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SONIC LABS

End of programme impact report 2026

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Foreword

Leading the UK's shift toward open, resilient and intelligent networks

Over the past five years, the global telecommunications sector has undergone a significant transformation. Rapid technological advances, supply chain challenges, and unpredictable geopolitics have led countries to reassess their networks. In the UK, this created an opportunity to redefine national capabilities for open and intelligent networks and position itself as a global leader. SONIC Labs was launched to capture these aims.

From the outset, the goal was to offer the UK a trusted, neutral environment for rigorous Open RAN testing. We focused on accumulating evidence, maintaining engineering discipline, and building a diverse, collaborative ecosystem, while avoiding hype and assumptions. SONIC Labs has brought ideas into practice, enabling vendors to refine products through real-world integration, operators to gain confidence from repeatable, evidence-based results, and government and regulators to access insights needed for precise policy development.

A key milestone was Digital Catapult's accreditation as the UK's first Open Testing and Integration Centre (OTIC). This designation connects the UK to a global network of recognised Open RAN testing centres. Achieving OTIC status has raised the UK's international profile. Operators, vendors, and policymakers have a trusted source for repeatable, standards aligned technical validation.

I am proud of this programme's achievements, including technical breakthroughs, contributions to standards, and enhanced international credibility for the UK. Most importantly, the programme has united people to address shared challenges. This is the essence of innovation: not only creating new technology but also fostering conditions for progress.

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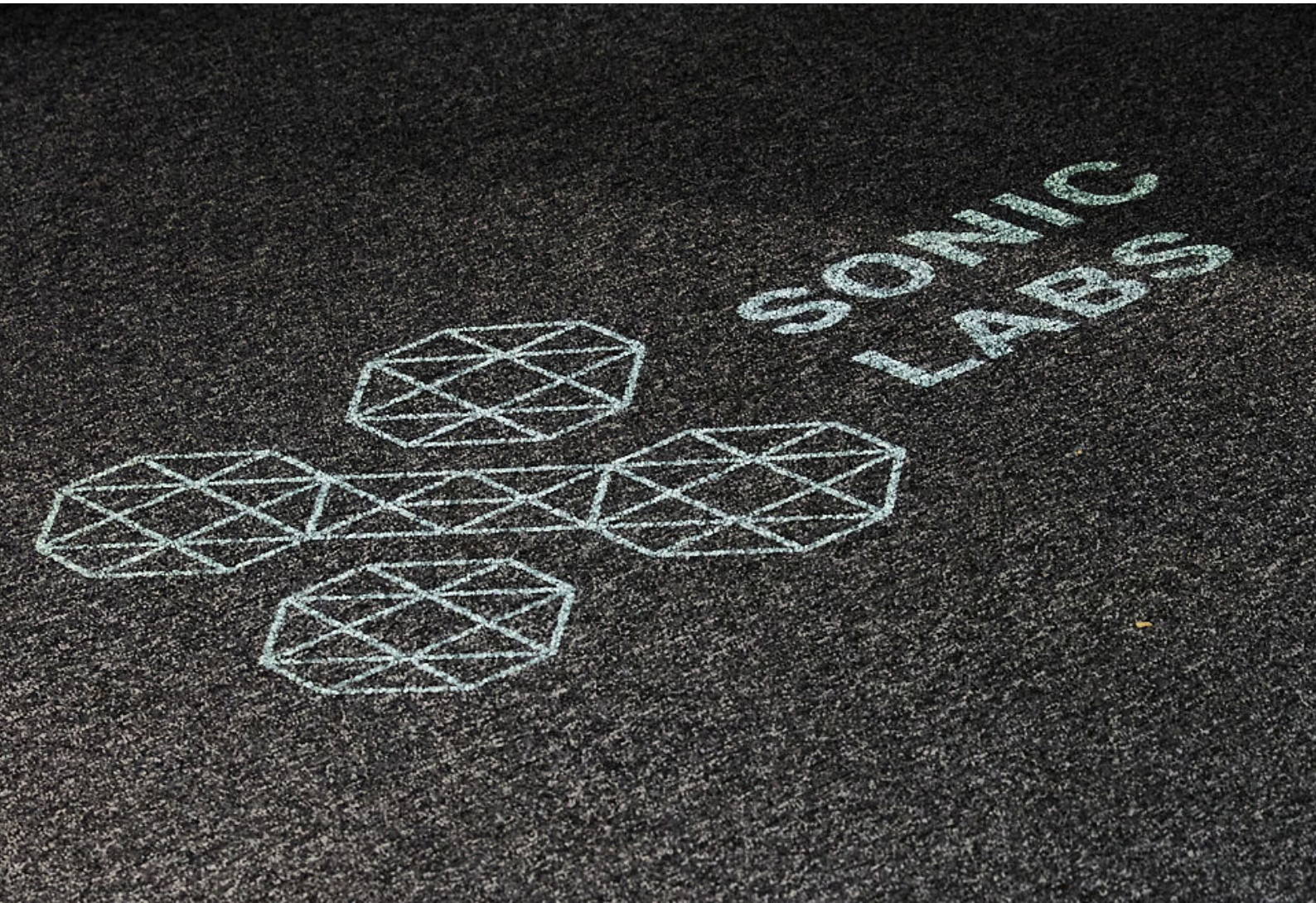
Looking ahead, this work grows more important. Open networks, AI-native architectures, energy-efficient systems, and interoperable supply chains will be key for the next decade of infrastructure. The UK now owns a globally recognised capability, aligned with strategic national priorities.

These achievements show what is possible when engineering aligns with national purpose. SONIC Labs has built a strong foundation. It is now up to industry, academia, policymakers, and innovators to build on this progress with ambition and responsibility.

Prof Dritan Kaleshi
Director of Technology,
Future Networks and Digital Infrastructure
Digital Catapult



Programme partners

Digital Catapult is a deep tech innovation organisation, accelerating the practical application of deep tech innovation to equip the UK to be future ready. It bridges the gap between industry, government, investors and academia to unlock commercial opportunities and create new market pathways for startups with pioneering solutions that drive sustainable economic growth. It enables partners organisations to think differently, build resilience and achieve success by challenging purposefully and using its expertise to equip them with the deep tech capabilities they need for the long-term.

Digital Catapult plays a pivotal role in the development of open networks in the UK by acting as a neutral convener across the telecom innovation ecosystem. It supports the transition from closed, vendor-locked architectures to open, interoperable network solutions– particularly in 5G and the evolution toward advanced connectivity technologies (ACT). By providing testbeds, lab infrastructure, and technical expertise, Digital Catapult enables UK-based firms and consortia to experiment with Open RAN technologies, validate performance, and de-risk innovation in real-world environments. This helps stimulate a more competitive supplier base, supports UK sovereignty in digital infrastructure, and strengthens resilience across critical communications networks.

Ofcom drives innovation and investment in network technologies to ensure people and businesses can access fast, reliable, and secure services. In partnership with Digital Catapult, Ofcom explored the practical implementation of Open RAN and emerging technologies to promote open interoperability in mobile networks. These insights helped shape Ofcom's priorities across policy, programmes, and regulation. To advance these objectives, Ofcom established a dedicated SONIC Labs branch within its Innovation Lab. This facility enabled concurrent Open RAN projects and supports geographically distributed deployments.

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> SONIC Labs has been a vital testbed for innovation in Open RAN products and systems. Over its lifetime, it has played an important role in exploring these technologies, understanding how they work in practice and expanding the range of suppliers that can be used in telecommunications infrastructure. We've been pleased to partner with Digital Catapult in this endeavour over the past five years. The progress made has been a valuable contribution to supporting a more diversified UK telecommunications supply chain.

Simon Burley
Technology Director, Ofcom

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Executive summary

National impact through trusted, evidence-led open network innovation

SONIC Labs: Accelerating the UK's journey towards open and intelligent telecommunications network

The Smart Open Networks Interoperability Centre (SONIC) Labs played a pivotal role in diversifying the UK telecommunications supply chain. Over the four-year programme, it strengthened the UK's advanced connectivity ecosystem and made national infrastructure more resilient, demonstrating its strategic value to the sector.

SONIC Labs was set up to address the national challenge of reducing systemic risk in a concentrated telecommunications supply chain. It aimed to create credible alternatives in a market with long investment cycles, complex integration, and high entry barriers. Since its announcement by the UK Government in 2021, SONIC Labs has been more than a "technical lab". It has served as a practical mechanism to turn policy ambition into engineering reality. It provided a trusted environment for testing and maturing open network technologies. Testing occurred under real-world conditions, beginning with Open Radio Access Networks (Open RAN). SONIC Labs offered a commercially neutral space that encouraged collaboration.

Delivered in partnership with Digital Catapult and Ofcom, SONIC Labs established the UK's first commercially neutral, multi-tenant Open RAN testing and integration facility. The programme united vendors, operators, system integrators, academia, and regulators across four interconnected sites. This openness enabled collaboration across commercial boundaries, reduced duplication and allowed technical challenges to be addressed collectively.

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> Since its announcement by the UK Government in 2021, SONIC Labs has been more than "just a lab". It has served as a practical mechanism to turn policy ambition into engineering reality.

Throughout the programme, SONIC Labs supported 27 vendors through seven interoperability testing and product maturation cohorts. There was also a dedicated Technology Access Programme. SONIC Labs conducted over 80 structured product and system-level tests. It built 50 complete Open RAN systems. These activities went beyond conformance testing. They revealed integration challenges, performance constraints, security considerations, and operational realities. Such issues are often missed in bilateral trials or paper-based assessments.

Interoperability testing accelerated product maturation. Participating vendors advanced by approximately 1.5 Technology Readiness Levels. This led to product roadmaps accelerating by six to nine months. Confidence in multi-vendor interoperability increased. For many vendors, SONIC Labs provided the first credible pathway from prototypes to deployable systems.

SONIC Labs had a tangible impact on the industry. By increasing confidence in tested systems, it lowered barriers for innovative suppliers. This included SMEs and international vendors entering the UK market. It reduced adoption risks for operators and enterprises by providing independent performance evidence and repeatable testing methods. SONIC Labs also strengthened competition. It enabled a broader and more diverse group of suppliers to take part in the UK telecommunications ecosystem. This was notable in private 5G, neutral host, and enterprise use cases. In these areas, open architectures offered valuable evidence for government and regulators.

The programme offered first-hand insights into technology, product, and vendor maturity, highlighting interoperability gaps and practical challenges in deploying open, disaggregated networks at scale. These findings grounded expectations, separated hype from reality, and informed a more nuanced view of where policy intervention could drive progress and where market challenges would persist.

SONIC Labs established a lasting national capability with international recognition. It is the UK's only Open RAN Alliance-accredited Open Testing and Integration Centre (OTIC), enhancing the UK's capacity to test, validate, and assure open architectures, specifications, and interfaces. The programme also advanced cloud-native RAN architectures and software-driven network functions. Over time, it expanded to address emerging priorities, including energy efficiency, security, and AI-assisted network functions. Consistent international inter-laboratory testing also became part of this work. SONIC Labs predicted the shift toward more intelligent, automated, and adaptive networks.

Internationally, SONIC Labs was the first of its kind. It positioned the UK as a credible and influential participant in the global open networking community. The programme made a global impact through sustained collaboration with other laboratories, operators, and standards bodies. This is shown by three multilateral Memoranda of Understanding. These have harmonised testing approaches and reduced fragmentation across markets. This engagement reinforced the UK's leadership in shaping how open networks were tested, validated, and deployed. It also ensured that UK perspectives informed global practice, rather than merely reacting to it.

Perhaps most importantly, SONIC Labs demonstrated the conditions under which open network innovation can succeed and deliver impact. It showed that using interoperability testing to engage vendors and accelerate product maturation in multi-tenant networks was the right decision. The programme also showed that interoperability testing requires patient, engineering-led collaboration. Neutral and trusted environments are essential to building confidence in pre-commercial engagements. Successful deployment depends on early and sustained alignment between technical development, commercial models, and regulatory frameworks. These lessons will extend beyond Open RAN and SONIC Labs.

As the telecommunications sector moves toward software-defined, AI-enabled, and automated systems, the experience and community developed through SONIC Labs provide a foundation for future progress. The programme's efforts strengthened supply chain resilience, accelerated innovation, and turned strategic intent into lasting national capability. The next challenge is to build on these successes to support the UK's advanced connectivity ambitions.

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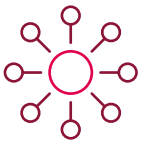
Delivering impact: Key outputs

SONIC Labs delivered several important outputs that strengthened both UK capability and the broader Open RAN ecosystem:



Demonstrated multi-vendor integration and performance

First-of-its-kind demonstrations of interoperability, mobility, scalability, outdoor operation, and system verification helped clarify standards sufficiency and deployment readiness.

The UK's primary Open RAN test and research facility

The programme enabled innovative suppliers to validate products, work with others, and accelerate commercial preparedness.

High-value technical outputs

Integration reports, upgraded lab infrastructure, and peer-reviewed publications provided practical insight into real-world Open RAN performance.

OTIC designation

Digital Catapult named as the UK's first and only Open Testing and Integration Centre (OTIC), strengthening national ability to verify open interfaces and support standards-based adoption.

Developed a national Community of Practice

Training, webinars, and shared learning activities supported capability building across the supplier base.

Supported future network technologies

Collaboration with international partners positioned the UK to assess cloud-native RAN, AI-enabled functions, hybrid architectures, and advanced security techniques.

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Smart Open RAN Network Interoperability Centre participants (2021-2026): Open RAN interoperability & end-to-end testing

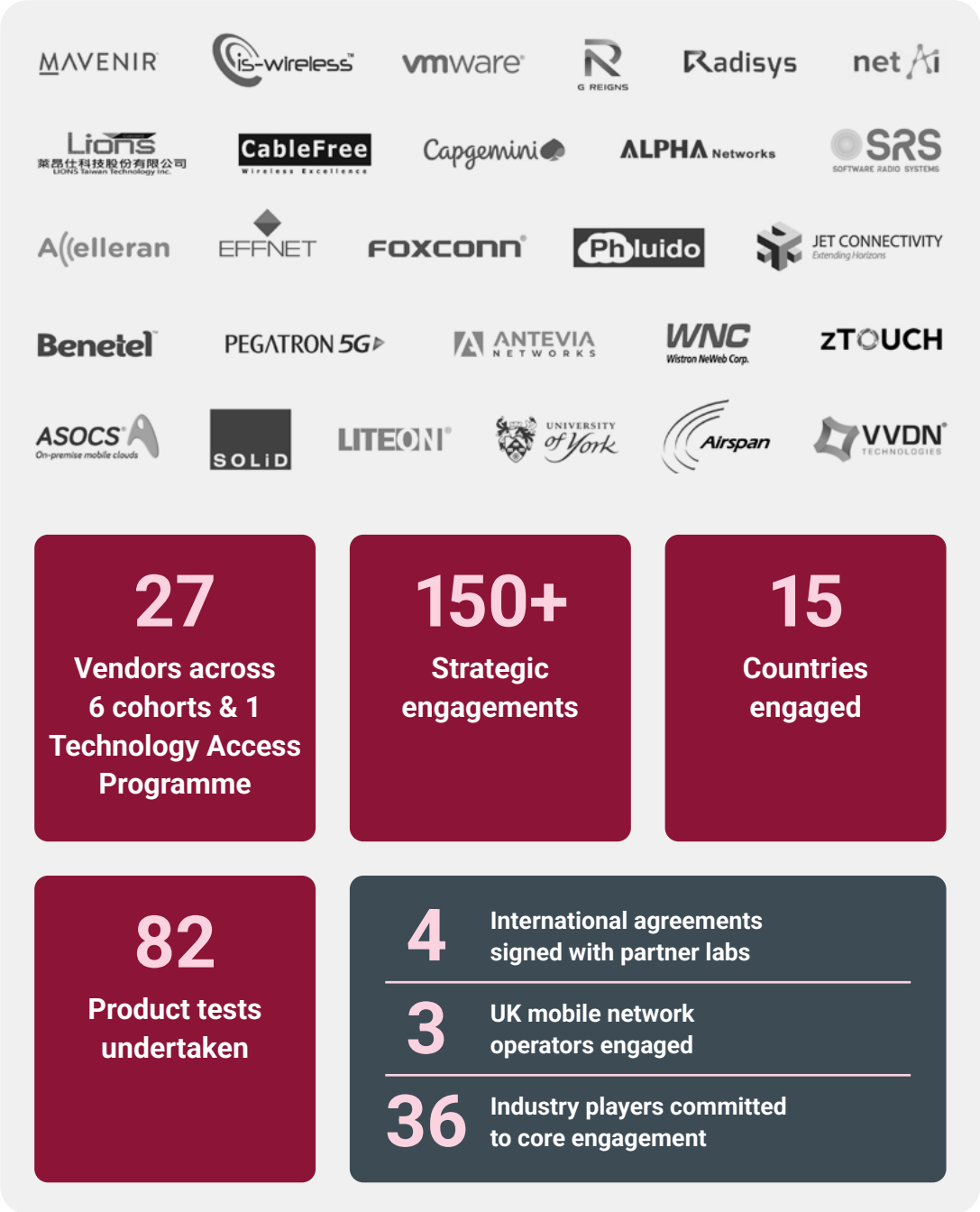

Figure 1: Smart Open RAN Network Interoperability Centre participants (2021-2026): Open RAN interoperability & end-to-end testing

In partnership with Ofcom

Funded by Department for Science, Innovation & Technology

Introduction and background

Building the strategic foundations for the UK's future-ready open network capability

STRATEGIC RESPONSE

Open RAN technology was developed to address vendor concentration, supply chain risks, and limited innovation in mobile networks. SONIC Labs was set up to accelerate the development of Open RAN products from new, trusted suppliers and to provide credible evidence of their maturity.

INDEPENDENT VERIFICATION

Digital Catapult and Ofcom established a test programme, with support from the Department for Science, Innovation and Technology (DSIT), to examine Open RAN in real-world conditions, positioning SONIC Labs at the intersection of policy, regulation, and engineering.

RELIABLE EVIDENCE

Open RAN technology is key to diversifying the UK telecommunications market. The SONIC Labs programme provided insights that informed policy, regulatory, and deployment decisions, significantly advancing the technology.

Why SONIC Labs was established

In the early 2020s, the UK telecommunications sector faced structural pressures that threatened network resilience, competition, and long-term innovation. These challenges influenced investment decisions, the viability of alternative suppliers, and the information available to lawmakers and regulators during a critical transition.

Global telecommunications supply chain constraints intensified as the UK's National Cyber Security Centre (NCSC) imposed restrictions on high-risk vendors (HRVs)[1,2] to safeguard national security and network resilience. This reduced the supplier base for Radio Access Network (Open RAN) technologies, resulting in a de facto duopoly in the UK market. Reliance on a few incumbent vendors decreased competition during a period of rapid 5G deployment and network modernisation.

By late 2020, the Department for Culture, Media and Sport (DCMS) —now under DSIT—released its '5G Supply Chain Diversification Strategy'[3]. Its aim was to build a more competitive and diverse supplier base that would enhance network quality, drive innovation, and strengthen the resilience of UK telecommunications networks. It focused on:

- Supporting incumbent suppliers to ensure their resilience and ability to supply the market in the near term, while easing their transition to the emerging market structure.
- Attracting new suppliers to the UK market to build resilience and competition, with a focus on deployments aligned with the government's long-term vision.
- Accelerating open-interface solutions and deployment to reduce reliance on any single vendor and advance the long-term vision for a more open and innovative market.

The strategy highlighted open-interface solutions, such as Open RAN, as essential for diversification. The UK's Government and Mobile Network Operators (MNOs) share the goal of achieving 35%[4] of UK mobile network traffic using open and interoperable RAN architectures by 2030.

[1] Factsheet 3: New National Security Powers (High Risk Vendors)
[2] Roadmap to remove high risk vendors from telecoms network
[3] 5G Supply Chain Diversification Strategy – GOV.UK
[4] https://www.gov.uk/government/publications/open-ran-principles-memorandum-of-understanding-between-government-and-industry

Achieving this long-term vision requires addressing barriers to market entry for new suppliers, investing in research and development (R&D) to accelerate interoperable technologies, and strengthening international collaboration between governments and industry. While Open RAN became strategically important in other regions, it was still considered operationally immature and had not proven consistent, production-ready performance at scale in complex, real-world networks.

Open Radio Access Networks (Open RAN)

An innovative approach to building mobile networks that disaggregates traditional, monolithic systems into separate hardware and software components, connected by open, standardised interfaces, allowing operators to mix-and-match equipment from different vendors, fostering competition, innovation, and supply chain diversity.

Nonetheless, policymakers, operators, and the broader ecosystem agreed that Open RAN could enhance vendor diversity, increase system flexibility, and drive innovation by decoupling hardware and software to enable multi-vendor architectures. Expectations around interoperability, cost reduction, and deployment timelines, however, varied and were often based on limited or vendor-specific evidence.

Evidence gap

There was a critical lack of trusted, neutral environments for holistic evaluation of Open RAN technologies. Most integration and testing occurred in vendor laboratories or bilateral operator-led trials, limiting transparency and comparability across vendors, architectures, and deployment scenarios. This resulted in an evidence gap, as decision makers lacked independent, system-level data on performance, operability, and readiness for various use cases.

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As a result, policymakers and regulators had limited evidence when making decisions on supply chain diversification, standards evolution, and long-term regulatory approaches, all of which carried significant economic and strategic implications. Operators also lacked credible insights to support investment decisions, and smaller vendors faced challenges demonstrating viability in end-to-end network environments.

The SmartRAN Open Network Interoperability Centre (SONIC) Labs programme was created to address this gap. Its purpose was not to advocate for a specific technology outcome, but to generate trusted, real-world data and coordinate action across government, industry, and the research community. By providing a neutral, multi-stakeholder laboratory environment, SONIC Labs enabled systematic integration, testing, and learning beyond what market forces alone could achieve.

In this context, the UK Government's creation and support of SONIC Labs was justified to reduce risk in experimentation, support evidence-based decision making, and accelerate the transition from strategic ambition to practical deployment.

> SONIC Labs was established in response to significant change and uncertainty in the UK's telecommunications supply chain, ensuring that future decisions would be based on empirical evidence rather than assumptions.

Open RAN landscape

Before SONIC Labs launched, the telecommunications industry was uncertain about Open RAN's ability to transition from early trials to reliable, commercially viable deployments.

This gap in confidence highlighted the importance of demonstrating the benefits of an open, interoperable system that include:

Vendor diversity and competition

Reduced reliance on a few major suppliers enables mixing components, such as sourcing radios from one supplier and software from another.

Lower costs

Increased competition and the use of general-purpose hardware could lead to a reduction in both capital and operational expenses.

Faster innovation

Open ecosystems attract new participants and accelerate the introduction of new features and technologies.

Supply chain resilience

Vendor diversification reduces geopolitical risks and security vulnerabilities.

Flexibility and scalability

Modular, disaggregated architecture allows easier upgrades and adaptation to evolving requirements.

Enhanced performance

Artificial Intelligence and Machine Learning (AI/ML) support network optimisation, improving user experience and operational efficiency.

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Many agreed a strong 5G ecosystem should aspire to deliver commercially ready Open RAN products. This led to a set of principles for building a standards-based interoperable architecture, including:

- Open interfaces.
- Functional and hardware/software disaggregation.
- Standard-based compliance.
- Neutral testing of solutions against standards.
- Demonstrated interoperability.
- Implementation neutrality.

Previously, tightly linked hardware and software slowed innovation, complicated upgrades, and increased network expansion costs. Open RAN addresses these issues by separating RAN functions and using flexible computing platforms from a mix of suppliers.

The expansion of 5G welcomed applications such as enhanced mobile broadband, ultra-reliable low-latency communications, and large-scale machine-type communications. Legacy RAN architectures proved increasingly inflexible, while Open RAN technologies were expected to support modular deployments, resource pooling, and improved edge automation.

