webinars on a number of 5G and wireless networks topics, presenting core need-to-know information in an accessible style for both technical and non-technical audiences.

Most of our courses can be delivered on-site at company premises, or via online or hybrid formats. We are happy to tailor course arrangements to suit your organisation's requirements.

Our Courses

- 5G Private Network Primer (1 day)
- Fundamentals of Digital Signal Processing (DSP) (3 days)
- DSP and Digital Communications (3 days)
- Software Defined Radio (SDR) using the RFSoc (2 days)
- FPGA Design and Implementation (3 days)
- Designing with the RFSoc Zynq FPGAs and PYNQ Workflow (3 days)

FPGA, SDR & RFSoc Consultancy

Neutral Wireless has an experienced team of engineers specialising in **embedded systems development**. We undertake work across many design areas that involve **AMD-Xilinx FPGAs** and **SDR systems**.

Embedded System Design

Our specialised engineers help clients navigate the embedded system development cycle: from capturing system requirements through to optimised FPGA design and software implementation.

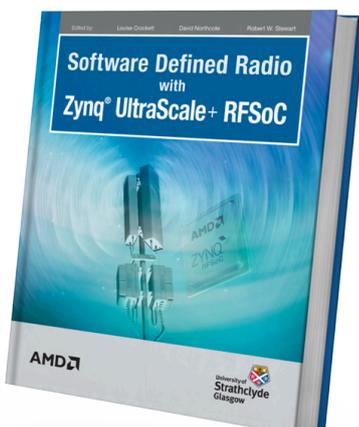


Bespoke RFSoc & SDR Design

We design and implement bespoke RFSoc systems, and work alongside clients to implement custom radio configurations that leverage the latest OFDM and 4G/5G standards. We can also provide simulation services that rapidly de-risk the development of our clients' SDR systems.

Rapid Development Workflows

Our expert engineers create custom rapid development workflows that support iterative FPGA prototyping to reduce project timescales and streamline system integration.



We Wrote the Book on RFSoc

Literally! Our engineering consultancy team was trained within the University of Strathclyde's StrathSDR research group, who collaborated with AMD-Xilinx to produce the free textbook, Software Defined Radio with Zynq® UltraScale+ RFSoc. Our team knows the RFSoc like nobody else, and can help you get your designs to where they need to be.

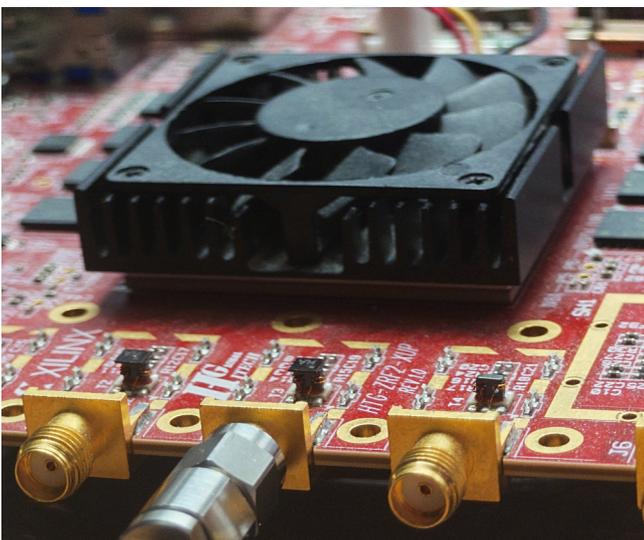
FPGA, SDR & RFSoc Consultancy

Our Consultancy Services



At Neutral Wireless, we offer a bespoke suite of services designed to meet our customers' unique requirements. Our expertise spans from conducting in-depth research and exploring new areas of interest through to the conceptualisation and creation of fully realised products. Our engineers combine deep theoretical knowledge, practical application experience, and hands-on skills in digital signal processing and wireless communications to provide world-class technical consultancy services.

Embedded Firmware Expertise



We specialise in designing embedded firmware to enhance the functionality of our customers' hardware platforms. Our expertise allows us to tailor the firmware specifically to the intricacies of the provided hardware, ensuring a seamless integration and optimal performance. Additionally, should our customers require assistance in selecting appropriate off-the-shelf hardware components to meet their unique design requirements, we offer our expertise to guide them in making informed choices that complement the firmware solutions we develop.

Neutral Wireless is a multi award-winning mobile communications company with extensive experience in the design & deployment of Private Mobile Networks, and in FPGA and Software-Defined Radio development.

Our team of specialised FPGA engineers has worked together for over a decade, and has a proven track-record of delivering projects across the globe.

Neutral Wireless offers design and integration services for various potential use cases. Our “truly-mobile” **NW Efive** solution provides a fully operational 5G standalone non-public network, and can be set up in as little as 30 minutes.



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