Since 2020, significant changes in mobile networks and the broader telecom sector have introduced new ideas and progress. However, these shifts also slowed the adoption and development of Open RAN in both business and operations. Key pressures included:

- The prioritisation of established suppliers after the removal of HRVs. This likely stabilised the market, but with the number of main vendors dropping from three to two, concerns over monopolies grew. Still, these established companies saw Open RAN as a threat they could manage.
- A misalignment with the investment cycle. Most Tier 1 operators committed to their primary 5G macro-RAN contracts between 2018 and 2020. As Open RAN components achieved higher TRLs, opportunities for large-scale replacements declined.
- The time between early trials and full-scale deployment making it hard for new Open RAN vendors to earn steady revenue. Without access to big contracts, they faced cash flow problems and sometimes cut back, merged, or left the market entirely.
- Focus from operators in existing networks shifting from openness to energy efficiency, integration risks, support, compatibility with old systems, and stability.
- Incumbents using their strong media presence to influence industry perceptions in the market while planning a limited Open RAN response. In 2024, instead of being replaced, the established suppliers added Open RAN features like open fronthaul and RIC to their offerings. This changed the market but failed to increase the number of suppliers.

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How Open RAN evolved during SONIC Labs

To keep up with these pressures, SONIC Labs worked closely with the telecommunications sector and adjusted its operations and goals as needed. Since 2021, Open RAN technologies progressed from early proofs of concept to deployable, reliable, high-TRL products and solutions.

Open Fronthaul integration moved from trials to repeatable field deployments, with integration timelines falling as testing frameworks matured. Virtualised RAN (vRAN) also steadily progressed. Elsewhere, Open RAN was being discussed as an AI-Native, future-ready platform, and importantly that the sector leveraged the high Core count of Intel's latest Xeon 6 processor to deliver single-server baseband solutions without the need for external accelerator cards.

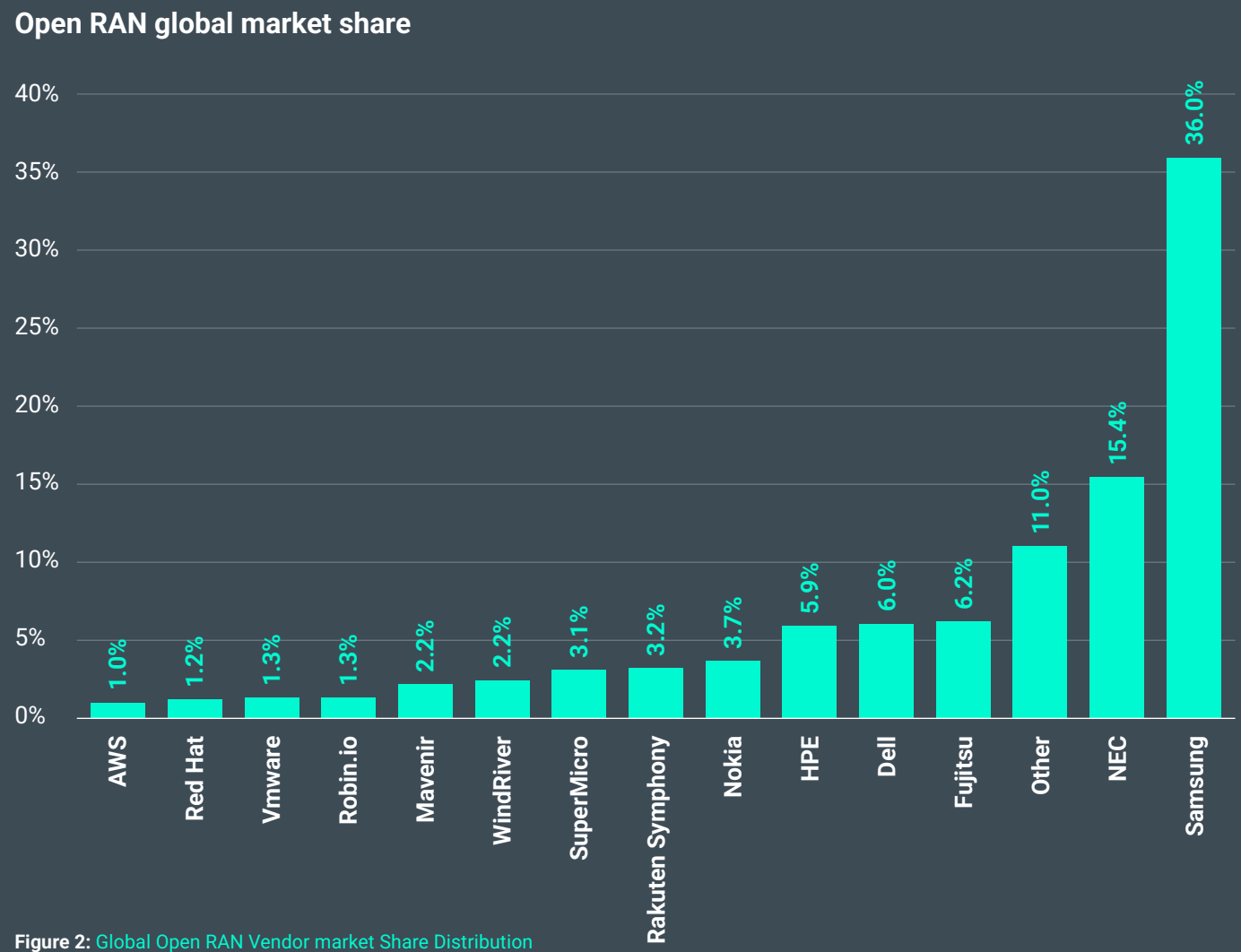


Figure 2: Global Open RAN Vendor market Share Distribution

The chart above illustrates that Open RAN has entered early commercialisation, though adoption remains uneven. Asia-Pacific currently leads global deployment, supported by large-scale 5G investment and proactive industrial policies. Whilst North America follows as a major innovation hub, with Europe advancing through gradual, targeted rollouts. Overall, Open RAN still represents a minority of the total RAN market, with traditional suppliers retaining dominant share.

Within the Open RAN architecture, the RAN Intelligent Controller (RIC) introduced standardised interfaces that supported more open and multi-vendor optimisation approaches compared to traditional, vendor-specific RAN management systems. Where deployed, it can enable near-real-time and non-real-time optimisation workflows, including AI-driven use cases.

On the business side, the global telecommunications industry moved from seeing Open RAN as a full replacement for traditional RAN to using it for specific, targeted needs.

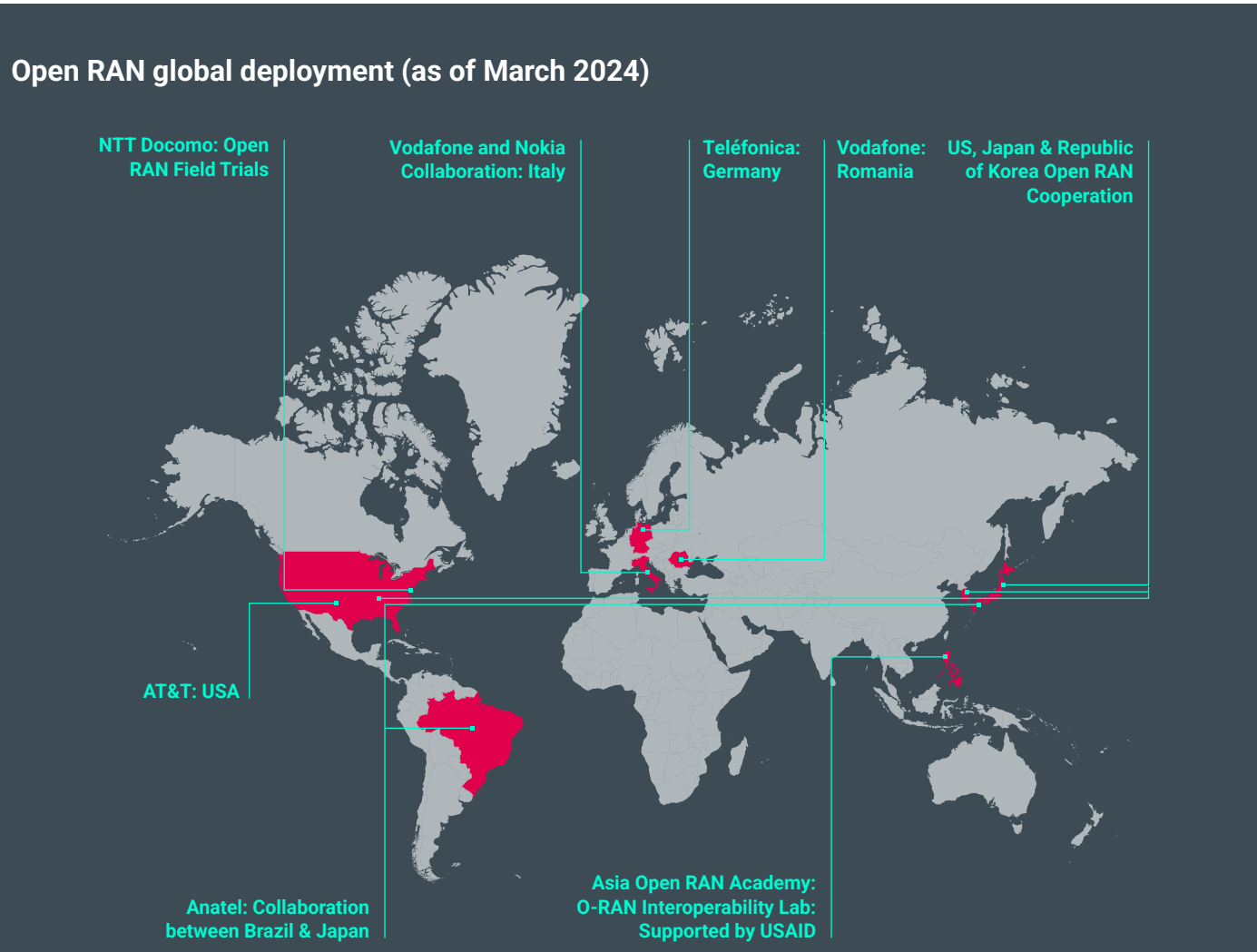


Figure 3: Open RAN deployment has been growing globally led by industry and government programmes

US-based telecommunications giant AT&T put systems integration responsibility on their major vendor, alongside clear third-party expectations. AT&T's Network CTO Yigal Elbaz said: "AT&T's strategy is multi-vendor. Besides Ericsson, AT&T is using software and hardware from Fujitsu's 1Finity division, Dell Technologies, and Intel." This was delivered in a stepwise programme to bring in new vendors.

Meanwhile, in a similar approach to AT&T, Telus Canada put systems integration responsibility on to Samsung, but it immediately set out to build resilience and competition by setting aside 50% third-party oRU delivery and has already put more than 5,000 third-party oRUs in service.

While MNOs made slow progress in adopting Open RAN in dense urban environments, brownfield operators increasingly used the technology for densification, private and enterprise networks, in-building coverage, neutral host deployments, and system lifecycle refreshes. Elsewhere, established vendors started to compete by offering more openness, better performance, and stronger integration support within an Open RAN framework.

See Appendix 1 for further information.

What SONIC Labs demonstrated

To navigate the dynamic ecosystem, six successive cohorts (plus a pilot) were onboarded during the SONIC Labs programme (Appendix 6) to conduct Open RAN integration over open interfaces (Fronthaul, E2, O1, and others) and to perform end-to-end performance evaluations. This approach led to more vendors and products being tested and enabled faster transition from early concepts to field-ready designs for small-cell and private networks, which are key to expanding coverage.

Open RAN development in SONIC Labs led to larger structural changes in the telecom sector. Although these can take time to materialise within large-scale industry transitions such as this, progress made through SONIC Labs laid the groundwork for future network growth and gave more clarity for technical and business decisions. SONIC Labs shaped the industry by testing ideas in real-world settings, adjusting expectations, and focusing on practical results instead of just promoting Open RAN.

At the end of the SONIC Labs programme, Open RAN was seen more as a set of evolving tools and methods to transform network construction and operation, rather than a single solution. At the FYUZ 2025 event in Dublin, Steve Papa of Parallel Wireless noted that, while Open RAN did not displace incumbents as intended, it succeeded in fostering innovation, a core principle of the SONIC Labs programme and Digital Catapult. A Samsung presentation[5] also highlighted that Open RAN networks enabled and amplified Telco AI and AI-RAN.

SONIC Labs objectives

The programme's overarching goals were to:

- Examine the reality of Open RAN and relevant technologies to facilitate open interoperability in mobile networks. This included standards sufficiency, vendor support, and interpretation of those standards and performance in realistic use cases to support policy and regulation and to improve its uptake through learning.
- Encourage innovative vendors to take part in the UK ecosystem and facilitate a more rapid path towards deployment in UK networks, providing UK operators (large and small) with a pipeline of innovative and effective vendors and products to choose from.
- Evaluate critical and longer-term advanced technologies in mobile, fixed and media networks, such as those identified in Ofcom's Technology Futures report[6], to enable prioritisation of technologies for further acceleration and support.

Programme phases

Phase 1
May 2021

Facility established

Phase 2
2022-24

Integration initiatives

Additional third year
2024-25

Innovation extended

Fourth and final year
2025-26

Certification introduced

[5] Samsung AI-RAN Presentation 111125.odp

[6] https://www.ofcom.org.uk/internet-based-services/technology/emerging-technologies

The SONIC Labs programme was conducted over two distinct phases. Phase 1, from May 2021, was set up to build a real-world UK public multi-vendor Open RAN open network facility on top of the existing Digital Catapult 5G testbed, followed by experimentation and results sharing.

This established the foundation for Phase 2 from 1 February 2022 to 31 January 2024. Phase 2 looked to support the aims of the Government's '5G Supply Chain Diversification Strategy' by:

- Enabling and encouraging suppliers of 5G Open RAN products to take part in the UK telecommunications ecosystem and provide MNOs with innovative and competitive suppliers and products.
- Facilitating widespread interoperability testing and collaboration across suppliers' products with a view to increasing technical knowledge of Open RAN performance and across the ecosystem and mitigating the risk of vendor lock-in in on future networks.
- Examining the reality of Open RAN and successive relevant technologies to facilitate open interoperability in mobile networks.
- Becoming a new, trusted national capability of Open RAN performance and interoperability testing and establish a well-informed position within the UK ecosystem as a hub of industry engagement into the UK's Open RAN capabilities.
- Encouraging growth and investment in the UK telecom sector, building UK telecommunications skills and expertise, promoting the development, integration, management and operation of open and disaggregated multi-vendor networks.
- Supporting international companies to participate in the UK Open RAN market and collaboration with other international Open RAN facilities.

An additional third year (2024-25) of Phase 2 focused on exploiting the investment and capability built in the previous two years to extend the intended outcomes of the programme. It aimed to enhance the engagement with MNOs as the programme and Open RAN technology matured by considering scale indoor and outdoor field trials, O-RAN Alliance testing specifications, Massive MIMO, network management and orchestration systems. In addition to the cohort activities, a Technology Access Programme (page 44) was set up to incentivise innovative Open RAN application development.

The final year (2025/26) looked to both continue the impact of the original programme, to address challenges in international harmonisation, and boost confidence in product assurance. It included Cohort 6, which focused on establishing an Open RAN certification and badging capability, producing technical studies exploring new directions of open network interoperability, contributing to standards, extending market engagement, building strategic partnerships and international collaboration.

The SONIC Labs model

> The SONIC Labs operating model was built around a collaborative, vendor supported, neutral testing environment operated by Digital Catapult with Ofcom, which further contributed to the programme with technical expertise and a dedicated lab facility.

Digital Catapult managed the facility, provided shared infrastructure, defined testing and integration methodologies, and coordinated the scheduling, governance and support needed for multi-vendor engagement. Vendors brought their products to be integrated and tested at the appropriate stage of maturity, with technical engagement carried out jointly by vendor engineers and SONIC Labs experts.

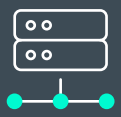
Different Open RAN technology integration models were used, including vendor-led, system integrator-led or in-house integration from SONIC Labs, depending on the technology and capabilities involved. Results were shared collaboratively with participating vendors, which preserved confidentiality while feeding insights back into the ecosystem.

SONIC Labs was intentionally aligned with national telecommunications initiatives. It linked upstream research and early-stage technology development to formal testing, security evaluation and downstream deployment activities through alongside the UK Telecommunications Lab (UKTL) and other UK Government programmes.

This ensured SONIC Labs acted as a central national capability for development stage integration, interoperability testing and innovation, while complementing other parts of the UK telecommunications capability landscape.

Description of workstreams

The SONIC Labs programme was delivered through six interconnected workstreams that provided the technical, operational and ecosystem foundations of the facility:



Workstream 1 – Design, build and operation

Designed, built and operated the shared testbed infrastructure, including distributed compute, virtualisation, RAN, core and management platforms. This allowed for a stable, representative environment for vendor engagement.

Workstream 2 – Integration, interoperability, operational test and measurement

Managed vendor onboarding, product integration and end-to-end interoperability testing. It defined methodologies, automation frameworks and campaign designs that underpinned technical credibility and knowledge generation.

Workstream 3 – Open network technology innovation platform

Extended SONIC Labs' role into wider innovation by supporting emerging companies developing open network technologies. Enabled innovators to prototype, validate and progress solutions using the SONIC Labs facilities, helping to build a pipeline of technologies and participants feeding the broader UK telecommunications ecosystem.

Workstream 4 – Stakeholder relationships and external governance

Led on ecosystem engagement and strategic partnerships with operators, vendors, research organisations, government bodies and international stakeholders. It ensured SONIC Labs remained in step with industry needs and contributed to national and international development.

Workstream 5 – Programme management, governance and operation

Oversaw programme management, financial and operational governance, risk management and the day-to-day processes that kept the facility running effectively.

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> Ultimately, the unique value of SONIC Labs lay in its ability to bridge the gap between early-stage innovation and real-world telecommunications deployment. Its unique positioning provided capabilities that no single operator, vendor or research facility could offer alone.

It enabled technologies to be developed, validated and integrated in a representative, multi-vendor environment—accelerating innovation, reducing risk and strengthening the resilience and diversity of the UK telecommunications supply chain. This made SONIC Labs more than a testing facility: It was a nationally strategic capability for open network adoption and market-ready innovation.

For detail of the programme budget please refer to Appendix 2.

UK Government

SONIC Labs was a key facilitator of the '5G Diversification Strategy' and supportive of DSIT's priorities in this sector. Advanced Connectivity Technologies (ACT) remain a technology priority for the UK Government, reflecting its commitment to deliver change and improve lives by unlocking the full potential of science and technology. Central to this ambition is the objective of embedding the right connectivity across both new and existing infrastructure, ensuring that telecommunications networks support digital inclusion, national security, economic resilience, and long-term sustainability.

As part of its 'Industrial Strategy', delivered through the 'Digital and Technologies Sector Plan'[7], the Government has continued to invest in ACT as a critical enabler of growth and competitiveness. From 2022, over £300 million was invested to promote R&D through programmes such as the 'Open Networks Programme and the Technology Missions Fund'.

[7] https://www.gov.uk/government/publications/digital-and-technologies-sector-plan

This investment supported the development of nationally significant capabilities, including the establishment of the UKTL, the UK Telecoms Innovation Network (UKTIN), and SONIC Labs, the creation of Federated Telecoms Hubs, and the launch of a Centre for Doctoral Training in Future Open Secure Networks. Together, these initiatives strengthen the UK's ability to innovate, test, and deploy next generation telecommunications technologies while building long term skills and expertise.

The Government reaffirmed its commitment to strengthening telecommunications infrastructure through the '10 Year Infrastructure Strategy'[8], setting out a series of actions designed to accelerate deployment and reduce systemic barriers. DSIT's support for real world Open RAN trials creates tangible progress against the challenges facing the sector, including network performance, integration complexity, and sustainability. In this context, SONIC Labs played a pivotal role by providing robust, independent validation capability.

By identifying and addressing risks during the transition from pilot projects to commercial deployment, SONIC Labs accelerated the practical implementation of government objectives. In doing so, SONIC Labs enhanced the UK's global position in telecommunications innovation, reinforced the country's resilience across critical national infrastructure, and helped ensure the UK is still a leader in open and interoperable network standards.

> Over the past few years, SONIC Labs has played a pivotal role in shaping how the UK approaches open, interoperable, software-driven networks. It has been a testbed, a convening space, a source of hard-won industry insight, and a catalyst for work on supply chain diversification across our telecoms sector.
>
> **Tom Eland**
> **Deputy Director for Technology, Spectrum and Strategy, DSIT**

[8] UK Infrastructure: A 10 Year Strategy

QUICK LINKS

Timeline of Government support:

2020
- ‘5G Supply Chain Diversification Strategy’ announced.
- Formulation of the Telecoms Diversification Taskforce.
- Open Networks programme launched.

2021
- Taskforce report published, government response.
- Creation of SONIC Labs.

2022
- The £250 million ‘Open Networks Research and Development Fund’ created by DCMS to accelerate open interface architectures.

2023
- ‘Wireless Infrastructure Strategy’ announced.
- DSIT awards £88 million for research and development across 19 projects as part of the Open Networks Ecosystem (ONE) Competition for innovative connectivity.
- Joint ambition also set for 35% of UK network traffic to use open interoperable RAN by 2030.

2024
- Telecommunications Supply Chain Diversification Advisory Council’ report published[9].

2025
- ‘Government Statement on Telecommunications Supply Chain Advisory Council Report’[10] and ‘Digital and Technologies Sector Plan’[11] published as part of the Industrial Strategy.

[9] https://www.gov.uk/government/publications/telecoms-supply-chain-diversification-report-and-recommendations

[10] https://www.gov.uk/government/publications/government-response-to-the-telecoms-supply-chain-diversification-advisory-council-report/government-response-to-the-telecoms-supply-chain-diversification-advisory-council-report

[11] https://www.gov.uk/government/publications/digital-and-technologies-sector-plan

External influences & drivers

The forces shaping the UK's Open RAN future

MARKET FORCES

Progress in Open RAN technology was shaped by market consolidation, maturing standards, geopolitics, energy pressures, and regulation. Understanding these helped to explain why some ambitions advanced while others stalled, and how the SONIC Labs programme refined its scope and priorities as conditions changed.

SHIFTING EMPHASIS

SONIC Labs was created to support and accelerate maturation and provide credible evidence of new products to support UK strategic objectives. To achieve this, it introduced structured frameworks to identify where intervention would be most effective, shifting its emphasis from pure interoperability to real-world deployability.

ADAPTIVE PROGRAMME

Amid a shifting geopolitical environment and technological development towards macro networks, SONIC Labs adapted its focus to high-growth areas to remain relevant, evidence-led and value driven.

The 5 forces influencing Open RAN and SONIC Labs

Geopolitics & national security

The removal of HRVs from the UK's telecommunication market and national security priorities meant more trusted and scalable suppliers were needed.

Market structure & economics

MNO market consolidation slowed investment cycles and reduced Capex on infrastructure upgrades.

Technology maturity & standards evolution

Risk-averse MNOs shied from adopting new technologies. Confidence-building testing and certification was essential to shift from PoCs to deployable systems.

Global innovation & international government action

Initiatives from other governments highlight the growing effort to advance Open RAN ecosystems globally.

Regulatory & policy direction

Increasing Open RAN ambition and usage caught the attention of Ofcom and the government.

> Between 2021 and 2026, key forces reshaped the UK RAN landscape: geopolitics, consolidation, standards maturity, and increasing pressure on operator economics. Throughout this period SONIC Labs proactively assessed these and refined its scope where intervention could make the greatest impact—shifting from experimentation to deployability as the ecosystem matured.

External factors

The UK Government's decision to restrict and ultimately remove High-Risk Vendors (HRVs) from national networks fundamentally reshaped operator strategy and accelerated the need for vendor diversification.

Meanwhile, ambitions outpaced technical and operational readiness. As the global Open RAN market grew rapidly—reaching $6-7 billion by the mid-2020s and it is predicted to continue growing at around 30% a year on average[1]—deployment at scale in the UK proved more complex than expected, particularly in macro networks. The combination of these factors created a strategic gap in the UK telecommunications market. Operators pursued diversification before such alternatives were fully deployable, creating heightened risk, slowing adoption and placing a stronger reliance on independent evidence and assurance.

As Open RAN technologies matured, early interoperability and experimentation shifted towards performance, stability, energy efficiency, and deployability. The focus transferred beyond macro networks to include small cells, private networks, and neutral-host environments—areas where Open RAN technologies showed earlier and clearer value.

[1] Open RAN Market Size, Share, and Industry Analysis

Demand-side barriers to Open RAN adoption

The HRV exclusion, along with an industry-wide push to diversify suppliers, forced MNOs to reconsider their network upgrade and expansion strategies. This challenge was intensified by two further external pressures: handset manufacturers raised the prices of new devices, while consumers became more cautious due to the "cost-of-living crisis". As a result, operator margins were squeezed, reducing their willingness to pursue ambitious or experimental investments, including early large-scale commitments to Open RAN.

Market consolidation then slowed decision cycles and Capex further. The VMO2 merger (2021) and Vodafone–Three (2025) mergers created integration pauses, and they prioritised swap outs over network densification or architectural change. In fact, during this period many operators pivoted toward efficiency- focused Capex, lengthening upgrade cycles.

Strand Consult noted that operators "must hold back on critical capital decisions while authorities assess the merger request", contributing to delays in 5G rollout and upgrade activity. At the same time, Dell'Oro reported that global RAN spending tapered in 2023–2024 as operators shifted toward efficiency-focused Capex rather than expansion, leading to slower upgrade cycles during this period.

With HRVs removed, Nokia and Ericsson were considered the only proven large-scale suppliers capable of nationwide deployments at the required pace. While Open RAN was not explicitly excluded during this period, awarding large national contracts to vendors without proven deployment at scale was difficult to justify, especially given the lack of mature multi-vendor Open RAN or vRAN rollouts.

As with other regulatory factors, clearer policy direction often determines whether operators are willing to take on new risks. Market consolidation, supply chain constraints, conservative procurement practices, and ambiguous national targets significantly influenced the pace and scale of Open RAN adoption in the UK.

Supply-side barriers to Open RAN adoption

Changes on the supply-side over recent years, with the emergence of a duopoly of suppliers, highlighted the need for a more resilient, interoperable, Open RAN-based network. Samsung emerged as a credible Open RAN supplier, with over 53,000 multi-vendor Open RAN and Open RAN-ready vRAN sites.

Building on this, at the FYUZ 2024 industry event, AT&T's VP of RAN Technology, Robert Soni, confirmed a "small cells first" strategy linked to Open RAN, which can be supported by Fujitsu's 1Finity platform supply of mini macro oRUs to AT&T with macro-grade units expected by 2026.

Further evidence that the Open RAN oRU market is supported by multibillion-dollar corporations, and solely not limited to early-stage firms, is demonstrated in Dell and HPE jointly delivering over 40,000 sites worth of vRAN infrastructure demonstrating a scalable ecosystem. While UK deployments remain small, the global supply chain is now robust and capable of delivering at scale.

Standards

Since 2021, Open RAN standards evolved from early ideas into a stable, widely used framework that now supports real-world deployments. The O-RAN Alliance expanded and strengthened its specifications giving operators and vendors a more reliable foundation to work from. Maturing the standards landscape was essential in turning Open RAN into a practical option for national telecommunications networks.

Extensive testing and certification became important as a result. Concerns from traditional vendors around performance, energy efficiency and operational complexity pushed the industry to refine specifications and improve how multi-vendor systems interoperate. The broader shift toward cloud-based and AI-assisted networks also shaped the direction of standards, aligning them with the way modern telecommunications infrastructure is now designed and operated.

As of early 2026, Open RAN was recognised not just as "open" but increasingly as "open and intelligent" thanks to its alignment with automation, cloud-native design, and emerging advanced connectivity thinking. While differences remain between the needs of nationwide operators and specialised private networks, the direction of travel is clear. The combination of maturing standards, growing ecosystem alignment, and real-world validation through environments like SONIC Labs has firmly positioned Open RAN as a viable, standards-driven architecture for the next generation of networks.

Products

A core ambition of SONIC Labs was to accelerate a diverse, open, and competitive telecommunications supply chain. Central to this is improving the availability of products. Enabling multi-vendor interoperability removes long-standing barriers that limited customer choice and constrained innovation.

Traditionally, operators were locked into vertically integrated systems where only a subset of products from a single vendor could be deployed. If that vendor did not produce a required component, the operator simply had no viable alternative. This often led to deployment delays, unmet coverage targets, and strategic frustrations.

Open RAN changed this. By disaggregating hardware and software and standardising open interfaces, vendors can build modular products designed to interoperate with others. Cost pressures pushed suppliers further towards cloud-native, software-centric solutions, increasing flexibility and scalability.

With Open RAN, the effective choice for operators grows substantially. A product previously unavailable from an incumbent vendor may now be sourced from several others, with little integration effort required. This avoids scenarios where operators perceive the incumbent as unresponsive or vulnerable to being swapped out. Instead, all vendors—including incumbents—can benefit through software, integration, or consulting contributions, while re-entering the market becomes less risky due to lower R&D barriers.

For SONIC Labs, demonstrating increased real-world product availability was essential to showing how Open RAN broadens operator access to interoperable solutions, reduces reliance on single-vendor roadmaps, and supports a more resilient and competitive market.

Global collaboration

Governments worldwide shared commitments to extend collaboration for joint R&D in emerging telecom technologies such as ACT, including Open RAN. The UK Government worked with several other countries to boost R&D through collaboration commitments. In July 2024, the UK and India launched the Technology Security Initiative (TSI) to create a robust ecosystem for joint innovation and development, including knowledge sharing, resilient supply chains, innovation, and shaping global technology governance.

Meanwhile, the UK's growing commitment to Open RAN was matched by substantial initiatives from other governments, reflecting a shared global effort to advance Open RAN ecosystems.

The US government's National Telecommunications and Information Administration (NTIA) granted over $530 million under the 2023 Public Wireless Supply Chain Innovation Fund[2] programme. It was designed to drive wireless innovation, competition, and supply chain resilience, as well as open new doors for companies from the US and partner nations.

In 2023, South Korea established its Open RAN Industry Alliance and allocated KRW 1.31 trillion (~$1 billion) to support companies and organisations, including Open RAN-related initiatives.

Germany signalled a significant commitment to advancing next-generation telecom infrastructure through an estimated $300 million investment in R&D funding. This pledge formed part of the country's broader strategy to modernise digital connectivity infrastructure and accelerate the adoption of ACTs.

Finally, both Japan and India engaged in government-backed pilot support and cooperation frameworks to enable Open RAN development and ecosystem growth. Japan's Ministry of Internal Affairs and Communications actively supported early Open RAN pilots and has fostered partnerships under bilateral cooperation frameworks with significant public investment destined to support these efforts.

These examples illustrate a clear shift in public expenditure toward open architecture systems. Rather than isolated grants, public investment is now being deployed as part of wider telecommunications supply chain diversification and critical technology strategies, reflecting the growing range of resources directed toward Open RAN.

Country	Public investment into Open RAN (2022-25)	Programmes & policy frameworks
United States	$530 million+	Public Wireless Supply Chain Innovation Fund (CHIPS and Science Act)
United Kingdom	~£250 million	Open Networks Research and Development Fund
South Korea	~$1 billion	Open RAN Industry Alliance support
Germany	~$315 million (pledged)	National digital infrastructure R&D funds
Japan/India	Unquantifiable	Pilots & cooperation frameworks, but no total public Open RAN figure available

Figure 4: Global Overview of Public Investment into Open RAN

[2] Public Wireless Supply Chain Innovation Fund

Regulation

Reliable, affordable internet is essential to modern life. Since 2021, the total monthly data traffic on mobile networks has more than doubled, with 5G traffic now accounting for approximately 28% of total reported monthly mobile data, and 97%[3] of outdoor premises now benefitting from 5G coverage from at least one operator.

While Open RAN deployments were still relatively limited within the UK, at the time of this report, Ofcom witnessed notable progress with the monthly data traffic carried over Open RAN exceeding one petabyte for the first time, partly driven by a doubling of live Open RAN sites. Ofcom monitored developments in the industry, with MNO's conducting trials using Open RAN systems within their network.

Technical barriers

The benefits of interoperable and diverse networks were significant. But accelerating the long-term deployment of Open RAN solutions demanded a better supply of products that met technical and interoperability requirements and stimulated demand for disaggregated solutions within adopters. There were several barriers that stood in the way of large-scale Open RAN deployment, including:

- **Deployment complexity:** Multi-vendor deployments add complexity, as each configuration must be tested thoroughly. This requires extensive system integration and specialised expertise, potentially leading to longer deployment timelines. For MNOs, these challenges were compounded by the need to also integrate legacy technologies.
- **Interoperability:** While an Open RAN ecosystem provides flexibility and choice, it also creates interoperability challenges. Different vendors may implement their solutions differently—for instance, a different interpretation of standards specifications and the presence of proprietary elements may lead to compatibility issues and potential conflicts between components.
- **Integration challenges:** Integrating hardware and software from different vendors involves managing a variety of specifications, interfaces, and configurations. Smooth integration requires careful planning, well-defined interfaces, and comprehensive testing. Collaboration across the ecosystem and certification programmes, such as those ran by OTIC, play a vital role in this process.

[3] Connected Nations 2025

- **MNO confidence:** MNOs operate critical infrastructure, such as the Emergency Services Network. Their risk-averse nature can present barriers to adopting new technologies, making confidence-building measures essential for Open RAN adoption.
- **Security:** As Open RAN becomes more widely deployed, this may increase the attack surface risk of internal threats when compared to traditional RAN. The disaggregation of the RAN and its interface may potentially increase the likelihood of exploitation of security vulnerabilities.

SONIC Labs response

These barriers were not independent of one another. They emerged from the configuration, rules and interactions embedded in the Open RAN ecosystem. Fostering an open and dynamic market in the future requires an integrated approach to address these interconnected barriers and lay the foundations for a growing ecosystem.

Drawing on research and consultations with external stakeholders on the drivers of change in the Open RAN ecosystem, SONIC Labs assessed the conditions necessary to accelerate the widespread adoption of Open RAN solutions. This work culminated in the definition of five strategic outcomes that shaped the later SONIC Labs intervention into the Open RAN ecosystem:

- **Increased confidence in Open RAN solutions:** Compelling evidence was required to convincingly demonstrate the technological and commercial value of Open RAN to align ecosystem actors behind diversified multi-vendor solutions.
- **Enhanced connectivity within the ecosystem:** Actors within the ecosystem ranging from HRV to policymakers were operating in siloes, thereby creating barriers to entry into the Open RAN market. Improving access to resources, knowledge, and partnerships would ease the entry of new vendors into the UK market.
- **Transformative innovations in Open RAN:** New vendor solutions with the right capabilities for the Open RAN market in the UK were necessary to convince adopters and regulators to support the transition towards this new system.
- **Accelerated launch of products & services:** Targeted technology and business support was necessary to fasten the progression from low technology and market readiness of products to full market launch.
- **Momentum towards Open RAN:** Expanded and maintained the coalition of actors supporting multi-vendor solutions by offering SONIC labs as a neutral and trusted convening space of global reach.

These outcomes represented the programme's impacts and indicators of a flourishing ecosystem. Using them as north stars, SONIC Labs stakeholders designed a package of interventions aimed at directing ecosystem dynamics (see results,insights & impacts section). These were:

- **Technology development**: Sourcing and distributing insights and support for the development of Open RAN technologies.
- **Business model development:** Supporting the commercialisation of Open RAN technologies.
- **Ecosystem building:** Forming connections in the Open RAN ecosystem where they would otherwise likely not occur and pulling in new actors and resources into the ecosystem.
- **Narrative building:** Creating a new message about Open RAN and promoting a mindset shift across the ecosystem.

Given the complexity and diversity of the ecosystem, these interventions were tailored to the multiple actors influencing the shift towards multi-vendor solutions. This framework was necessary because progress in Open RAN is not driven by individual technologies or standalone interventions, but by the interactions between multiple actors operating across technical, commercial and regulatory domains. Confidence, interoperability and deployment readiness appear only when barriers are addressed in a coordinated way. Sustainable market development depends as much on ecosystem connectivity as on technological advancement.

SONIC Labs' role extended beyond that of a testing environment. By deliberately convening vendors, operators, policymakers, regulators, standards bodies and international laboratories within a shared framework, SONIC Labs enabled collaboration and learning that would otherwise have been lost.

In the stakeholder ecosystem section it examines the stakeholder ecosystem that emerged around SONIC Labs, and how structured collaboration became a critical mechanism for amplifying technical insight, accelerating maturity and supporting the programme's wider objectives.

> Progress in Open RAN is not driven by individual technologies or standalone interventions, but by the interactions between multiple actors operating across technical, commercial and regulatory domains.

QUICK LINKS

Stakeholder ecosystem

Uniting a leadership community to accelerate open network adoption

COLLABORATION IMPERATIVE

SONIC Labs's value lies as much in who it connects as what it tests. Fragmented ecosystems slow adoption and erode trust.

NEUTRAL PLATFORM

SONIC Labs was a trusted platform connecting government, industry, and academia. It structured collaboration through targeted and focused consortia, building international confidence and alignment through agreements and testing.

NETWORKING FACILITATOR

SONIC Labs proactively strengthened the UK Open RAN ecosystem to become a recognised global authority and accelerate viable paths to deployment.

QUICK LINKS

SONIC Labs was launched to accelerate the maturity and adoption of Open RAN and open network technologies. Its ecosystem spanned the full value chain from standards and policy setting to testing, deployment, and commercialisation. It secured insights grounded in reality while remaining vendor- and technology-agnostic.

Over its lifetime, SONIC Labs evolved from an early interoperability facility into a globally connected ecosystem, proactively enabling collaboration across national and international boundaries and supporting the UK's supply chain diversification and advanced connectivity ambitions.

Industry groups

STRATEGIC ADVISORY BOARD

FreshWave You're on · NEC · MAVENIR · Mobile UK · University of Bristol · Telecom Infra Project · techUK · Wireless Infrastructure Group

THE MOBILE NETWORK OPERATOR INDUSTRY GROUP

BT EE · Virgin Media O2 · Three

WIRELESS INFRASTRUCTURE INDUSTRY GROUP

boldyn networks · cellnex · CGI · FreshWave You're on · telent · Wireless Infrastructure Group

TESTBED INDUSTRY GROUP

BT · Telecom Infra Project · University of Sussex · C-DOT · EANTC · i14y Lab · ETS de Ingeniería de Telecomunicación Universidad de Málaga · VVDN Technologies · Rakuten · ITS · NEC · ITRI Industrial Technology Research Institute · University of Surrey · University of Bristol

NEUTRAL HOST INDUSTRY GROUP

Three · Virgin Media O2 · boldyn networks · cellnex · BT · Nokia · Rakuten Symphony · Accelleran · IONX · 1FINITY · Ontix · Wireless Infrastructure Group · Ericsson · Samsung · Parallel Wireless · FreshWave You're on · Antevia Networks

From its inception, SONIC Labs dedicated itself to understanding the true state of Open RAN maturity through active industry engagement. This included gathering global insights on the benefits and challenges of Open RAN development, guided by its Strategic Advisory Board, four dedicated industry working groups and a Community of Practice. The outcomes of SONIC Labs would not have been achieved without the support of these partner companies.

Strategic Advisory Board

The Strategic Advisory Board offered insight and guidance to shape a sustainable model for delivering the technical and innovation capabilities needed to advance open networks and diversify the UK's 5G supply chain.

The Mobile Network Operator Industry Group

Chaired by trade association Mobile UK, this group brought together the three leading UK mobile network operators: EE, Virgin Media O2, and Vodafone-Three. As major adopters of Open RAN, the MNOs provided valuable insight into emerging product requirements and offered exposure to new innovators participating in SONIC Labs. Their input helped shape key areas such as testing priorities, future vendor cohorts, and field trial design.

Wireless Infrastructure Industry Group

Representing the broader UK network deployment ecosystem, this group comprised organisations involved in using Open RAN for neutral host, in-building, and private network applications. The group ensured product capabilities reflected real-world needs while supporting the SONIC Labs programme and UK Government ambitions for network innovation and diversification.

Testbed Industry Group

This group focused on collaboration across Open RAN and 5G diversification testbeds. Activities included exploring ways to streamline innovation and testing processes between different laboratories, aligning testing methodologies, and reducing duplication through shared approaches to testing and knowledge sharing.

Neutral Host Industry Group

The group represented the broader UK shared network deployment ecosystem, focusing on neutral host in-building, outdoors and private network applications. The group ensured that product capabilities reflect growing sustainability needs while supporting the SONIC Labs programme and wider UK Government ambitions.

Community of Practice

In 2025, SONIC Labs established a Community of Practice (CoP) model to support structured peer learning and collaborative problem-solving, allowing participants to identify priority areas for further exploration including commercialisation readiness and technical integration. This inclusive approach fostered cross-vendor alignment and building relationships that might not have developed otherwise.

The CoP agenda included a webinar, and an in-person showcase at the FYUZ event in Dublin. SONIC Labs participants presented their solutions directly to key system integrators and distribution partners, opening new deployment opportunities and providing vendors with tailored insights into downstream partner expectations for emerging Open RAN technologies.

The FYUZ showcase highlighted how the Community of Practice could extend beyond the laboratory, creating opportunities for live engagement, market exposure, and strategic partnerships, ultimately contributing to a more resilient and globally connected Open RAN ecosystem. Through the FYUZ activities, further marketing opportunities arose with Rakuten Symphony's Zero-Touch Live Podcast dedicating an episode and follow-up blog to the SONIC programme.

By facilitating these interactions, SONIC Labs demonstrated its value beyond technical testing. The CoP programme served as a catalyst for ecosystem maturity by strengthening vendor–integrator relationships, supporting commercialisation pathways, and enabling UK and international stakeholders to collaborate on real-world challenges.

For further detail please refer to Appendix 3.

PlugFest

Digital Catapult hosted several O-RAN Alliance PlugFests. These activities were organised twice a year at labs and OTICs around the world. PlugFests aimed to accelerate the maturity of products and solutions based on Open RAN specifications and to validate multi-vendor interoperability and conformity.

At its events, Digital Catapult brought together 30 key industry participants, covering over 200 test cases. The clear objective was to promote SONIC Lab capabilities and support the Open RAN ecosystem. Additionally, every participant gained access to Digital Catapult's testing environment and the opportunity to receive impartial feedback on their technologies.

Working with other PlugFest hosts from around the world also enhanced Digital Catapult's testing capabilities and provided an opportunity to work with a wider range of vendors. Further enhancements in AI-enabled RIC applications for energy efficiency and Open RAN security, and advanced testing methodologies are set to emerge because of them.

Timeline of PlugFests hosted by Digital Catapult:

PlugFest 1

Autumn 2023: Focused on three test scenarios: E2E functionality and performance testing, Open RAN cybersecurity, and RIC testing over E2 interface.

PlugFest 2

Spring 2024: Continued with the testing on E2E and cybersecurity including distributed denial-of-service (DDoS) attacks.

PlugFest 3

Autumn 2024: Had a larger number of participants than in previous PlugFests. Also marked the beginning of the focus on energy efficiency testing scenario, specifically on energy efficiency for O-RU and O-DU as the two main power-hungry elements.

PlugFest 4

Spring 2025: Continued with the testing scenarios from previous PlugFests, but also introduced new testing capabilities and new test cases, such as multiple new RUs to perform handover and mobility testing.

PlugFest 5

Autumn 2025: This PlugFest focused on two key test scenarios, massive MIMO performance and beam detection testing. There was also inter-lab collaboration between SONIC Labs and i14y Lab testing consistent and repeatable test cases.

Technology Access Programme (TAP)

To help accelerate the development of energy efficient Open RAN solutions, SONIC Labs launched an innovation support initiative: the Technology Access Programme (TAP). The programme welcomed five organisations aligned with one of two themes (see project evolution and milestones section).

Through this, participants were given access to SONIC Labs' advanced testing facilities at Digital Catapult, received targeted training on Open RAN technologies, and were supported in the development of novel energy saving solutions.

Participants also received comprehensive market readiness support, including strategic reviews by Digital Catapult's industry experts. Additional sessions with the investment team covered topics such as refining business propositions and effective pitching to investors and potential clients.

By combining technical innovation with strategic guidance, the TAP laid the foundation for energy-efficient Open RAN solutions that can be both commercially viable and aligned with the UK's sustainability goals.

The participants involved were:

Standards

Part of the SONIC Labs programme's aim was to help position the UK as a leader in Open RAN adoption. To achieve this, Digital Catapult consulted with ecosystem stakeholders developing international standards for Open RAN technology. From 2024, Digital Catapult monitored and contributed to the O-RAN Alliance Next Generation Research Group (nGRG). This was grew to include participation in the Alliance's Technical Oversight Committee, Architecture, AI/ML, and Research Platforms meetings.

With UKTL, Digital Catapult also monitored the O-RAN Alliance WG11 Security standardisation progress, attended meetings, and provided internal updates to its 5G team. In 2025, the SONIC Labs team also contributed to standardisation efforts in O-RAN Alliance meetings.

The O-RAN Alliance collaborated with regional standards development organisations to secure official endorsement of O-RAN specifications. Alliance-standard documents enabled Telecom Infra Project (TIP) to coordinate vendors, MNOs, and other international telecom stakeholders to test, integrate, certify, and conduct live trials. By the end of the SONIC Labs programme, TIP had completed 150 trials across more than 50 countries.

The Alliance was also actively engaged in the UK to help reshape Open RAN specifications and to support a more competitive telecommunications ecosystem. Compared to other regions, such as the US, which focused on large-scale commercialisation, and Japan, which centred its efforts on leading technology integration, the UK proactively redefined its RAN frameworks. This approach positioned the UK as a front-runner in the global competitiveness narrative.

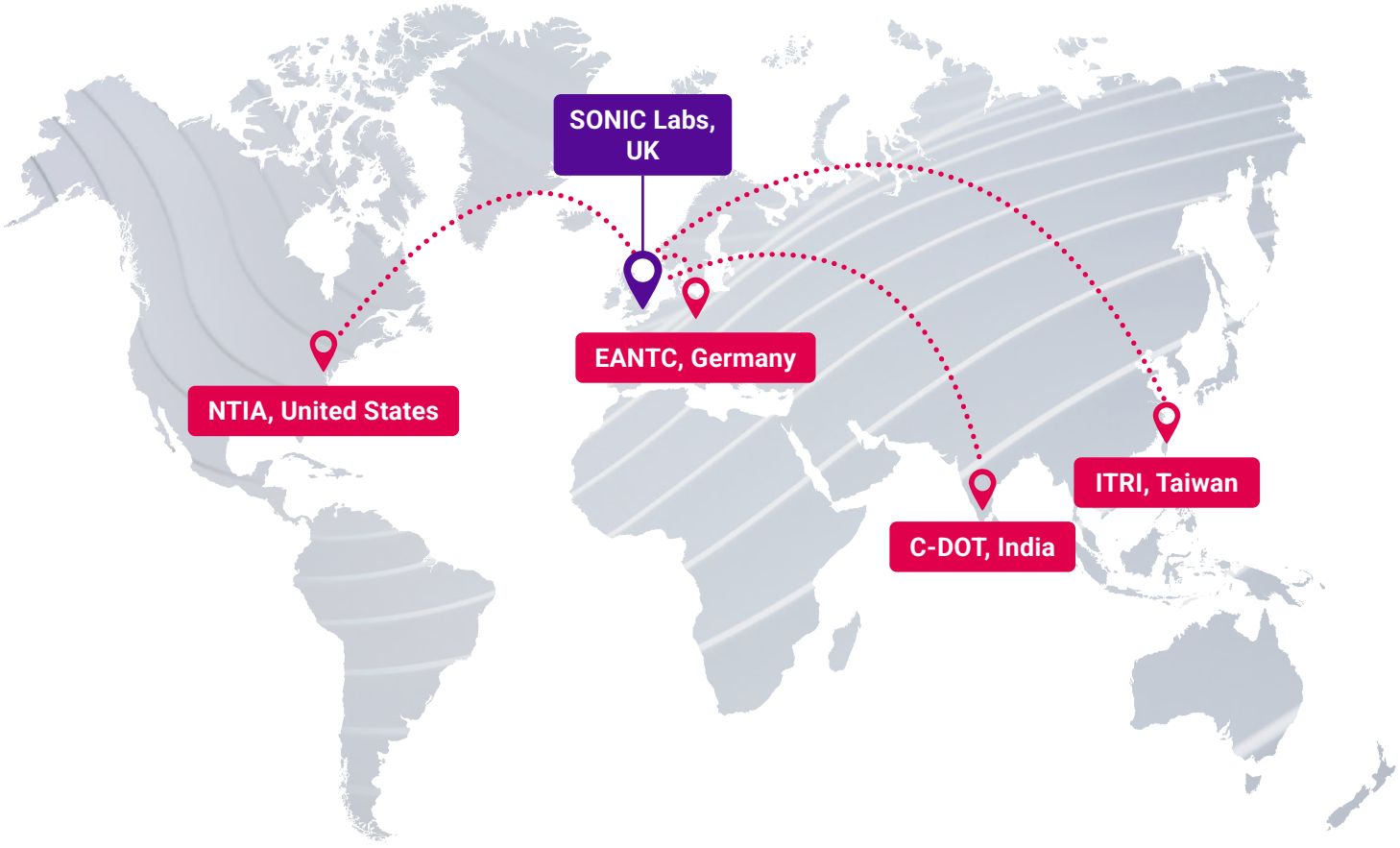


Figure 5: International research collaborations

International research collaboration

A core principle of the SONIC Labs programme was to strengthen relationships across telecommunications communities—especially with international counterparts—to promote greater diversity and resilience within the telecommunications supply chain.

The collaboration with global testing facilities strengthened significantly, progressing from initial relationship building to the exchange of ideas, and, ultimately, to formal Memorandums of Understanding (MoUs). These agreements established a clear framework for collaboration, fostering transparency, enhancing communication, and building long-term trust.

MoU with Industrial Technology Research Institute (ITRI), Taiwan

The SONIC Labs' MoU with the Industrial Technology Research Institute (ITRI) focused on enhancing development in the field of Open RAN testing and on the learnings that can be shared on testing lab activities from its world-leading innovation programme and research and development facilities.

MoU with the European Advanced Networking Test Centre (EANTC), Germany

Digital Catapult established strong collaborative ties with the European Advanced Networking Test Centre (EANTC). EANTC showed significant interest in the work of SONIC Labs and recognises the facility as a leader in the field.

MoU with the Centre for Development of Telematics (C-DOT), India

Building on the UK-India Technology Security Initiative (TSI), SONIC Labs and the C-DOT signed an MoU focusing on Open RAN-related policy and technical collaboration, covering areas such as 5G Open RAN and the application of Artificial Intelligence in 4G/5G networks.

Partnership with the National Telecommunications and Information Administration (NTIA), United States

The partnership between Digital Catapult and the NTIA underscored a shared dedication to advancing technological innovation and deepening collaboration between the UK and the US. Both organisations committed to fostering cooperation between neutral laboratories involved in Open RAN development. Through their testing facilities, SONIC Labs and CRAIN Labs and formally agreed to collaborate by sharing test plans, equipment capabilities, and best practices through ongoing engagement, events and workshops and knowledge exchange.

For further detail on these collaborations please refer to Appendix 4.

Global Coalition on Telecommunications (GCOT)

To address their priorities on supporting next generation telecommunication technologies, governments from around the world united in a shared commitment to collaboration. The Department for Science, Innovation and Technology (UK); the Department of Infrastructure, Transport, Regional Development, Communications and the Arts (Australia); the Department of Innovation, Science and Economic Development (Canada); the Ministry of Internal Affairs and Communications (Japan); and the National Telecommunications and Information Administration (USA) established the Global Coalition on Telecommunications (GCOT).

This coalition coordinated initiatives to advance common goals, focused on:

- Enhancing cooperation and information sharing to ensure complementary national approaches to telecommunications policy.
- Building broader international consensus on key telecommunications issues.
- Fostering dialogue between policymakers, industry, and academia.
- Promoting innovation and creating growth opportunities for industry.

Through the work of GCOT, two frameworks were published to support these commitments:

The principles on artificial intelligence adoption in the telecommunications industry

This outlined the view of GCOT partners that AI in telecommunications was a significant innovation with many potential benefits, including improved network performance, enhanced security, and better customer experiences.

The Open RAN certification principles

These voluntary guidelines aimed at helping create an industry-led certification program for Open RAN products.

QUICK LINKS

> Against a backdrop of growing geopolitical upheaval and global competition for leadership in advanced connectivity, collaboration with DSIT and international government partners was central to the strategic impact of SONIC Labs activities.

Close alignment with DSIT priorities and active engagement in multilateral initiatives provided SONIC Labs with a credible mechanism for translating UK policy ambition on supply chain diversification, Open RAN assurance, and future network technologies into practical, evidence-led outcomes.

This reinforced the UK's leadership in shaping interoperable, industry-led approaches to Open RAN certification and AI-enabled networks, while ensuring that domestic capabilities remained aligned with global standards. In doing so, SONIC Labs strengthened confidence in UK Open RAN capability and proved itself as a key national asset supporting DSIT's long-term objectives for resilient, secure and globally relevant telecommunications infrastructure.

QUICK LINKS

Open Testing and Integration Centre

In March 2025, Digital Catapult was designated as an Open Testing and Integration Centre (OTIC) by the O-RAN Alliance. It was the UK's first OTIC and remains the only one as of the end of the SONIC Labs programme. This was the result of clear and consistent evidence gathered from cohort participants and sustained engagement with MNOs.

OTICs are collaborative, independent and impartial working environments used to perform different conformance, interoperability testing and end-to-end tests. They prioritised early multi-vendor integration and continuous feedback into the O-RAN Alliance. This approach de-risked deployment, accelerated innovation, and ensured global interoperability across Open RAN solutions.

They highlighted structural barriers of Open RAN adoption that could not be addressed through vendor-specific laboratories or bilateral trials alone and emphasised the need for a trusted, neutral facility capable of independently validating Open RAN solutions.

Digital Catapult's OTIC designation formalised SONIC Labs' ability to deliver standardised testing, badging, and certification aligned with O-RAN Alliance principles, producing trusted outcomes. These assurances provided MNOs with greater confidence in the maturity, openness, and deployability of Open RAN solutions, while enabling vendors to demonstrate compliance and readiness through recognised and trusted validation processes.

Publicity & marketing

Digital Catapult and SONIC Labs delivered sustained communications and marketing activity to raise the awareness and credibility of its activities. It focused on three primary areas:

Reputation
Build awareness of the programme's leading expertise

Impact
Amplify the outcomes of the programme

Engagement
Connect with key industry stakeholders

Highlights from marketing and communications activity include:

9.9%
LinkedIn Click Through rate (CTR)
vs. 1.2% industry standard

75
External attendees
reaching an attendance rate of 79%

60.1%
Engaged website visitors
Top performing page views on the website

240+
Connections made during MWC 2025
130% increase compared to 2024

Impressive press coverage
in major titles across multiple 'key moments' of the programme

Press coverage played a key role in marking programme milestones and reinforcing confidence across industry and government. There was notable coverage over the launch of the Lab space, cohort launches, international collaboration announcements, technical insights and Digital Catapult's announcement as the UK's first OTIC.

Online communications complemented press activity by boosting engagement with a broader audience. SONIC Labs content was consistently featured across Digital Catapult's platforms, with particular interest in pages relating to testing capabilities, cohort activity, technical publications and, later, certification and badging services.

The launch of the Test-as-a-Service proposition and supporting online content represented a shift from programme visibility to sustained capability awareness, signalling a transition toward longer term exploitation and commercial uptake. Technical blogs, insight reports and event summaries helped translate complex engineering outcomes such as interoperability testing, energy efficiency studies and AI-enabled RAN into accessible narratives.

Social media and event-led communications further amplified reach and reinforced SONIC Labs' position within the Open RAN ecosystem. They highlighted the diverse mix of programme activities such as PlugFests, cohort showcases and participation in global industry events. Flagship events, particularly MWC 2025, where Digital Catapult had a dedicated stand in the UK Innovation Pavilion and highlighted SONIC Labs through an immersive experience.

These communications activities ensured that SONIC Labs' technical achievements translated into visible ecosystem impact.

Ecosystem builder

SONIC Labs played a pivotal role in strengthening a broad and diverse set of ecosystems that underpin the global evolution of Open RAN through its work with mobile network operators, vendors, testbeds, standards bodies, international research partners, and government stakeholders.

SONIC Labs provided a vehicle to drive collaboration, reduce fragmentation, and accelerate real-world progress through structured engagement models—from industry groups and PlugFests to international MoUs and the Community of Practice.

This ecosystem not only amplified the maturity, resilience, and commercial readiness of Open RAN solutions but also established a scalable foundation for future innovation. As global networks continue to evolve, the interconnected communities fostered through SONIC Labs will be essential to driving interoperable standards, supporting sustainable supply chains, and ensuring that emerging technologies can be tested, validated, and deployed with confidence in an increasingly complex and competitive telecommunications landscape.

Methodology & approach

How SONIC Labs delivered trusted, actionable evidence

TRUSTED PARTNER

Confidence in Open RAN depends on generating thoroughly demonstratable evidence. Without this, the sector cannot inform policy, procurement, or standards.

BRIDGING THE GAP

SONIC Labs operated in the "gap" between R&D and commercial deployment. It applied a phased, system-level methodology and ensured there was governance, confidentiality, and comparability throughout.

GLOBAL LEADER

Credible evidence was supplied to policy, procurement, and industry decision-makers through impartial and repeatable testing methods. This supported the development of similar testing facilities in the UK telecommunications sector.

QUICK LINKS

Programme governance

The SONIC Labs programme was delivered by Digital Catapult and Ofcom, with oversight from DSIT. Digital Catapult was responsible for programme setup, contracting with all vendors and suppliers, and operational delivery of the facilities and services. Ofcom contributed technical expertise, hosted part of the testbed infrastructure, and jointly received insights generated during the programme.

This governance made sure the programme had robust milestones and deliverable-based controls. This ensured financial discipline, timely delivery, and the ability for DSIT to steer the programme in line with evolving policy and technical priorities in the fast-moving Open RAN ecosystem (see external influences & drivers section).

Overall, SONIC Labs was designed to be adaptive and responsive, reflecting the programme's need to pivot as Open RAN technologies evolved. This included coordinated decision-making on technical architecture, vendor selection, security frameworks, and benefits realisation. This ensured that SONIC Labs remained a trusted national capability for multi-vendor Open RAN integration and testing while delivering long-term value for the UK telecommunications ecosystem.

QUICK LINKS

Lab build

A multi-site laboratory architecture was developed within Digital Catapult's London base and other locations, combining enterprise-grade infrastructure with real-world operational complexity. This enabled SONIC Labs stakeholders to operate effectively within the 5-7 TRL gap between research and deployment.

Instead of a single static environment, four complementary test sites were created to represent the full Open RAN development lifecycle, from early integration and controlled experimentation to distributed system operation and realistic indoor and outdoor deployment. These sites enabled repeatable, impartial, and system-level testing that met the requirements of operators, regulators, and standards bodies.

The four-site approach set SONIC Labs apart from other research programmes. The infrastructure became a cornerstone of SONIC Labs' value—enabling trustworthy results, accelerating maturity, and underpinning confidence in Open RAN across the UK telecommunications ecosystem.

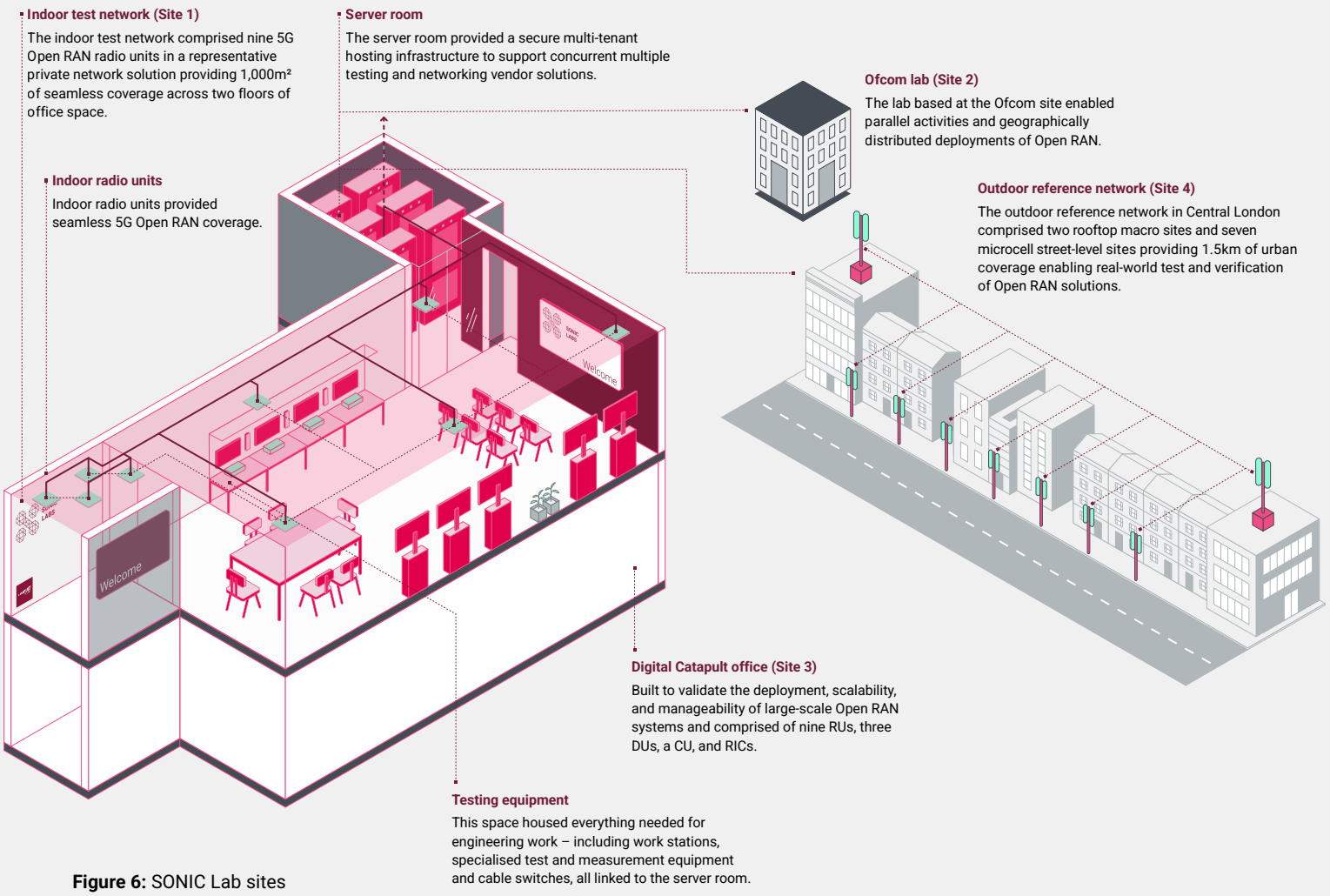


Figure 6: SONIC Lab sites

Site 1: SONIC Labs, Euston Road

The SONIC Lab programme's core infrastructure was designed and built as an enterprise-grade laboratory comprising a fully redundant active-passive environment. It provided the foundation of the multi-site capability and served as the technical and operational core of the SONIC Labs programme, providing a resilient environment in which multi-vendor integration, test methodology development and controlled experimentation could be carried out with confidence.

The networking infrastructure at Site 1 was designed to support high-speed fronthaul and backhaul connectivity for Open RAN 5G operations. It included a high-capacity ethernet switching fabric supporting 10G, 25G, 40G, and 100G interfaces to enable low-latency and high-throughput data transfer. Time-sensitive networking capabilities were implemented to meet strict real-time performance requirements.

Site 2: Ofcom, Riverside House

Site 2 was located at Ofcom's head office in Riverside House, Southwark, and was divided into two zones: the main lab space and the server room, which housed a 42U rack. It was primarily an indoor representative network site, evolving to host cohort components and test a truly distributed cohort-led Open RAN system.

This site allowed SONIC Labs to operate a geographically distributed architecture connected to the core lab roughly four kilometres away at the Euston Road site via a dedicated 10Gbps layer, allowing for a replication of services across both sites. This configuration supported realistic assessment of distributed deployment, resilience and operability—conditions that closely mirror those encountered in live operator networks.

By situating Open RAN systems within a regulator-adjacent environment, Site 2 established a close, practical collaboration between SONIC Labs engineers and Ofcom's technical and policy teams. The proximity strengthened the feedback loop between engineering evidence and regulatory insight, supporting Ofcom's work on standards monitoring, industry engagement and horizon scanning.

It also ensured that test activities and findings were informed by regulatory priorities, allowing Ofcom to observe and interrogate emerging Open RAN behaviours within a controlled setting.

Site 3: Indoor reference network, Euston Road

The primary objective of the Site 3 indoor reference network is to evaluate the deployment, scalability, and manageability of Open RAN systems in a large-scale indoor environment.

It supported the deployment of Open RAN systems consisting of nine Radio Units (RUs), three Distributed Units (DUs), a Central Unit (CU) and RAN Intelligent Controllers (RICs), supporting field testing in indoor environments at scale. The site was designed to validate Open RAN as a solution for indoor environments such as enterprises, campuses or venues.

Site 4: Outdoor reference network, Fulham

In contrast to the other sites, Site 4 deployed outdoor Open RAN systems with multiple RUs per DU (up to four) and multiple DUs per CU (up to three). Site 4 was designed to address issues related to large-scale outdoor Open RAN deployments.

Further detail can be found in Appendix 5.

Test and measurement

The lack of trusted, system-level evidence was a fundamental barrier to Open RAN adoption. To address this, SONIC Lab stakeholders developed a comprehensive suite of test and measurement (T&M) capabilities designed to accelerate the evaluation, integration, and validation of multi-vendor solutions within a controlled yet flexible environment.

The T&M architecture was built around open interfaces defined by the O-RAN Alliance and 3GPP bodies. By integrating different test tools, the platform provided rigorous analysis of performance, energy consumption and interoperability testing.

The key T&M capabilities included:

Functional and interoperability testing:

- Validation of Open Fronthaul, F1, E1, E2, A1 and O1 interfaces.
- Multi-vendor RU–DU–CU–RIC interoperability testing.
- End-to-end system integration and regression testing across cohorts.

End-to-end performance and scalability testing:

- Throughput, latency, jitter and packet loss benchmarking.
- Mobility and handover testing across indoor and outdoor reference networks.
- Largescale UE emulation to assess stability and scalability under load.

Energy efficiency and sustainability assessment:

- Power and energy consumption measurement for O-RUs, O-DUs and O-CUs.
- ETSI aligned energy efficiency methodologies.
- Evaluation of AI enabled energy saving xApps and rApps.

RIC validation and AI enabled control testing:

- Near-RT and Non-RT RIC interface testing.
- Validation of xApp and rApp functionality and policy control.
- Assessment of closed loop optimisation scenarios.

Automated and repeatable test campaigns:

- Automated test execution aligned with cohort objectives.
- Reproducible test plans enabling comparison across vendors and labs.
- Structured test outputs supporting lessons learned and vendor feedback.

These capabilities evolved as the SONIC Labs programme matured—supporting increasingly complex scenarios such as distributed multi-site operation, urban outdoor trials, and PlugFests (see stakeholder ecosystem section).

The T&M capabilities transformed complex, multi-vendor engineering activity into credible, shareable evidence that informed vendor roadmaps, operator confidence, regulatory insight and standards development. By combining technical depth with neutrality, transparency and repeatability, SONIC Labs demonstrated how disciplined T&M can de-risk innovation, accelerate maturity and support evidence-based decision making.

The architecture shown below illustrates the integrated tools and platform that enable functional validation, end-to-end performance benchmarking, interoperability testing, energy efficiency assessment and conformance testing.

Automated test and measurement platform

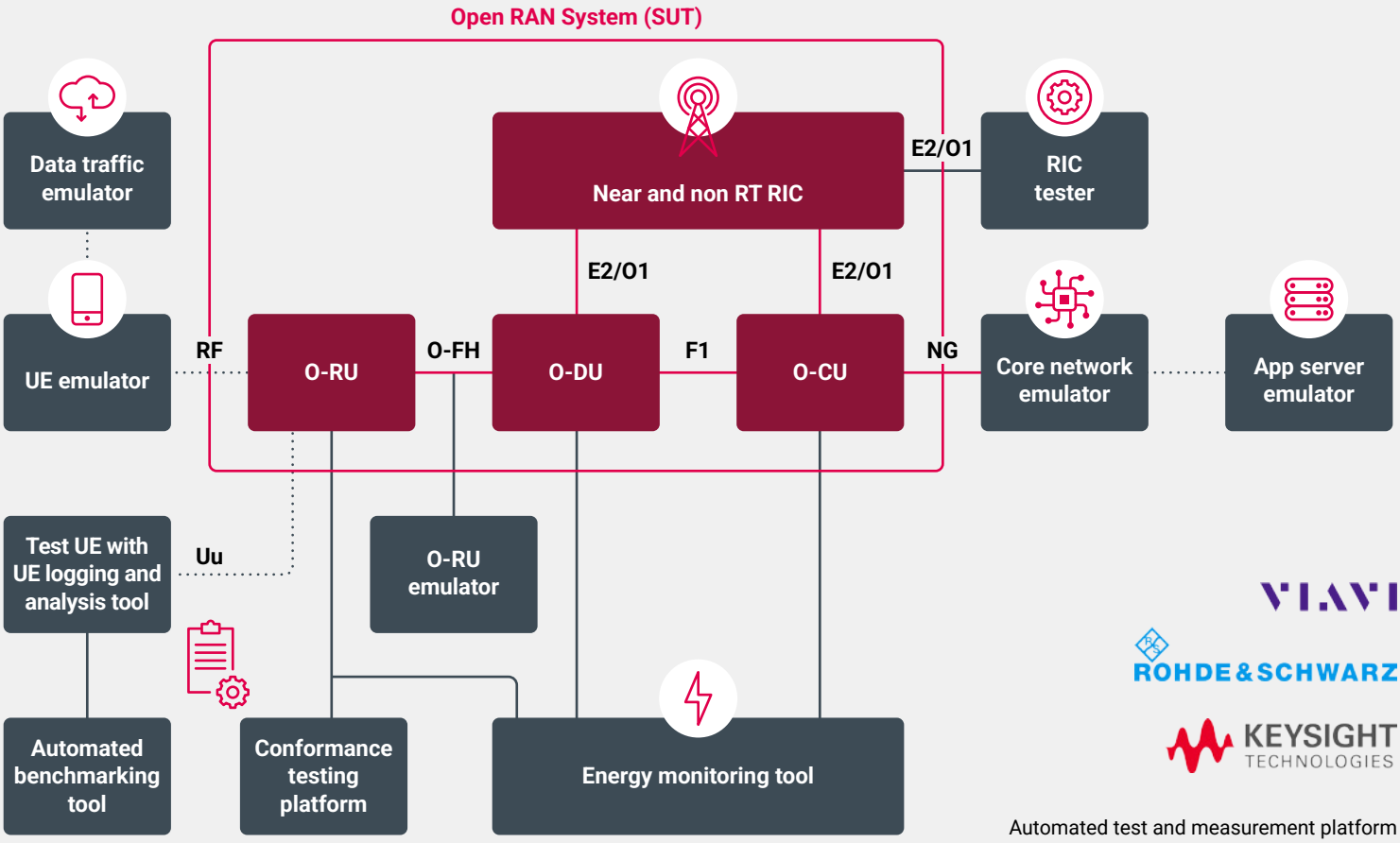


Figure 7: Automated test and measurement platform

QUICK LINKS

Badging

> As the first and only OTIC in the country, Digital Catapult put the UK on the world map of Open RAN testing and increased its leadership role in driving innovation and adoption of Open RAN technologies.

Becoming an OTIC aided the development of internal Open RAN technical skills and increased visibility and trust in vendor solutions emerging from the programme. It also helped support the wider Open RAN community to build relevant skills via activities such as demos, events and field trials.

Digital Catapult's status as an OTIC also meant it could lead on the badging and certification of Open RAN activity. Digital Catapult operated as a neutral, collaborative space facilitating pre-competitive experimentation, knowledge sharing across operators, vendors, academia, other industry sectors, and joint vendor integration without commercial bias.

Market readiness

As part of its role to diversify the Open RAN supply chain, the SONIC Labs programme supported start-ups and innovative companies in their preparation to enter the telecommunications market. The market readiness programme and SONIC Labs' other commercialisation work included several events and online activities, such as:

"Market insights" webinars were arranged to raise awareness about the state of the UK Open RAN market and the ecosystem's current challenges, opportunities, and areas for collaboration. In these, Digital Catapult's expert insights and partnerships team hosted industry leaders who provided Open RAN vendors with insights about the UK market from policy and commercial perspectives.

"Go to market webinars" were geared toward building knowledge, providing participants with detailed insights and practical examples that help deepen their understanding of Open RAN technology and its real-world deployments.

"Community of practice events" were a main component on the cohorts and designed as a place where they could discover what they have in common, share and develop knowledge, and discuss skills (see stakeholder ecosystem section).

QUICK LINKS

Project evolution & milestones

The programme's growth, achievements and strategic progression

OPEN EVOLUTION

Open RAN maturity developed over time rather than occurring immediately. Understanding this progression clarifies when and why certain advancements became possible.

COHORT COLLABORATION

SONIC Labs' cohort-based model intentionally increased ambition and applied lessons from each phase to the next. Supporting capabilities were developed alongside technical knowledge.

PROGRAMME AGILITY

Insights from each cohort addressed many Open RAN concerns and highlighted the benefits of agile working to achieve SONIC Labs' objectives. Each phase produced measurable results, demonstrating the value of public investment and building confidence for large-scale deployment.

Programme overview

SONIC Labs delivered insights to the sector through its cohort approach. Each cohort was a timebound, structured activity that enabled close collaboration with selected vendors to identify ecosystem needs, encourage knowledge sharing, and disseminate findings to stakeholders and policymakers.

Targeted initiatives built on this model, focusing on specific Open RAN capabilities such as energy saving, spectrum sharing, and app development.

See Appendix 6 for further detail of each cohort participant.

> Over the five-year programme, SONIC Labs worked with over 27 organisations, certified six systems and carried out 82 tests.

Through this structured progression from early functional interoperability (Cohorts 0–2) to RIC integration, mobility, scalability, and outdoor field trials (Cohorts 3–5), the programme enabled vendors to validate performance, refine architectures, and improve product readiness. This led to measurable improvements in interoperability, stability, and deployment confidence.

The TAP further enhanced SONIC Labs expertise and knowledge by driving innovation in energy-efficient Open RAN operation, supporting rApp/xApp development and CU/DU optimisation.

With advanced testing capabilities and the transition to formal Open RAN certification and badging (Cohort 6), the programme positioned the UK as a credible centre for standards-aligned Open RAN validation. This reinforced the UK's ability to reduce integration risk for operators and accelerate commercial readiness for vendors.

Cohorts

Each cohort built progressively on the capabilities, lessons and infrastructure established in previous phases, enabling SONIC Labs to deliberately scale technical ambition while reducing integration risk. The cohorts served as vehicles for generating credible evidence and structured learning, directly shaping future programme priorities, strengthening engagement with standards bodies, and increasing confidence in real world Open RAN deployment.

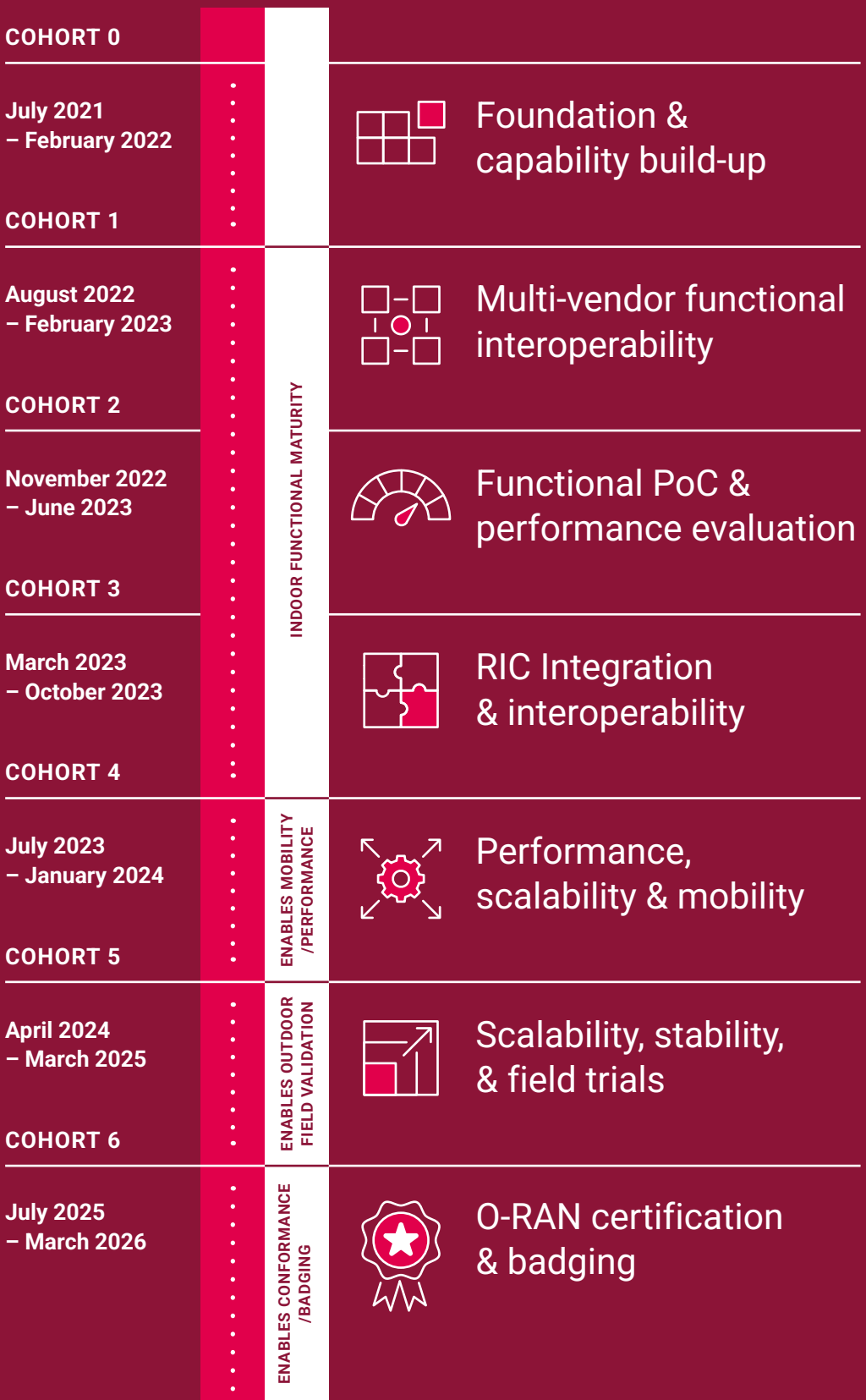


Figure 8: Cohort evolution

QUICK LINKS

Cohort 0:
Foundation & capability build-up

Dates: July 2021 – February 2022

Objective & scope: The establishment phase of SONIC Labs with the primary objective of setting up the foundational people, processes, and technical infrastructure required to support collaborative Open RAN integration and testing. The cohort started vendor engagement and created an initial laboratory environment to accelerate early Open RAN integration and testing efforts.

Configuration & tests: During this initial cohort, components from five participating vendors were integrated to establish an early multi-vendor setup. Baseline functional validation was performed on early-stage Open RAN products.

Cohort 1:
Multi-vendor functional interoperability

Dates: August 2022 – February 2023

Objective & scope: Validated functional interoperability of multi-vendor Open RAN systems and confirm end-to-end operation.

Configuration & tests: Open RAN products from six vendors were integrated to form multi-vendor systems. Functional testing was conducted to validate interoperability across vendor components, with a particular focus on verifying RAN interoperability with third-party Open RAN components, primarily the O-RU. Interface interoperability and end-to-end system operation were also validated.

Cohort 2:
Functional PoC & performance evaluation

Dates: November 2022 – June 2023

Objective & scope: Moved beyond basic functionality to include more advanced interoperability testing and performance evaluations, while increasing vendor diversity and architectural complexity.

Configuration & tests: Integrated Open RAN systems using components from nine vendors, enabling the formation of multi-vendor configurations. Activities included verification of key interfaces to ensure correct interoperability and alignment with specification requirements. End-to-end performance evaluations were conducted to assess system behaviour under laboratory-based test scenarios, alongside the deployment and performance assessment of Open RAN systems running on ARM-based platforms.

Cohort 3:
RIC Integration & interoperability

Dates: March 2023 – October 2023

Objective & scope: Integration and validation of RAN Intelligent Controllers (RIC) in multi-vendor Open RAN systems.

Configuration & tests: Open RAN systems were integrated using components from nine vendors enabling multi-vendor configurations that included the RIC. Conducted functional testing of the RIC, including verification of its interoperability with third-party O-DU and O-CU components. Backward compatibility of relevant interfaces was also assessed to identify integration issues and gaps across vendor implementations.

Cohort 4:
Performance, scalability & mobility

Dates: July 2023 – January 2024

Objective & scope: Validated performance, scalability, and mobility of Open RAN systems while assessing the feasibility of testing outdoor RUs in indoor environments.

Configuration & tests: Integrated Open RAN systems using products from eight vendors. Integration and testing activities focused on performance, scalability, and mobility evaluation. This included, for instance, an O-DU operating with two O-RUs of another vendor, verifying handover between the cells, and testing of outdoor radio units under indoor conditions.

Cohort 5:
Scalability, stability & field trials

Dates: April 2024 – March 2025

Objective & scope: Evaluated Open RAN systems at scale, validating performance, handover, mobility, and stability across both indoor and outdoor reference networks.

Configuration & tests: Open RAN systems were integrated using products from seven vendors and it was executed in three structured phases. The staging phase focused on validating outdoor O-RUs within the laboratory environment. This was followed by an indoor testing phase, during which Open RAN systems were integrated with both emulated and commercial core networks. The final phase extended testing to an outdoor testbed in deep-urban environments, where the performance of multi-vendor Open RAN systems was validated under real-world deployment conditions.

Cohort 6:
O-RAN certification & badging

Dates: July 2025 – March 2026

Objective & scope: Centred on O-RAN certification and badging, marking a shift toward formal validation and ecosystem readiness for Open RAN products.

Configuration & tests: Six Open RAN systems from participating vendors were evaluated as part of certification- and badging-oriented integration and testing activities. Conformance, interoperability, and end-to-end performance testing were selected from O-RAN standards specifications and according to guidelines provided for certification and badging.

By grounding the research in a cohort-based model, the SONIC Labs programme followed a deliberate, cumulative progression in which capabilities and outcomes from earlier cohorts enabled subsequent advances. Together, these dependencies illustrate a structured pathway from early integration and functional maturity to ecosystem-level validation and readiness for real-world Open RAN deployments.

Technology Access Programme

The Technology Access Programme (TAP) focused on leveraging innovative technologies and methodologies to optimise RAN operations. The eight-month programme addressed the challenge of developing Open RAN energy efficiency solutions categorised under two themes: RIC enabled Sleep Modes and optimising CU/DU power utilisation of server CPU cores.

Theme 1: RIC-enabled sleep modes

The RIC, as a software-defined component, controls and optimises Open RAN functions. Through the application of AI/ML techniques, it assesses, diagnoses and learns to optimise the performance of radio network elements. SONIC Labs shortlisted three partner organisations (zTouch, NetAI and University of York) to develop rApps and xApps solutions that run on non-real time and near real-time RIC platforms to achieve improvement in energy consumption by the radio access network.

The partners demonstrated how adaptive RAN management can significantly reduce energy costs while maintaining high-quality mobile connectivity.

By leveraging intelligent resource allocation algorithms and dynamic cell switching, this approach provided insights towards a scalable and sustainable solution for 5G networks. In the case of the scenario where macro coverage cells provide wide area connectivity and micro cells handle localised high traffic demands, as shown in Fig 9, the intelligent resource allocation allows the network to dynamically switch off low-power cells when traffic demand is minimal, thereby reducing energy consumption without compromising overall service quality.

Intelligent RIC Control: AI-Driven Energy Optimisation for Open RAN

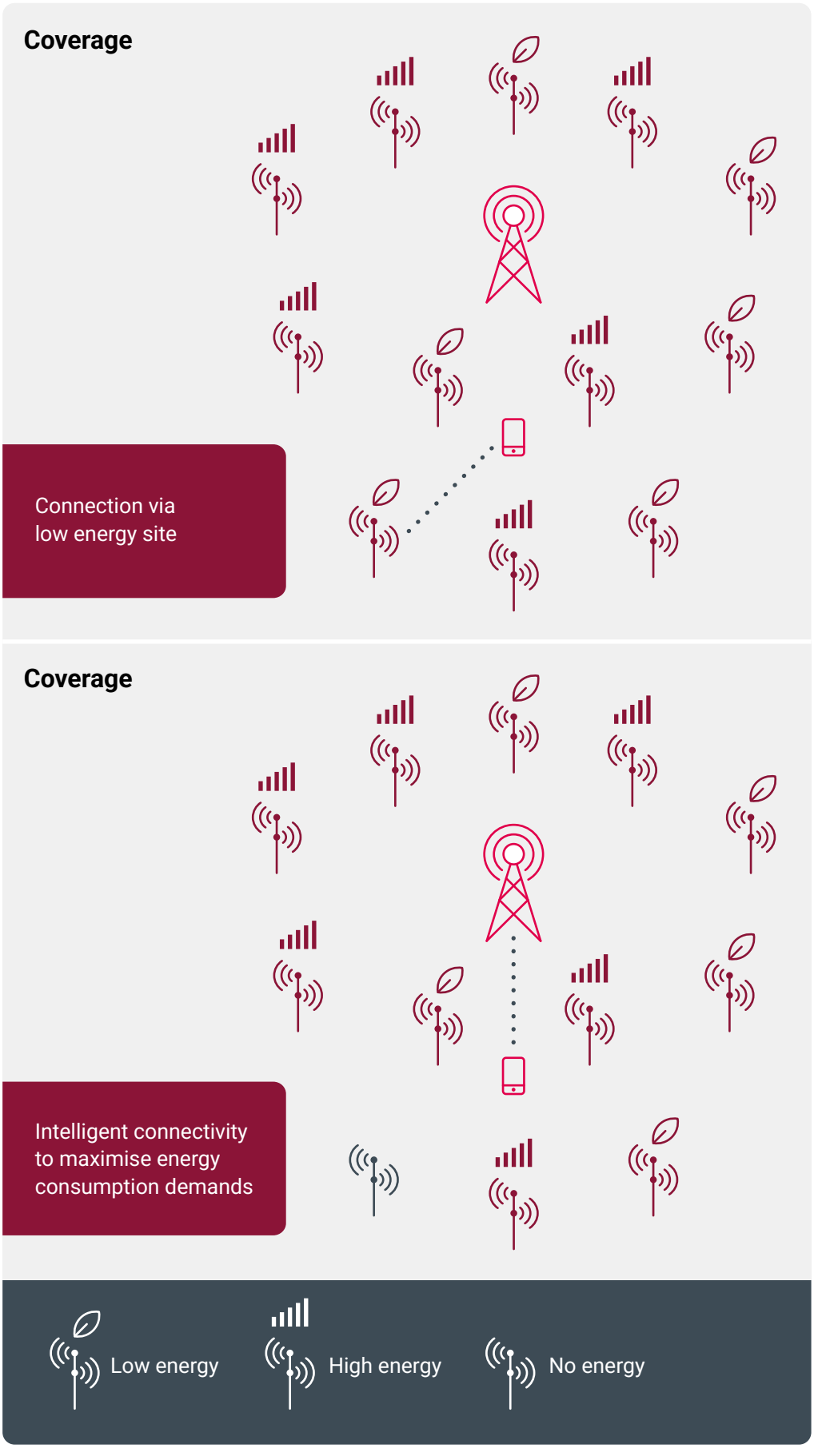


Figure 9: Deployment scenario

Theme 2: Optimising CU/DU power utilisation of server CPU cores

The O-DU and O-CU consume significant processing power from the underlying compute node. This theme explored the optimisation of O-DU and O-CU network functions to provide energy efficient solutions to the MNOs and private network provider community.

SONIC Labs shortlisted two programme partners (G Reigns and JET engineering) to provide, deploy and integrate O-CU/O-DU software solutions within an energy monitoring and optimisation test platform. The partners benchmarked energy consumption under controlled and repeatable traffic conditions. The programme demonstrated measurable energy-efficiency improvements compared to baseline configurations. Figure 10 shows the test setup architecture for characterising energy consumption by Open RAN DU /CU.

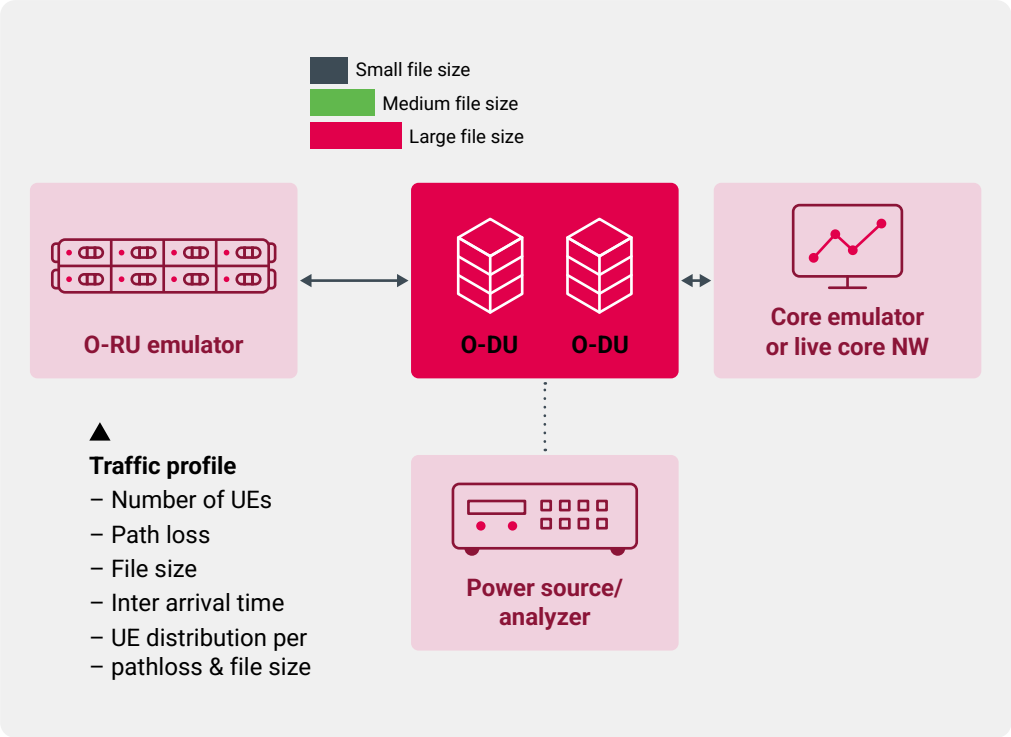


Figure 10: High level test setup architecture

Overall, the TAP programme successfully delivered practical Open RAN energy efficiency innovations, validated through relevant testing, while fostering collaboration.

SONIC Labs' lasting impact on Open RAN

Through the progressive cohorts and the TAP, SONIC Labs transformed Open RAN from early-stage interoperability challenges to certification-ready, commercially viable solutions validated in real-world conditions.

The programme's success reflects the value of agile, evidence-based development and the critical role of organisations like Digital Catapult and Ofcom in bridging the gap between technical innovation and market deployment.

As Open RAN continues to evolve, the methodologies, infrastructure, and partnerships established through SONIC Labs provide a replicable model for accelerating technology maturity, strengthening supply chain resilience, and supporting strategic policy objectives.

In the next section, the outcomes and consequences of the broader SONIC Lab activities are captured by distilling the key deliverables, insights, and reports produced across all cohorts and initiatives.

> "Interacting with the Viavi RIC Tester allowed us to test as close to a real-world deployment, which was the greatest benefit. The programme was useful in improving the solutions…
>
> **NET AI, (TAP PARTICIPANT)**

Technical excellence & deliverables

Technical insight and standards-aligned outcomes for UK diversification

EVIDENCE OVER ADVOCACY

Decision-makers need evidence, not advocacy. Technical credibility is essential to counter misinformation and unrealistic expectations.

DEMONSTRATABLE DEPLOYMENT

The SONIC Labs programme demonstrated strong performance, interoperability, and energy-efficiency gains in real-world Open RAN deployments.

TRUSTED PARTNER

SONIC Labs participants turned complex, multi-vendor engineering research into trusted insights and standards. SONIC Labs proved its world-leading position through OTIC accreditation, international lab partnerships and first-of-its-kind verification.

The programme's deliverables highlight SONIC Labs' long-term technical excellence and its impact on Open RAN maturity, while providing a foundation for continued innovation across future cohorts and industry-wide collaborations. Beyond core testbed development, the SONIC Labs programme made notable contributions to international collaboration, academic research, and ecosystem growth.

Through its cohorts, the programme showed growing interoperability, performance maturity, and scalable test capabilities. Collectively, these deliverables strengthened the UK's Open RAN ecosystem and supported the development of a more diverse and resilient telecommunications supply chain.

Key deliverables

In its lifetime, SONIC Labs delivered 38 technical reports that advanced multi-vendor Open RAN integration, testing, and platform development. These outputs strengthened both the programme's operational capabilities and the wider Open RAN ecosystem.

The cohorts delivered 17 detailed reports covering system commissioning, integration into SONIC Labs, performance evaluation, and lessons learned. This work demonstrated growing maturity across multi-vendor deployments and helped enhance the repeatability and reliability of test scenarios. The development of the automated T&M capabilities generated six key deliverables, documenting the design, build, commissioning, and later upgrades of the advanced test environment.

Additional technical reports captured the commissioning of Sites 3 and 4, alongside foundational architectural and infrastructure work that underpin future programme capabilities.

SONIC Labs also contributed to international collaboration and research dissemination. Two reports documented participation in the 2025 O-RAN Alliance PlugFests, supporting global interoperability efforts. The programme also produced five academic publications covering topics such as interface interoperability, end-to-end performance, energy efficient architectures, digital twin enabled control, shared spectrum private networks, and urban multi-vendor deployments.

Key points summary table

Deliverables	Key details & highlights
Total technical outputs	**38 technical outputs** delivered over the reporting period.
Cohort reports	**17 reports** covering Cohorts 0–6, including system commissioning, integration into SONIC Labs, performance evaluation, and lessons learned.
Multi-vendor integration	Demonstrated growing maturity of **multi-vendor CU/DU/RU** Open RAN deployments.
T&M platform development	**Six deliverables** documenting the design, build, commissioning, and upgrades of the automated **Test & Measurement platform**.
Test facilities & networks	Technical reports covering commissioning of **indoor and outdoor reference networks at Sites 3 and 4**, plus foundational architecture and infrastructure design work.
Peer reviewed publications	**Five academic publications (2024–26)** covering: interface interoperability, energy efficient architectures, digital-twin enabled control, shared spectrum private networks, and multi-vendor urban deployments.
International collaboration	**Two reports** documenting SONIC Labs' participation in the **2025 O-RAN Alliance PlugFests**, supporting global interoperability.
Ecosystem impact	Strengthened Open RAN ecosystem maturity, testing repeatability, and international influence; contributed to a more diverse and resilient telecommunications supply chain.

Lessons-learned reports offered practical guidance to industry stakeholders on deploying and operating Open RAN systems. This work strengthened confidence in the technical feasibility of Open RAN. SONIC Labs helped transition small-cell and private-network Open RAN technologies from early proof-of-concept status to demonstrably robust, multi-vendor solutions capable of meeting real-world performance expectations.

The programme retained stability and momentum during a period of external scrutiny and mixed perspectives on Open RAN adoption (see external influences & drivers section). This section provides a detailed account of each SONIC Labs cohort, outlining key outcomes and their contribution to subsequent cohorts and overall programme goals.

Further detail can be found in Appendix 8.

Cohort outcomes

Cohort 0:
Foundation & capability build-up

Cohort 0 established SONIC Labs' initial operational capability, defining foundational testing processes and an engagement model for participating vendors, and building the baseline laboratory infrastructure required to support future activities. It enabled the scale-up of vendor participation, expansion of test coverage, and increased technical ambition of later cohorts, while also informing early governance and collaboration models for multi-vendor Open RAN engagement.

Cohort 1:
Multi-vendor functional interoperability

This cohort demonstrated functional interoperability across multiple-vendor products and validated basic end-to-end Open RAN operation. Early interoperability and configuration challenges between vendor components were identified, providing valuable feedback for subsequent improvements. By establishing a baseline interoperability framework, Cohort 1 directly informed the expansion of testing toward more complex integration and testing scenarios in later cohorts.

> Capgemini's 5G Open RAN solution alongside its engineering capabilities have been a vital part of this chapter, the final phase of establishing the world class SONIC Labs.
>
> **JASON GLEW, MANAGING DIRECTOR, CAPGEMINI ENGINEERING UK (COHORT 1, 3, 4, 5 PARTICIPANT)**

QUICK LINKS

Cohort 2:
Functional PoC & performance evaluation

Cohort 2 demonstrated successful integration of Open RAN systems and operations using components from different vendors. The interoperability across key interfaces was verified, including, for the first time, successful verification of the E2 interface. Performance characteristics were assessed proving the feasibility of deploying Open RAN components on alternative hardware architectures.

Cohort 3:
RIC Integration & interoperability

This cohort validated the integration of the RIC within multi-vendor Open RAN systems and highlighted shortcomings in O-RAN Alliance specifications, particularly with respect to interface backward compatibility. Findings from the integration and testing activities were consolidated into technical feedback and shared with O-RAN Alliance.

> The independent verification provided by SONIC Labs has been crucial in giving both the 5G marketplace and potential customers independent confidence in our products.
>
> **PADRAIG MCNAMARA, COO & CO-FOUNDER, BENETEL (COHORTS 1,3,4,6 PARTICIPANT)**

QUICK LINKS

Cohort 4:
Performance, scalability & mobility

Cohort 4 demonstrated multi-vendor interoperability, end-to-end operational features, system scalability at O-CU/O-DU levels, and extended testing coverage to include outdoor-class O-RU.

Cohort 5:
Scalability, stability & field trials

This cohort validated throughput performance and demonstrated system scalability through indoor testing with hundreds of emulated UEs as well as multi-UE trials in outdoor deployments. The stability of multi-vendor Open RAN systems was confirmed, supporting assessments of their readiness for live network operation. Cohort 5 marked a significant maturity milestone by establishing robust testing methodologies, infrastructure, and expertise.

> The SONIC Labs programme elevates the global multi-vendor integration of Open RAN to a stage aligned with practical deployment.
>
> **ANJU DAY, CEO, LIONS TECHNOLOGY (COHORT 5 PARTICIPANT)**

QUICK LINKS

Cohort 6:
O-RAN certification & badging

For the Open RAN components and end-to-end systems evaluated within Cohort 6, the technical testing was completed with a total of seven O-RAN badges and certificates awarded. The cohort strengthened alignment with O-RAN Alliance certification and badging frameworks. By formalising certification- and badging-oriented testing processes, Cohort 6 reinforced SONIC Labs' role as a trusted validation and certification environment, supporting its strategic goal of advancing the maturity of Open RAN products toward real-world deployment while shaping future ecosystem collaborations.

> With access to outdoor and indoor facilities, technical support and collaboration opportunities, SONIC Labs offers a favourable environment for Pegatron 5G to enhance our solutions and advance in the global Open RAN integration landscape.
>
> **DAVID HOELSCHER, VP OF BUSINESS DEVELOPMENT & CHIEF PRODUCT OFFICER, PEGATRON**

Community of Practice

The SONIC Labs CoP programme helped vendors and businesses to understand real-world Open RAN challenges and opportunities. Participants valued the practical insights and a deeper appreciation of testing, deployment realities, and ecosystem dynamics.

Technical capability building featured prominently during SDK and VIAVI training delivered over seven days to Technology Access Programme participants, supported by technologists from Digital Catapult and SONIC Labs. This provided hands-on knowledge of RIC testing, deployment techniques, and performance evaluation.

Additional CoP sessions resulted in measurable increases in participants' understanding, particularly of indoor deployment challenges, AI's role in automation, and recommendations for greater transparency, enhanced testing environments, and expanded future RIC-related discussions.

Many participants expressed how valuable the support from SONIC Labs was and mentioned the strength in technical leadership, the benefits of a neutral convening environment, and hands on testing capabilities.

Looking ahead, several areas for future work emerged from the sessions, including:

- Strengthening multi-vendor testing environments—such as expanding RF chamber access and improving automation transparency—would reduce bottlenecks and enhance experimentation.
- Advancing RIC maturity through deeper technical collaboration, improved simulators, and expanded xApp/rApp development would support emerging use cases.
- Additional focus on O-RAN certification pathways, system integration skill development, and structured investor-readiness support would also help vendors scale more effectively and navigate the commercial realities.
- Development of cross-cohort CoP and more real-world demonstrators would strengthen long-term knowledge exchange and route to market visibility.
- Expanding AI-enabled Open RAN workstreams and building stronger partnerships with industrial adopters would accelerate the practical application of Open RAN innovations across varied sectors.

Taken together, CoP activities created a cohesive, trusted, and highly productive knowledge-sharing network that accelerated the maturity of the entire Open RAN ecosystem. By bringing together vendors, researchers, test engineers, and prospective adopters in a neutral environment, the CoP reduced information asymmetry, accelerated capability development, and enabled shared understanding of what is required to accelerate the adoption of Open RAN.

The programme not only improved the technical and commercial readiness of each participant, but also boosted the sector's overall ability to build, integrate, and deploy multi-vendor solutions with confidence.

A summary of the output can be found in Appendix 9.

Academic publications

Alongside the technical excellence delivered directly to the Open RAN sector, the SONIC Labs team published several academic reports. Together, they show how Open RAN technology matured into a workable, interoperable, and increasingly intelligent architecture capable of supporting practical private 5G deployments.

'Experimental Study of End-to-End (E2E) Performance for Multi-vendor 5G Open RAN Systems in Indoor and Outdoor Urban Environments' (accepted)

F. Mehran, C. Turyagyenda, and D. Kaleshi. Vehicular Technology Conference 2026, France, June 2026.

This study addressed a critical gap in the current understanding of end-to-end performance in multi-vendor Open RAN deployments. The findings provided empirical validation of Open RAN's feasibility in real-world private 5G scenarios, informing both research and deployment decisions for next-generation wireless networks.

'Interoperability Assessment of Fronthaul and E2 Interfaces for Multi-vendor Open RAN Systems'

F. Mehran, C. Turyagyenda, and D. Kaleshi. European Wireless 2025, France, October 2025.

This paper tackled the practical challenges of interoperability in multi-vendor Open RAN deployments, focusing on two critical and complex interfaces: Open Fronthaul and E2. The results contributed valuable guidance for accelerating the development, validation, and adoption of interoperable Open RAN architectures.

'Experimental Evaluation of Multi-vendor 5G Open RANs: Promises, Challenges, and Lessons Learned'

F. Mehran, C. Turyagyenda, and D. Kaleshi. IEEE Access, vol. 12, pp. 152241-152261, October 2024.

This work analysed practical lessons learned from the integration and testing of multi-vendor Open RAN systems, addressing challenges in achieving interoperable and reconfigurable RAN deployments. It provided empirical evidence on what worked and where integration gaps remained. The observations and recommendations offered concrete guidance to support the maturation of Open RAN products and informed future design and deployment practices.

‘Maximising Energy Efficiency in Large-Scale Open RAN: Hybrid xApps and Digital Twin Integration’

G. Singh, C. Turyagyenda, and D. Kaleshi (Digital Catapult), A. Al-Tahmeesschi, D. Grace, H. Ahmadi, and Y. Chu (University of York). 2025 IEEE Globecom workshop on Data Driven and AI-Enabled Digital Twin Networks and Applications, Taiwan, December 2025.

This report presented insights into the design, development, and deployment of intelligent AI-based RIC energy efficiency applications within deep urban Open RAN networks. The machine learning algorithm used large datasets generated by a digital twin which replicated complex real-world field scenarios and performed actuations to conserve energy consumption by the radio units without compromising quality.

‘Performance Assessment of 5G Private Networks with Shared Spectrum in Deep-Urban Environments’

F. Mehran, G. Singh, V. Singh, C. Turyagyenda, and D. Kaleshi. IEEE DySPAN, UK, May 2025.

This submission provided early empirical insights into the performance implications of spectrum sharing for 5G private networks operating in the upper n77 band, an area of growing regulatory and industrial interest. Through controlled deep-urban field trials, it quantified the throughput degradation introduced by shared access and showed that, under certain conditions, the performance impact can remain within acceptable limits. The study offered a systematic approach to inform spectrum-sharing policies and support evidence-based regulatory decisions.

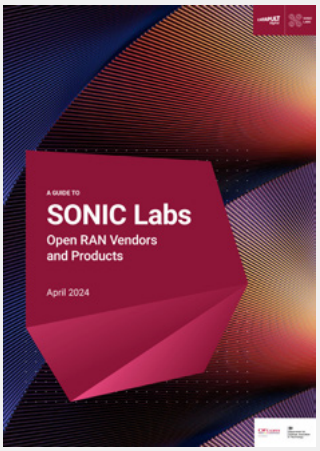
QUICK LINKS

Commercial reports

Throughout the programme, Digital Catapult published commercial reports and papers to provide expert insight to the telecom's community, build UK thought leadership and push the boundaries of Open RAN commercialisation:

'Barriers to Open RAN Adoption' February 2025

Developed in collaboration with industry experts and stakeholders, the report highlighted key challenges such as integration complexity, supply chain constraints, and the need for more advanced testing environments. Through case studies and targeted recommendations, the report identified ways to improve interoperability, diversify the supply chain, and foster innovation across the telecom's ecosystem.



'Guide to SONIC Labs Open RAN Vendors and Products' May 2024

This guide provided a snapshot of some of the Open RAN products that were tested as part of the SONIC Labs programme between March 2022 and March 2024. It featured more than 50 global vendors and more than 60 products. It let industry stakeholders to better understand the evolving Open RAN ecosystem and connect with technology providers. It provided evidence of the UK's leadership in innovation and SONIC Labs' role in shaping telecommunications infrastructure by supporting emerging vendors and enabling global collaboration.

Standards

To accelerate the development of standards within the Open RAN landscape, Digital Catapult drew on a broad range of expertise beyond traditional 5G domains, incorporating insights from distributed systems specialists and AI/ML experts. As a result, the organisation was able to integrate advanced standardisation learnings emerging from the O-RAN Alliance's next Generation Research Group (nGRG) directly into its work.

This enabled SONIC Labs technical studies, deliverables, and other key projects to be informed by the latest cross disciplinary thinking, ultimately strengthening the quality, relevance, and future readiness of the UK's Open RAN ecosystem.

Over the course of the programme, SONIC Labs made 18 formal contributions to the O-RAN Alliance across groups including TIFG, WG4, WG10, IEFG and the 6G Workshop. These ranged from 'Change Requests' to technical and strategic papers, demonstrating consistent engagement in both specification development and forward-looking architectural work.

Notable contribution areas to the nGRG work included:

- 'AI-Native Telecommunications: Building the foundations of trust' presentation to a 6G Workshop at a O-RAN Alliance meeting in Dallas.
- Input to nGRG's contribution to 'Analysis of AI/ML for 5G as information to 6G discussion' for 3GPP–O-RAN Alliance joint workshop.
- 'AI/ML in 6G RAN Evolution' whitepaper review in Research Stream 03 AI/ML.
- 'Decentralised Identity in 6G Networks' research item in Research Stream 04 Security.

Results, insights & impacts

Insights that shape policy, strengthen industry, and inform the UKs next steps

HEED THE CALL

The true value of SONIC Labs lies in what was learned, not just what was built. Future programmes must avoid repeating the same mistakes.

FEEDBACK FORM

SONIC Labs captured insights across a broad range of stakeholders including vendors, operators, regulators, and policymakers—converting lessons into practical guidance for future market interventions.

GLOBALLY RECOGNISED

SONIC Labs showcased what is possible by accelerating interoperability and developing active ecosystems, both nationally and internationally, to achieve scalable deployment capabilities and accelerating product development through a broad range of certified, world-leading testing and measurement facilities.

Accelerating the shift towards Open RAN systems

The SONIC Labs team, in consultation with external stakeholders, assessed the conditions necessary to accelerate the widespread adoption of Open RAN solutions. These provided a framework for designing programme interventions and collaborations between the SONIC Lab workstreams (see introduction and background section).

The main finding was that Open RAN is not driven by individual technologies or standalone interventions, but by the interactions between multiple actors operating across technical, commercial and regulatory domains. Confidence, interoperability and deployment readiness appear only when barriers are addressed in a coordinated way. Sustainable market development depends as much on ecosystem connectivity as on technological advancement.

The SONIC Labs programme deployed a holistic package of interventions, tailored to the multiple actors influencing the shift towards multi-vendor solutions:

Interventions

Technology development

Sourcing and distributing insights and support for the development of Open RAN technologies

Business model development

Supporting the commercialisation of Open RAN technologies

Ecosystem building

Forming connections in the Open RAN ecosystem where they would otherwise likely not occur and pulling in new actors and resources into the ecosystem

Narrative building

Creating a new message about Open RAN and promoting a mindset shift across the ecosystem

Key results

Technical and product results

≥1 TRL progression achieved within 6- 9 months

70% of vendors reported increases in their interoperability with other vendors

70% of vendors reported improvement in the availability of shared knowledge of Open RAN and collaborations

Commercial market results

72% of vendors reported new commercial partnerships, sales or leads

85% of SONIC Labs participants reported the start of new Open RAN product development

18% of vendors reported “some” or “significant” improvement in collaborations with international programmes

Recommendations

- Create more opportunities for real-world field deployments to help build confidence and generate practical evidence.
- Support for new and international vendors.
- Strengthen conformance and certification pathways.
- Build stronger international alignment and cross-lab collaboration.
- Strengthen structured feedback cycles across stakeholders.

Figure 11: Intervention overview

The impacts of these interventions were evaluated through regular surveys and interviews with key programme stakeholders. Data gathered from external participants was then combined with the SONIC Labs team's collective insights to build a picture of the overall programme impact, extract the key learnings and drive recommendations.

> Open RAN is not driven by individual technologies or standalone interventions, but by the interactions between multiple actors operating across technical, commercial and regulatory domains.

Technology development

This intervention aimed to accelerate the launch of new products and services, as well as enhance the resilience of the ecosystem. It was led by Workstreams 1 & 2 in creating the shared testbed infrastructure and managing vendor onboarding, product integration, and end-to-end interoperability testing. They also defined the methodologies, the automation frameworks, and the campaign designs that underpinned SONIC Labs' technical credibility and knowledge generation.

> The overwhelming feedback indicated this intervention successfully advanced the technical maturity, interoperability and market readiness of vendor products.

It contributed to a faster progression of products from initial trials and demonstrations to final market launch by supporting vendors in optimising solutions and granting access to strategic insights that guided product development.

Key results

Observations from SONIC Labs participants demonstrated significant technical progress:

- **Faster technology progression of Open RAN products along TRL scales:** Across every cohort, vendors reported a TRL progression of at least one level on the TRL scale within a six-to-eight-month period. Over this period, vendors reported higher product maturity and improved integration speed.
- **Increased product interoperability:** Around 70% of vendors reported increases in their interoperability with other vendors, and over 90% of vendors had more confidence in the interoperability of their products.
- **Greater certification readiness level:** By the end of the SONIC Labs programme, around 60% of the products tested were fully ready to be submitted for certification. This represented a 50% increase in readiness level compared to onboarding stages.
- **Faster entry into UK market by international vendors:** SONIC Labs provided vital information about UK system requirements to foreign vendors. This offered valuable insights to guide product development, optimisation, and market strategies.
- **Accelerated learning curves across testing community:** Knowledge sharing with SONIC Labs allowed for a faster set-up of testing facilities and processes, avoiding duplication of errors and enhancing capabilities for cutting-edge innovation.
- **De-risked innovation for vendors and adopters:** Testing activities in SONIC Labs allowed vendors to identify and solve integration and operational challenges earlier than would have otherwise been possible. This enabled a strategic allocation of resources and implied greater confidence by adopters who had been offered already tried-and-tested multi-vendor solutions.
- **Enhanced transparency for adopters:** SONIC Labs provided comparative insights across vendors and Open RAN architectures. These learnings allowed operators to validate vendor claims and explore architectural options without the commercial and operational exposure of live network deployments.

Overall impact

SONIC Labs supported the increased availability of functional and system-ready multi-vendor solutions in the UK, which is central to the success of Open RAN. The programme boosted vendor confidence in product interoperability through essential system insights (for instance, system requirements, user preferences, regulation). This, in turn, informed resource allocation, product prioritisation, and go-to-market strategies.

The opportunities to test and integrate products allowed vendors to identify and address operational issues early and gain valuable procedural learnings on how to efficiently develop multi-vendor solutions in the future. In this way, SONIC Labs accelerated learning curves for vendors who were better positioned to progress products with greater certainty and were better positioned to initiate innovations in the future.

Greater ecosystem collaboration enabled an efficient flow of technical knowledge and evidence of new, functional multi-vendor solutions emerging from within it. The multilateral connections amplified knowledge spillovers across sectors and across countries, lowering information barriers to entry into the UK market and the launch of new neutral testing labs. It also created a stable channel through which to raise awareness and deliver evidence-based insights to UK adopters on emerging multi-vendor solutions.

Insights

- SONIC Labs was valued as an independent and neutral organisation, which increased confidence in results and enabled product validation in real multi-vendor Open RAN environments.
- Vendors gained critical procedural knowledge on parameter exchange, system configuration, and integration processes, widely seen as the most valuable outcome of the programme.
- Participation guided product simplification and user-centred improvements, informed by hands-on testing with real RAN elements and other vendors' interfaces.
- Vendors benefited from SONIC Labs' state of the art facilities, specialist expertise, diverse cohort themes and testing equipment that would otherwise be costly or inaccessible.

QUICK LINKS

> SONIC Labs provided a practical way to understand how these capabilities are developing and maturing, and how they drove innovation, improved performance, and delivered operational benefits–ultimately translating into benefits for people and businesses.

Simon Burley
Technology Director, Ofcom

Business model development

This intervention aimed to support the commercialisation of Open RAN technologies to accelerate the launch of new Open RAN products and services in the UK. It was led by Workstream 3 supporting prototypes, validation and advancing solutions using the SONIC Labs facilities.

Overall, SONIC Labs support for business model development succeeded in enhancing vendors' commercial capabilities and signposting new multi-vendor solutions to the right opportunities for adoption.

Key results

SONIC Labs participants benefited from the business model development intervention in several ways:

- **New commercial leads:** 17 vendors reported new commercial partnerships, sales or sales leads following the end of the programme at any of the cohorts. This represented 72% of all the vendors involved and highlights the positive effect SONIC Labs' commercialisation activities had in expanding business growth opportunities.
- **Enhanced innovation capabilities of vendors:** Four vendors reported new job opportunities and dedicated more resources to R&D in the UK following their engagement with SONIC Labs, reflecting the increased confidence in them.
- **Additional innovations in Open RAN:** By the end of the SONIC Labs programme, 85% of respondents reported they had initiated the development of new Open RAN products. Vendors made use of the knowledge acquired to design products that met UK telecommunications and system operator requirements.
- **New entrants into the UK Open RAN market:** Alongside technical testing, SONIC Labs' commercialisation, network-building, and awareness-raising activities increased credibility of Open RAN solutions from foreign vendors solutions in the UK, enhancing commercial pathways.
- **Pipeline of vendors and multi-vendors:** Open RAN adopters have access to vendors offering viable products and sustainable business models. SONIC Labs has played a key role in reducing innovation risks and increasing industry confidence.

Overall impact

These interventions had positive effects in empowering vendors to explore new applications of their products in different industries, and initiate new developments for Open RAN products, showing the potential spillover effects and multiplying benefits the programme will have in the future.

Feedback from the vendors showed how SONIC Labs helped bridge the gap between technical capability and market readiness by clarifying deployment pathways, product roadmaps, and scaling opportunities. It was also said that by easing insights and opportunities to inform vendors' go-to-market strategies it accelerated the development of new Open RAN solutions.

Overall, the accumulation of this work stimulated business growth, expanded future product pipelines, and validated that there is a viable market for emerging multi-vendor solutions when the right support structures are in place.

Insights

- Ecosystem-matching activities were seen as highly valuable, supporting trust-building and collaboration between vendors and demonstrating how solutions work when embedded within existing technology environments.
- However, mediating cross-sectoral collaborations requires special attention. Matching partners within a programme required consideration of resources, motivations and levels of engagement by different partners to avoid tensions or mismanaged expectations in the process. Vendors expressed a desire for greater engagement with system operators in future activities.
- Operators continued to have concerns around vendor sustainability, roadmap maturity, and long-term support models. More opportunities for real-world field deployments would help build confidence and generate practical evidence of solution performance.

Ecosystem building

This intervention aimed at building connections in the Open RAN ecosystem where they otherwise were unlikely to occur. Success in this area would lower barriers to market entry, increase confidence in Open RAN solutions, and drive further innovations. All workstreams were engaged in creating a cohesive Open RAN ecosystem. From consolidating existing relationships between vendors to establishing new connections between vendors and system operators, the networks facilitated by SONIC Labs enabled greater knowledge transfer and commercial opportunities.

This collaborative approach helped show where UK firms had strong capabilities, highlighted the need for government investment to accelerate progress, and supported international firms in preparing products for mobile network operator requirements.

Key results

SONIC Labs helped to realise several benefits of creating a vibrant and engaged ecosystem:

- **Increased national collaboration & partnerships:** 15% of vendors responded to have seen “some” or “significant” improvements in their collaboration with other national programmes. Vendors reported better market justification, awareness of opportunities, and product validation as a result.
- **Increased international collaboration:** 18% of vendors reported “some” or “significant” improvement in collaborations with international programmes. Foreign vendors found it easier to enter the UK market and reach UK customers.
- **Enhanced cohesion in the international testing community:** SONIC Labs contributed to the creation of an international community of neutral testing laboratories aimed at enhancing the visibility of multi-vendor solutions, increasing evidence availability, and creating momentum towards Open RAN systems around the world. Working together also amplified the visibility and credibility of the movement and the actors involved.
- **Knowledge spillovers:** SONIC Labs provided a platform for adopters and vendors to share knowledge about the challenges and opportunities for Open RAN development. The evidence-based and neutral learnings led to a positive cross-pollination of ideas and unexpected benefits, including new commercial partnerships.

Overall impact

By creating ad hoc channels of collaboration and tailored engagement models, SONIC Labs contributed to the creation of a global testing community that was not present at the time of the government's '5G Diversification Strategy'. Active and sustained engagement between stakeholders strengthened the maturity of the Open RAN ecosystem, allowing it to support a shared understanding of existing and emerging priority areas. This continued collaboration fostered a more global and holistic perspective on the challenges ahead and supported the development of credible alternatives to traditionally monolithic systems.

Insights

- Vendor-to-vendor relationships were highlighted as the most valuable outcome, as collaboration enabled knowledge sharing, benchmarking, and product improvement.
- Process-focused learnings, particularly on how to integrate effectively with other vendors, were seen as the more valuable learnings from the programme.
- Vendors appreciated the visibility that SONIC Labs provided for their solutions and platforms. Visibility and ongoing post-testing commercialisation support are necessary to maintain the programme's success.

Narrative building

This intervention sought to articulate and align ecosystem actors behind a common Open RAN vision. This would enable increased confidence in Open RAN solutions and accelerate momentum in the ecosystem by driving future transformative innovations in Open RAN.

Workstream 4 led on leveraging strategic partnerships with operators, vendors, research organisations, government bodies and international stakeholders to increase confidence in Open RAN. Through its outreach, SONIC Labs remained in step with industry needs and contributed to national and international development.

Narrative-building interventions had an amplifying effect on the outcomes outlined above. By increasing the availability of shared knowledge and an improved understanding of Open RAN across the ecosystem, SONIC Labs created self-sustaining mechanisms for generating consistent and evidence-based messaging around Open RAN.

Supported by technical evidence on the functionality of vendor solutions and commercial case studies, the broader ecosystem is more aligned around the benefits and opportunities afforded by Open RAN. The channels supported by the ecosystem building activities created mechanisms to sustain this alignment in the future as Open RAN challenges evolve.

Key results

SONIC Labs participants reported various benefits from the work around building a strong narrative on Open RAN technology:

- **Increased availability of shared knowledge:** A lack of trust and transparency was flagged as an important barrier to entry into the market. The programme's activities led to an increase in the availability of shared knowledge by vendors which contributed to their understanding of challenges and opportunities in Open RAN ecosystem on topics like policy regulations, perceptions, system operator requirements. Around 70% of vendors reported "some" or "significant" improvement in the availability of shared knowledge of Open RAN and collaborations with ecosystem actors. Vendors gained confidence in their products and their effectiveness within the networks and strengthened commercial messaging around product reliability and integration capabilities.

- **Increased awareness of opportunities in Open RAN:** Vendors reported that the increased understanding of the Open RAN ecosystem and its challenges inspired refinements of their product roadmaps and overall business strategies. Vendors also reported exploring new application areas like communication services and satellite operations and continuing their collaboration with vendors beyond the end of the programme.
- **Greater drive and credibility of the transition towards Open RAN:** Momentum around credible and validated solutions created a community of testing organisations that did not previously exist.

Overall impact

SONIC Labs created positive feedback loops across the Open RAN ecosystem, ensuring that an expanding supply of innovative solutions is met by informed and credible demand. The robust evidence generated through SONIC Labs has been effectively translated into insights for decision-makers and key stakeholders.

By acting as both a benchmark and a source of inspiration, the programme has strengthened commercial narratives around reliability and performance, improved differentiation in market standing, and increased customer confidence. In doing so, SONIC Labs grew transparency, aligned closely with policy goals to broaden vendor participation, and helped shape how businesses articulate value and engage with emerging market opportunities worldwide.

Insights

- More attention is needed on setting up seamless feedback loops between evidence-generation and awareness-raising activities to have greater impact.
- More evidence is needed of the real-life system deployments of Open RAN solutions.

Conclusion & summary findings of the interventions

> SONIC Labs not only delivered its core mission—it has helped shape the future of an open, innovative, and globally competitive telecommunications ecosystem.

By accelerating Open RAN product maturity, validating multi-vendor interoperability in real-world environments, and strengthening certification readiness, SONIC Labs demonstrated the power of neutral testing, shared learning, and industry-wide collaboration.

It provided operators, vendors, and policymakers with trusted, deployment-grade evidence that will underpin future commercial rollouts and fuel a more resilient, diverse, and dynamic UK telecommunications landscape. These achievements have clear, system-wide benefits.

Mobile operators now have access to independently verified performance results, a more straightforward path to certification-ready components, and reduced deployment risks proved through practical end-to-end testing. Vendors have accelerated product maturity, strengthened their routes to market, and gained commercial momentum anchored in impartial test results.

Policymakers and regulators have gained a reliable evidence base to inform certification frameworks, resilience planning, and wider adoption of open network architectures. Together, these insights show overwhelming support for SONIC Labs as a nationally significant capability; one that has laid a strong foundation for the next generation of diversification initiatives.

The table below summarises the core impacts of Digital Catapult and Ofcom's SONIC Labs programme. It shows how the interventions collectively delivered against the programme's overarching aims. This diverse set of insights shows how the neutral test environment, cross-sector engagement and knowledge-sharing mechanisms accelerated product maturity, improved interoperability, created new commercial and collaborative pathways, and helped set up the foundations for a more open, diverse and globally connected UK Open RAN ecosystem.

Increased confidence in Open RAN solutions

- Increased awareness of viable Open RAN solutions.
- Increased understanding of Open RAN challenges and opportunities.
- Increased confidence in product interoperability.
- Increased momentum in Open RAN community.
- Enhanced transparency and access to neutral, reliable evidence for adopters.

Lowered the barriers of entry to the UK Open RAN market

- New national & international collaborations created.
- Enhanced knowledge of system requirements and UK ecosystem.
- Increased level of knowledge -sharing and transparency.
- New commercial partnerships and sales leads.
- New, international vendors entering UK market.

Transformative Innovations in Open RAN

- Increased product certification readiness and interoperability.
- Increased inwards investment into R&D in Open RAN.
- New Open RAN products in development.
- Reformed product roadmaps, centred on Open RAN technologies.
- New industry applications for Open RAN solutions.

New Open RAN products & services in UK

- Accelerated product maturity.
- Pipeline of certification-ready products.
- Faster route to market and commercial readiness.
- Strengthened product roadmaps and strategic decision-making.
- Enhanced knowledge spillovers and improved innovation capabilities.

Enhanced resilience of the Open RAN ecosystem

- Consolidated international community of testing laboratories.
- New cross-sectoral channels of collaboration created.
- Increased recognition of the future of Open RAN and understanding of challenges to move forward.

Looking forward, to sustain these benefits, there is a need to:

Enhance support for new and international vendors

Transparency was vital in welcoming new and international vendors to the UK market. These entrants benefited considerably from SONIC's support in navigating UK requirements. Offering more structured onboarding materials and technical primers would provide a smoother entry pathway while encouraging broader participation.

Strengthen conformance and certification pathways

Clear, trusted certification criteria give operators confidence in product maturity and help vendors demonstrate readiness more effectively. Expanding and publishing these criteria would further reduce uncertainty across the ecosystem.

Strengthen structured feedback cycles across stakeholders

Structured feedback cycles between vendors, operators, and policymakers should be introduced to sustain market momentum. These exchanges were highly valuable during the programme and formalising them would enable better alignment around evolving technical and commercial requirements.

Build stronger international alignment and cross-lab collaboration

A robust integration framework can also strengthen opportunities for international alignment. SONIC Labs' contribution to an emerging global testing community showed how agreed methodologies reduce duplicated effort and improve interoperability for vendors targeting multiple markets. Enhancing collaboration with international laboratories would extend this value and position the UK as a leader in shaping Open RAN practices.

QUICK LINKS

> We recognise that repeatable and consistent testing is essential. That is how test results become credible and accepted by operators, by grounding them in real, operator-defined performance requirements.

Tiffany Lin
Deputy Manager, Department of ICT Deployment & Industry Service, ITRI

Looking forward

The next generation of open and intelligent networks

FUTURE DEVELOPMENT

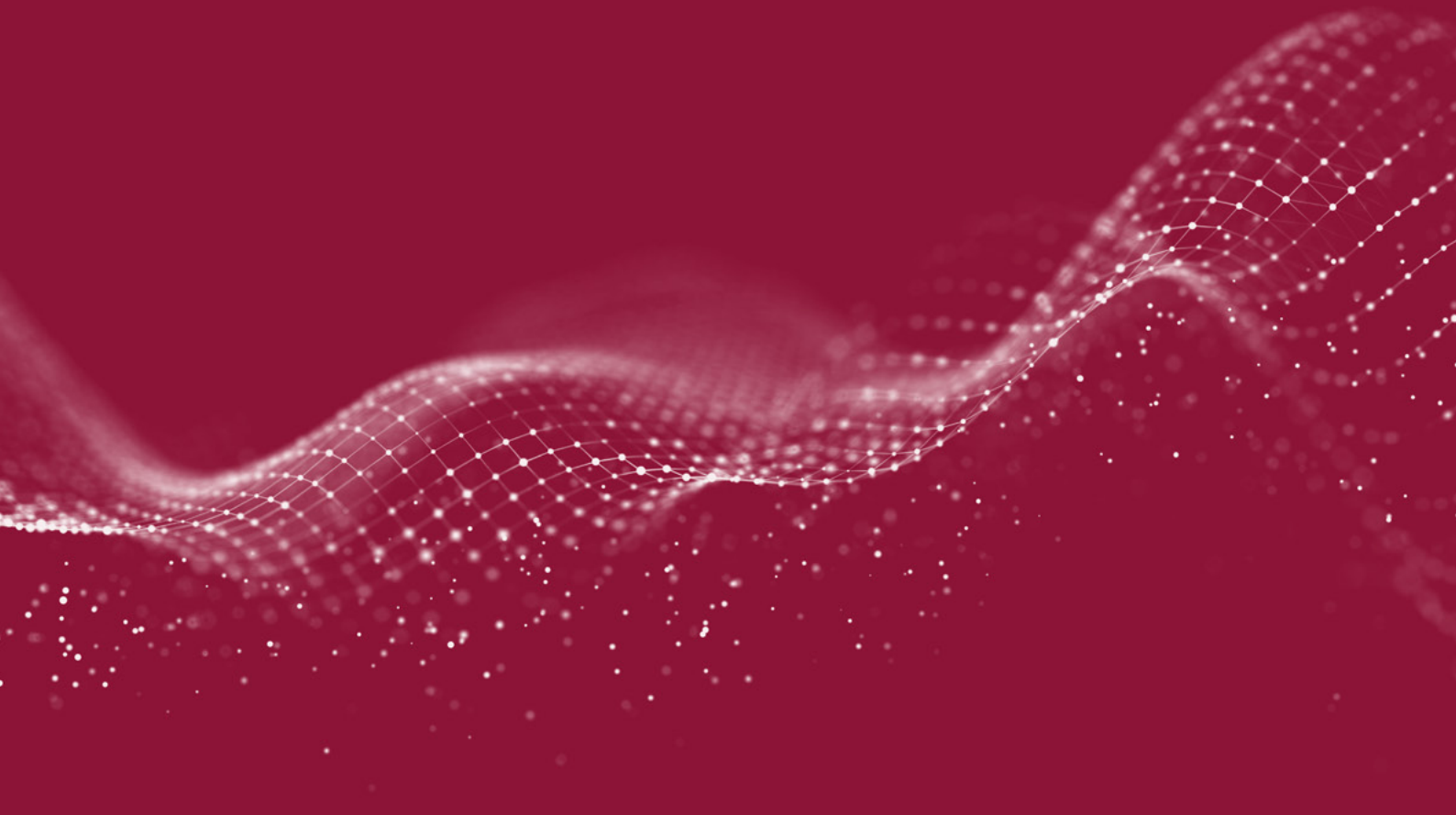
Open RAN supports future networks, AI-driven operations, and supply chain resilience. The next phase of the sector's evolution requires established capabilities rather than ad hoc projects.

STRONG FOUNDATION

SONIC Labs provided a solid foundation for future testing, innovation, collaboration, and certification, offering government and industry flexible options rather than fixed solutions.

ONGOING LEGACY

SONIC Labs' capabilities and partnerships establish a sustainable foundation for Open Networks, AI-enabled telecommunications, and emerging technologies, supporting the goals of the Advanced Connectivity Technology requirements.



SONIC Labs facilities and ways of working

SONIC Labs proved that independent, standards-aligned testing and integration are essential for the UK's telecommunications future. It accelerated product maturity, increased vendor confidence, advanced TRL progression, improved interoperability, and built ecosystem momentum. These achievements reflect its role as a national capability that bridges the gap between technical promise and deployment.

The facilities were central to this value. SONIC Labs' multi-site architecture featured enterprise-grade infrastructure at Euston Road and Riverside House. Indoor and outdoor reference networks enabled real-world testing for operators and policymakers. Commercial-grade networks, high-capacity connectivity, and RIC-ready environments supported both indoor densification and outdoor deployment, offering vendors a flexible space to test, integrate, refine, and validate solutions across TRLs 5–7.

With its OTIC designation, SONIC Labs met internationally recognised standards for conformance, interoperability, and certification. The status elevated the facility from a national asset to a trusted node in the global lab network, enabling harmonised methodologies, shared roadmaps, and comparable results. The partnerships delivered reproducible tests, aligned approaches to AI-enabled RAN innovation, and strengthened global confidence in the UK's technical leadership.

Equally important was the operating model supporting the facilities. The structured, cohort-based approach, combined with strong governance from the Strategic Advisory Board and industry engagement groups, created value. Continuous feedback reduced risks in multi-vendor integration and generated reusable knowledge. This model enabled faster vendor onboarding, repeatable testing, and fostered a collaborative, maturing ecosystem.

SONIC Labs' infrastructure, partnerships, and model create a resilient platform that advances Open RAN, AI-enabled telecommunications, and advanced connectivity from concept to real-world use. These foundations strengthened the UK's influence and position as an innovation leader.

As a result, the UK is better positioned to influence global open networking practices. It can accelerate cross-market adoption and ensure that UK-developed technologies are deployment-ready, interoperable, and competitive internationally. SONIC Labs leaves a mature, internationally connected capability. It serves as a springboard for the next era of open, intelligent, and future-ready telecommunications networks.

QUICK LINKS

> As artificial intelligence becomes increasingly embedded in telecommunications, the importance of data, interoperability, and intelligent control only grows. SONIC Labs gives us insight into these challenges today, while also informing how we look towards 6G and beyond.

Simon Burley
Technology Director, Ofcom

Government priorities

In its 2025 Industrial Strategy, the UK Government positioned ACT, including Open RAN, as one of the six frontier technologies that will shape the nation's economic, security, and technological trajectory over the next decade. ACT is expected to serve as a foundational driver of UK prosperity, enabling the country to emerge as one of the top three global locations to create, invest in, and scale high-growth technology businesses by 2035.

ACT will become a central to the development of future industries—powering autonomous clean energy systems, next-generation manufacturing, AI-enhanced life sciences, and resilient defence capabilities. It will underpin the UK's digital economy, providing the high-performance infrastructure required for future innovation and competitiveness.

The government's early financial and infrastructure commitments laid the groundwork for this future. An initial four-year £240 million research investment will catalyse breakthroughs in next-generation connectivity technologies, accelerating innovations across advanced wireless systems, photonics, satellite communications, and the evolution towards ACT. Over the coming years, these areas will drive new markets, create globally competitive UK capabilities, and strengthen national technological sovereignty.

In parallel, the £130 million invested in laboratory and testing infrastructure is expanding the UK's long-term capacity for telecommunications research and development. This growing capability will be decisive in positioning the UK at the forefront of global telecommunications innovation—supporting future standards, interoperability frameworks, and the development of secure, high-performance communication networks. SONIC Labs demonstrated Digital Catapult's ability to leverage the UK's R&D capabilities to create material change.

By 2030, the government aims to establish a stable R&D funding environment across digital and technology sectors, targeting an annual investment of £22.6 billion. This sustained funding approach is designed to unlock long-term innovation cycles, stimulate private-sector investment, and ensure the UK is still an essential hub for the commercialisation of advanced network technologies.

Digital Catapult will continue to help to drive forward the government's digital ambitions—building the collaborative ecosystems, test environments, and innovation pathways required for the UK to lead globally in next-generation connectivity. Through continued partnership, experimentation, and strategic programme delivery, the UK is poised to shape the future of ACT and secure its position as a global centre for high-growth technology innovation.

On-going support for Open RAN

Support for Open RAN development in the UK requires ongoing coordinated action from government, industry, and the research community. National alignment around interoperability and security standards is also an important consideration and will require further collaboration with the ACT industry and those who play a key role in adoption and deployment.

Universities and research institutions are essential in pushing forward the underlying technologies, experimenting with new architectures, and delivering independent evaluations that confirm performance, resilience, and openness. Their insights enable wider knowledge sharing across the ecosystem, reducing the uncertainty for industry as it assesses emerging solutions. In doing so, they strengthen domestic understanding and contribute valuable evidence to global Open RAN developments.

Finally, industry partners—including operators, vendors, and system integrators—are vital in translating Open RAN concepts into operational reality. The industry must drive large-scale adoption by supporting R&D&I institutions through real-world deployments, open interfaces, and collaborative ecosystems that break down traditional vendor silos.

Together, these coordinated efforts across government, industry, and academia create the ecosystem needed to advance Open RAN and emerging connectivity technologies. With this foundation in place, discussion now turns to future technical capabilities that will enable this progress.

Open networks

Open networks represent a fundamental shift in how telecommunications infrastructure is designed, deployed, and operated, creating the foundations for automation, intelligence, and large-scale programmability.

By moving away from vertically integrated, vendor-locked systems towards modular, software-driven architectures with open interfaces, open networks combine components from multiple vendors. This is central to modern telecommunications networks, where flexibility, real-time control and rapid innovation are as important as raw performance.

This transition has been driven by the growing demands of ACT which need networks that can adapt dynamically to changing traffic, user behaviour, and service requirements. Open networks respond to this challenge by decoupling hardware and software, adopting cloud-native design principles, and aligning to globally recognised standards.

These characteristics make open networks inherently more amenable to automation and analytics, providing the observability, interfaces and control points needed to support AI-enabled network operation. As a result, open networks can be considered as a critical enabler of AI in telecommunications. This was shown throughout the SONIC Labs programme, particularly through the work on RICs, AI-enabled energy efficiency, and closed-loop optimisation in both indoor and outdoor environments.

QUICK LINKS

While these capabilities introduce significant benefits—ranging from reduced vendor lock-in and improved supply chain resilience to faster innovation cycles—they also introduce new challenges. Open networks shift greater responsibility for integration, testing and lifecycle management onto operators and the wider ecosystem. The introduction of AI compounds this complexity. Achieving carrier grade performance, reliability and security depend on robust system level validation, repeatable testing, and trusted assurance mechanisms.

It is within this landscape that SONIC Labs' insights become significant. By providing an environment for integrating, testing, and validating Open Network solutions—including AI-enabled RAN use cases—SONIC Labs helped to bridge the gap between architectural promise and operational reality. The programme demonstrated how open networks and AI can be developed together in a controlled, evidence-led manner, supporting confident adoption today while laying the groundwork for intelligent, open, and resilient networks in the future.

AI in telecommunications

AI is becoming a central driver of transformation across the telecommunications sector. The rise of the RIC and AI-driven optimisation is reshaping how networks are operated, enabling automation, dynamic resource allocation, and energy efficient management at scale.

Operators are also moving towards cloud-native, virtualised, and disaggregated networks. This shift highlights the growing role of telecom operators and cloud service providers in delivering real-time, low-latency AI capabilities across distributed infrastructure.

Key characteristics of open networks that directly support AI-driven telecommunications include:

- Programmability and open interfaces, enabling AI systems to observe network state and actuate control decisions in real time.
- Virtualised and cloud-native infrastructure, providing scalable compute platforms for AI/ML workloads across centralised and distributed locations.
- Multi-vendor interoperability, which increases architectural diversity while creating a need for intelligent orchestration and assurance.
- System-level visibility, enabling data-driven optimisation of performance, resilience, and energy efficiency.

SONIC Labs' work illustrated how open network architecture, such as Open RAN, provided the interfaces, APIs, automation, and transport architecture needed to support AI in telecommunications.

While AI is rapidly proliferating across network management, threat detection, resource optimisation, and customer experience, there is currently no formal methodology for verifying or certifying AI models used in telecom environments. This creates risks around explainability, robustness, security, and bias—particularly when AI systems make automated decisions in critical national infrastructure.

SONIC Labs has identified the need for new verification, validation, and testing frameworks to ensure safe adoption. Establishing such frameworks will be essential as AI becomes a foundational component of future 5G Advanced and ACT.

ACT in the UK

Even as SONIC Labs draws to a close, the UK's Open RAN and ACT landscape is still evolving rapidly, supported by a growing community of innovative start-ups and a solid foundation of test, validation, and integration capability.

UK-based Open RAN companies already span innovative capabilities that collectively strengthen the UK's position in the global open networking ecosystem. These firms build essential technologies but can also demonstrate them in real-world environments, helping the UK advance toward more open, diverse, and resilient telecommunications networks. They include companies with UK venture capital backing, UK engineering and UK manufacturing.

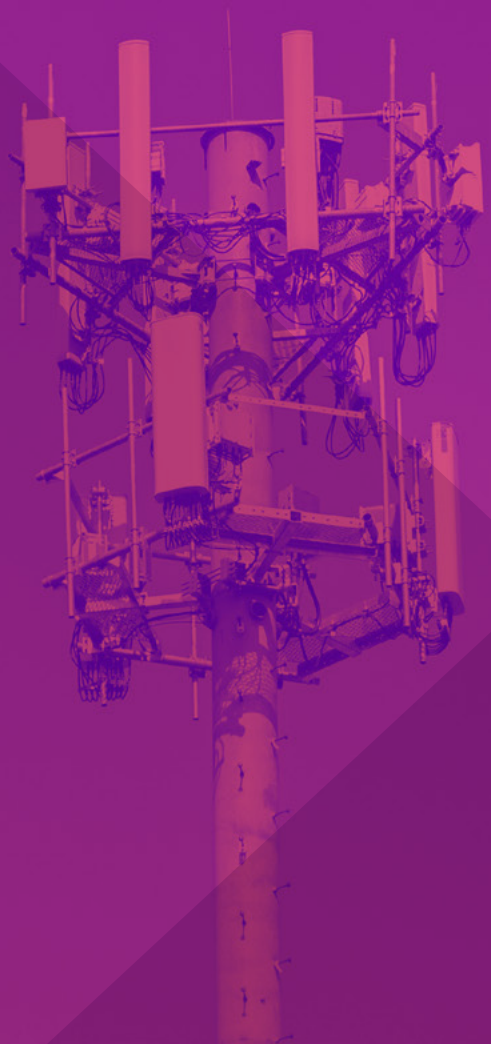
SONIC Labs has enabled companies of all sizes to integrate, test, and validate Open RAN solutions at pace. By lowering the entry barrier for emerging vendors, accelerating product readiness, and enabling transparent multi-vendor interoperability, SONIC Labs provided the UK with a capability that few global markets own. It acted as both a national proving ground for Open RAN technologies and a catalyst for commercial deployment—supporting a growing ecosystem that increasingly includes both domestic innovators and international players investing in UK-based R&D, engineering, and testing capability.

As Open RAN adoption evolves, the UK stands at a pivotal moment. Building on the momentum created by SONIC Labs, the country can establish itself as a global leader in open, intelligent, and software-defined networks. By sustaining and expanding this collaborative testing ecosystem—linking researchers, startups, scaleups, global vendors, and operators—the UK can drive faster innovation, strengthen supply chain resilience, and create new commercial pathways for cutting-edge ACT.

With the right long-term commitment, the UK can shape the next generation of mobile networks: interoperable by design, powered by domestic innovation, and built on an open architecture that enables competition, creativity, and global leadership in 5G and beyond.

Appendix

1. Detailed insights into the evolution of the programme
2. Programme funding overview
3. Industry group detail
4. International collaborations detail
5. Lab build detail
6. Cohort overview
7. Vendor engagement summary
8. Technical report summary
9. Community of Practice
10. Annual report summary (2025–2026)



QUICK LINKS

Appendix 1: Detailed insights into the evolution of the programme

Open RAN systems were envisaged back in 2015. By 2018, the C-RAN Alliance and XRAN forum merged to create the O-RAN Alliance.

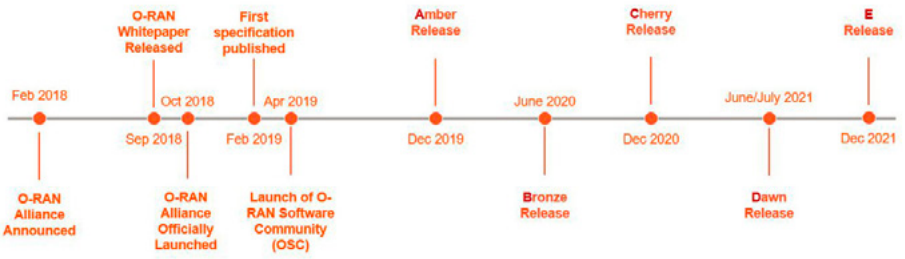
XRAN FORUM + C-RAN ALLIANCE = O-RAN ALLIANCE

The key principles of the OPEN RAN Alliance included:

- Leading the industry towards open, interoperable interfaces, RAN visualisation, and big data-enabled RAN intelligence.
- Maximising the use of common-off-the-shelf hardware and merchant silicon and minimising proprietary hardware.
- Specifying APIs and interfaces, driving standards to adopt them as appropriate, and exploring open source where appropriate.

The origins of O-RAN have always included both Open Fronthaul, Cloudification, NFV and Disaggregation.

O-RAN TIMELINE



While some limit their scope of discussion to mean devices in the Open-Fronthaul chain which are interoperable, and others focus upon the virtualisation of RAN functions and their execution on regular Commercial Off the Shelf (COTS) servers, this report considers multi-vendor Open-FH solutions whether with traditional, virtualised (vRAN) or Centralised or Cloud-RAN (CRAN) basebands just as the founders proposed.

Pre-SONIC

In 2021 the market assessments mostly started with the word 'immature'. There are solid reasons for this. The O-RAN Alliance had been formed in 2018 by the merger of the C-RAN Alliance and the xRAN Forum. The xRAN Forum promoted a software-based, extensible Radio Access Network (xRAN) and to standardising critical elements of the xRAN architecture. The C-RAN Alliance aimed to promote the development and adoption of a centralised, cloud computing-based architecture for radio access networks. This architecture, known as Cloud-RAN, supports various wireless communication standards and aims to address the limitations of traditional RAN architectures.

The C-RAN Alliance was primarily made up of China Mobile and other Chinese vendors, while the XRAN Forum consisted of operators and vendors from the U.S., Europe, Japan, and South Korea. Founder members included operators AT&T, Deutsche Telekom, NTT DOCOMO, SK Telecom, Telstra and Verizon, and vendors Altiostar, Amdocs, Aricent, Ciena, Cisco, Commscope, Fujitsu, Intel, Mavenir, NEC, Nokia, Radisys, and Samsung.

At the time of the founding of SONIC in July 2021, the Alliance was only on their 4th release and weighted down by the growth to over 300 member companies.

2020/21 started to see consolidation in the market and sub-ecosystems forming, such as Rakuten buying Altiostar and Robin.io to combine them into what would ultimately become Rakuten Symphony. There were many PoC and trials, and the major Mobile Network Operator Groups had just given their feedback to these in the form of Open RAN Technical Priority Document, by the Open RAN MoU signatories (Deutsche Telekom, Orange, Telefónica, TIM and Vodafone) in June 2021, directing efforts to tackle that immaturity.

Interim

3 further technical priority releases have subsequently been made by these 'brownfield' operators. While they have all made commitments to buying only Open RAN from 2025 and to carry 30% of their traffic over Open RAN by 2030, their 5G networks are built or committed by legacy vendors. They are starting to make volume commitments in 2025, but revenues will start to flow in 2026. The lack of revenues has seen Open RAN pioneers Parallel Wireless retrench, Mavenir withdraw from the HW market after it invested heavily in Radios, while Altiostar IPR operates within the Rakuten Symphony brand.

Meanwhile in the greenfield space Rakuten in Japan, DISH in the US, and later 1&1 Versatel in Germany announced plans to build nationwide networks based upon Open RAN Standards.

While greenfield networks have found the freedom and innovation of O-RAN beneficial, the operational and cash implications of building networks means that all 3 have struggled with deployments. DISH's merger with Echostar, re-financing and now a National Roaming deal and spectrum sale with AT&T has seen a stop in Open RAN deployment as the now re-named Boost service aims to recover to the 10M customer it once had. Rakuten Mobile has taken 6 years to grow to the same number, while the Rakuten Symphony-powered 1&1 has hit 10M subscribers in Germany in just 2 years with its CRAN / Open vRAN network.

Trials–and now live deployments–of RAN Intelligent Controllers figure prominently as a second phase of O-RAN deployments. As an example, Qualcomm–generally associated with Mobile networks for their Device chipsets (with only a modest FSMXXX presence in Small Cell SoC)–are now entering networks with their Dragon Wing RAN Automation, a multi-vendor platform running Samsung's AI-powered Energy Saving Manager (AI-ESM) in Verizon's vRAN network.

Putting it all together

Within the past 4 and a half years, a combination of standardisation, rising standards and Technology Readiness Level (TRL) of products, and a broad consensus on more flexibility for oRU interconnect, fewer options for AAU interconnect has delivered reduced friction interworking. OpenFrontHaul integration is now weeks for oRU and months for AAU with G Reigns and Amplitech5G integrating a 64R64R mMIMO during a December 2025 SONIC PlugFest. While there is a perception that a DRAN-for-DRAN COTS solution will require more energy as an Open vRAN solution than as proprietary, this is the only corner-case.

Appendix 2:
Programme funding overview

Total programme cost by year

Financial year	Budget (£)
21/22	528,951
22/23	6,083,375
23/24	8,562,561
24/25	4,964,181
25/26	5,500,191
Total	**25,639,259**

Total programme cost by category

Cost category	Budget (£)
Labour	9,401,835
Overheads	3,760,734
Materials	1,555,064
Capital usage	5,322,164
Travel & subsistence	148,396
Other	3,173,264
Subcontractors	2,277,802
Total	**25,639,259**

Source: CR18 CFP

Appendix 3: Industry group detail

Industry groups

Since its inception, SONIC Labs was dedicated to understanding the true state of Open RAN maturity through active industry engagement. This included gathering global insights on the benefits and challenges of Open RAN development, guided by our Strategic Advisory Board and three dedicated industry working groups.

Strategic Advisory Board

The Strategic Advisory Board offered insight and guidance to shape a sustainable model for delivering the technical and innovation capabilities needed to advance open networks and diversify the UK's 5G supply chain. The Board brought together leading public and private stakeholders from across the telecom's ecosystem. Comprising accomplished experts, the Board provided independent, forward-looking advice and a dynamic perspective to benefit the wider industry.

Members included:

Freshwave
Mavenir
Mobile UK
NEC
techUK
Telecom Infra Project
University of Bristol
Wireless Infrastructure Group

The Strategic Advisory Board's key responsibilities were to:

- Support the SONIC Labs core delivery team and Governance Board by providing expert insights and strategic knowledge.
- Align SONIC Labs with key national and international initiatives related to telecoms diversification and Open RAN development.
- Advise on emerging challenges, opportunities, technology roadmaps, and capabilities relevant to SONIC Labs and the broader Open RAN ecosystem.

The Mobile Network Operator Industry Group

Chaired by Mobile UK, this group brought together key stakeholders from the three leading UK mobile network operators, EE, Virgin Media O2, and VodafoneThree. As major adopters of Open RAN technologies and products, the MNOs provided valuable insight into emerging product requirements and offer exposure to new innovators participating in SONIC Labs. Their input helped shape key areas such as testing priorities, future vendor cohorts, and field trial design—ensuring these activities delivered maximum value to vendors and potential users of Open RAN solutions in the UK.

Wireless Infrastructure Industry Group

This group represented the broader UK network deployment ecosystem, focused on organisations involved in deploying Open RAN for neutral host, in-building, and private network applications. It leveraged the expertise of Wireless Infrastructure, Neutral Host, and Telecoms Services Providers to identify and address the practical deployment challenges facing Open RAN adoption in the UK. The group's insights helped ensure that product capabilities reflected real-world needs while supporting the SONIC Labs programme and wider UK Government ambitions for network innovation and diversification.

Members included:

Boldyn Networks
Cellnex
CGI
Freshwave
Telent
Wireless Infrastructure Group

Testbed Industry Group

Comprising commercial, public sector, and academic representatives from both the UK and abroad, this group focused on collaboration across Open RAN and 5G diversification testbeds. Its goal aligned and coordinated with other Open RAN testing initiatives, simplifying the journey for vendors as they bring products to market. Activities included exploring ways to streamline innovation and testing processes between different labs, aligning testing methodologies, and reducing duplication through shared approaches to testing and knowledge sharing.

Members included:

BT
Centre for Development of Telematics (C-DOT)
European Advanced Networking Test Center
i14y Lab/Deutsche Telekom
Industrial Technology Research Institute
NEC
Institute for Telecommunication Sciences (a division of the National Telecommunications and Information Administration)
Rakuten
Telecommunications Engineering of the University of Malaga
Telecom Infra Project
University of Bristol
University of Surrey
University of Sussex
VVDN

Neutral Host (IB/OD) Industry Group

This group represented the broader UK shared network deployment ecosystem, focusing on neutral host in-building, outdoors and private network applications. It leveraged the expertise of MNO JOTS, Neutral Host, Equipment Vendors large & small, SIs and Telecoms Services Providers to identify and address the practical deployment challenges facing Shared Infrastructure adoption in the UK. The group's insights helped ensure that product capabilities reflected growing sustainability needs while supporting the SONIC Labs programme and wider UK Government ambitions for network innovation and diversification.

Members included:

VodafoneThree
VirginMedia O2
BT
Rakuten Symphony
Boldyn Networks
Cellnex
IONX
Freshwave
ONTIX
Wireless Infrastructure Group
Ericsson
Nokia
Samsung Networks
Parallel Wireless
1Finity
Antevia
Accelleran

Appendix 4: International collaborations detail

Encouraging and enabling innovative suppliers of 5G Open RAN products to engage with the UK telecoms ecosystem has been a central focus of SONIC Labs. The programme has worked to build and strengthen relationships across telecommunications communities—specifically collaboration with international counterparts—to promote greater diversity and resilience within the telecoms supply chain.

SONIC Labs' collaboration with global testing facilities has strengthened significantly over the years—progressing from initial relationship building to the exchange of ideas, and ultimately to formal **Memorandums of Understanding (MOUs)**. These agreements establish a clear framework for collaboration, fostering transparency, enhancing communication, and building long-term trust.

Industrial Technology Research Institute (ITRI)

The SONIC Labs' MOU with the Industrial Technology Research Institute (ITRI) focuses on enhancing development in the field of Open RAN testing and on the learnings that can be shared on testing lab activities from its world-leading innovation programme and research and development facilities.

The collaboration looks specifically at a common framework for repeatable, consistent testing and validation to reduce variability of results, as well as test plans for use cases for indoor testing scenarios of the Telecom Infra Project (TIP).

Our collaboratively developed test plan for indoor Open RAN small cell solution is used by ITRI as it works towards achieving the TIP Silver Badge. Within this jointly developed test plan, Digital Catapult has taken the lead on the interface IoT test cases based on the O-RAN Alliance architecture and has provided technical expertise to ITRI.

Our work with ITRI has allowed Digital Catapult to provide Taiwanese vendors a platform for interoperability and integration opportunities with other vendors, and to validate their capability through a neutral lab in a market other than Taiwan. The global priority for collaboration has also provided Digital Catapult the opportunity to be represented as a leading UK testing facility in ITRI's 5G Summit in Taiwan, bringing together key industry leaders and Open RAN innovators to share valuable takes on the current challenges, and to contribute to the co-evolution of our global telecom ecosystem.

European Advanced Networking Test Centre (EANTC)

Digital Catapult has established strong collaborative ties across Europe, most notably with the European Advanced Networking Test Centre (EANTC). EANTC has shown significant interest in the ongoing work at SONIC Labs and recognises our facility as a leader in the field.

This partnership has resulted in the signing of a Memorandum of Understanding (MOU), further strengthening our relationship with European testing facilities. The agreement sets out plans for joint, consistent, and repeatable testing under the O-RAN Alliance Plugfest framework—bringing institutions together to test, evaluate, and validate products and solutions. These efforts aim to accelerate the transition from specification to commercialisation of Open RAN, reinforcing global partnerships and driving innovation within the telecoms sector.

Centre for Development of Telematics (C-DOT)

Building on the solid foundation of the UK-India Technology Security Initiative (TSI), which prioritises telecommunications, SONIC Labs and the Centre for Development of Telematics (C-DOT) came together to sign an MOU. The agreement centres on Open RAN–related policy and technical collaboration, covering areas such as 5G Open RAN and the application of Artificial Intelligence in 4G/5G networks. This partnership represents a significant step forward in enhancing India–UK cooperation in telecommunications, driving innovation in Open RAN and next-generation networks, and supporting the development of global standards for emerging technologies.

National Telecommunications and Information Administration (NTIA)

The partnership between Digital Catapult and the National Telecommunications and Information Administration (NTIA) underscores a shared dedication to advancing technological innovation and deepening collaboration between the UK and the USA. Together, our facilities aim to accelerate the global adoption and deployment of interoperable Open Radio Access Networks (Open RAN).

Both organisations are committed to fostering cooperation among neutral labs involved in Open RAN development through their testing facilities, SONIC Labs and CRAIN Labs and have formally agreed to collaborate by sharing test plans, equipment capabilities, and best practices through ongoing engagement, events and workshops and knowledge exchange.

By building this relationship with the NTIA, Digital Catapult has represented the UK via our involvement in the NTIA's International Open RAN Symposium. Digital Catapult has supported by providing input into examining testing procedures, such as badging and certification, and to gather further insights on international Open RAN adoption through technical and policy collaboration and where UK testing facilities can support these initiatives.

Appendix 5: Lab build detail

Site 1 – SONIC Labs, Euston Road

The SONIC Lab core infrastructure is designed and built as an enterprise-grade comprising a fully redundant active-passive environment.

The networking infrastructure at Site 1 is designed to support high-speed fronthaul, and backhaul connectivity for Open RAN 5G operations. It includes a high-capacity Ethernet switching fabric supporting 10G, 25G, 40G, and 100G interfaces to enable low-latency and high-throughput data transfer. Time-sensitive networking capabilities are implemented to meet strict real-time performance requirements.

Precision synchronisation is ensured through the use of the Precision Time Protocol, enabling accurate timing across Open RAN components. The network fabric is optimised for low latency and high throughput and supports advanced networking features such as VLAN and SR-IOV for traffic isolation and efficient resource utilisation. Network interface cards optimised for high-performance packet processing are deployed, along with traffic generators and packet analysers for detailed performance testing. Redundant networking paths are provided to ensure high availability and reliability of the lab infrastructure.

The networking infrastructure interconnects O-RU, O-DU, and O-CU components and provides high-performance connectivity to the VMware compute clusters deployed in the lab. It enables testing and validation of Fronthaul interfaces and supports the measurement and verification of key performance parameters, including latency, jitter, and packet loss.

- Active–Passive Firewalls.
- Active–Passive 10Gbps Internet Backbone.
- 100GbE Capable Switching.
- High Performance Computing.
- NVIDIA GPU enabled servers.
- VMWare Private Cloud.

Site 2 – Ofcom, Riverside House

Site 2 is located at Ofcom Riverside House and is divided into two zones: the main lab space and the server room, which houses a 42U rack, primarily an indoor representative network site, evolving to host cohort components and test a truly distributed cohort-led ORAN system.

There is a 10Gbps layer two connection between Sites 1 and 2, allowing for a replication of services across Sites 1 and 2.

Site 3 – Indoor reference network

The primary objective of the Site 3 indoor reference network is to evaluate the deployment, scalability, and manageability of Open RAN systems in a large-scale indoor environment. In contrast to sites 1 and 2, Site 3 deployed Open RAN systems constituting Open RAN functions with a mostly M:1 mapping, i.e., multiple (up to 3) RUs per DU and up to 3 DUs per CU, one RIC. Site 3 supported the deployment of Open RAN systems consisting of 9 Radio Units (RUs), three Distributed Units (DUs), a Central Unit (CU) and RAN Intelligent Controllers (RICs), supporting field testing in indoor environments at scale. It is envisaged that the Site 3 indoor reference network will be utilised for experimentation designed towards addressing the following aspects pertaining to large-scale indoor Open RAN deployments.

- Validation of Open RAN as a connectivity solution for private enterprises, venues, campuses etc.
- Verification of scalability, stability, and management of Open RAN systems in indoor environments.
- Validation of mobility and handovers as users move across multiple RUs and DUs in an indoor environment.
- Maintenance of the reference network with up to 32 friendly users.
- Verification of RIC KPMs in indoor environments, and xApps deployed for Traffic Steering and Energy Saving use cases.

Fig. A5.1 presents the High-Level Design (HLD) for the Site 3 indoor reference network constituting.

- 9 Radio Units (RUs).
  - 6 Benetel RUs.
  - 3 Foxconn RUs.
- 3 Distributed Units (DUs) from Capgemini.
- 1 Centralised Unit (CU) from Capgemini.
- 1 RAN Intelligent controller (RIC) from Capgemini.
- 1 Element Management System (EMS) from Capgemini.
- 1 5G Standalone (SA) Core Network from Druid deployed in Digital Catapult SONIC Labs.

The 5G Core Network, CU, DU, EMS and RIC are hosted on COTS servers that are interconnected by switches, routers and firewalls in the SONIC Labs data centre. The Radio Units (RUs) are deployed across the 8th and 9th Floor at Digital Catapult office premises.

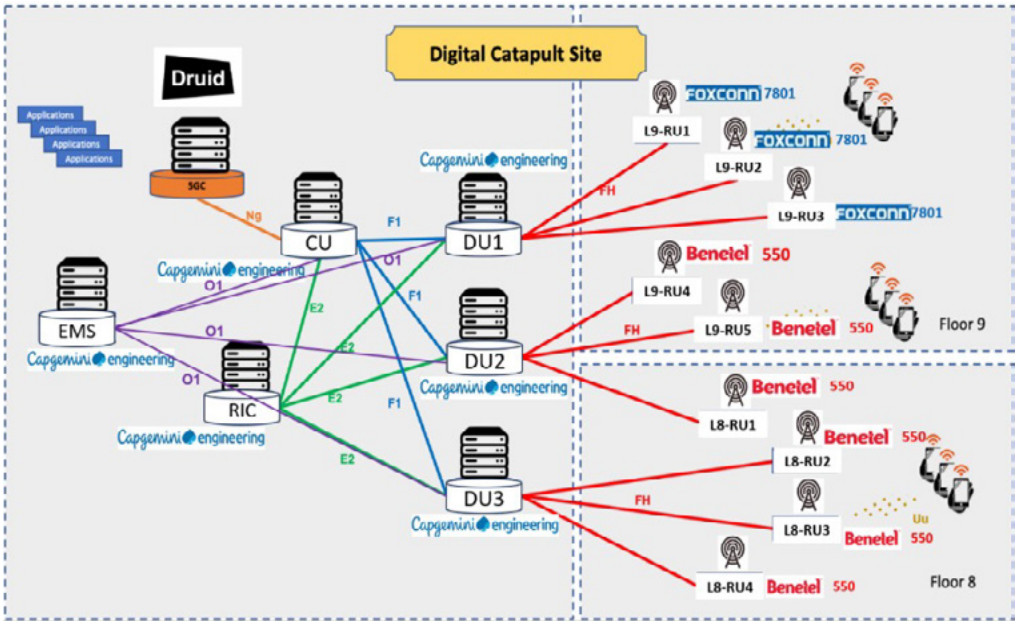


Fig. A5.1: Site 3 – Indoor Reference Network High Level Design (HLD)

Site 4 – Outdoor reference network

In contrast to Sites 1, 2, and 3, which were all indoor deployments, Site 4 deployed outdoor Open RAN systems comprising Open RAN functions with multiple RUs per DU (up to four RUs per DU) and multiple DUs per CU (up to three DUs per CU). It was envisaged that Site 4—the outdoor reference network—would be utilized for experimentation aimed at addressing the following aspects related to large-scale outdoor Open RAN deployments:

- Validation of Open RAN as a connectivity solution for private networks, venues, campuses etc.
- Verification of scalability, stability, and management of Open RAN systems in an outdoor environment.
- Validation of mobility and handovers as users move across multiple RUs and DUs in an outdoor environment.
- Maintenance of the reference network with up to 20 friendly users.
- Verification of RIC KPMs in an outdoor environment.

Site 4 Outdoor reference O-RAN based 5G network was deployed in 2 phases. Phase 1 covered a limited number of micro RUs in Fulham, two micro RUs only, and excluded Fulham Telephone Exchange (TE)

Phase 2 was more extensive and covered Parsons Green with all the micro RUs, as well as the remaining micro RUs connected to the Fulham Telephone Exchange (TE), including the TEs for both Fulham and Parsons Green. The scope details for Phase 2 are listed below.

- Complete reference network design with all the remaining RUs for Site 4 deployment.
- Remaining Open RAN components and hardware from Phase 1 for Fulham, including Fulham TE and second Fulham micro site.
- In phase 2, GPS signal was taken directly from Parsons Green TE site and time sync was provided over dedicated connection to different micro sites, i.e. street cabinets, connected to Parsons Green TE.
- GPS signal used in Phase 1, during Phase 2 moved from Site 1, i.e. Digital Catapult Lab, to the Fulham TE to serve Fulham TE macro RU and micro RUs connected to Fulham TE.

Site 4 – Layout and area map

Fig. A5.2 shows the map and the layout of the outdoor network area in Fulham & Hammersmith, that is about 1.5 km2, between Parsons Green TE and Fulham TE.

Fig. A5.2: Map of Fulham and Hammersmith

RF planning and coverage in Fulham and Hammersmith (F&H)

Fig. A5.3 provides a detailed RF planning, that was done for this area by an outsourced spectrum management company, LS Telecom, to help with the site selection; and provide a better understanding of the interference conditions around the site. This RF planning was essential to finalise the positions of the Macro and Micro cells. Fig. A5.3 below covers both Fulham and Hammersmith as part of both deployment phases (phase 1 & phase 2).

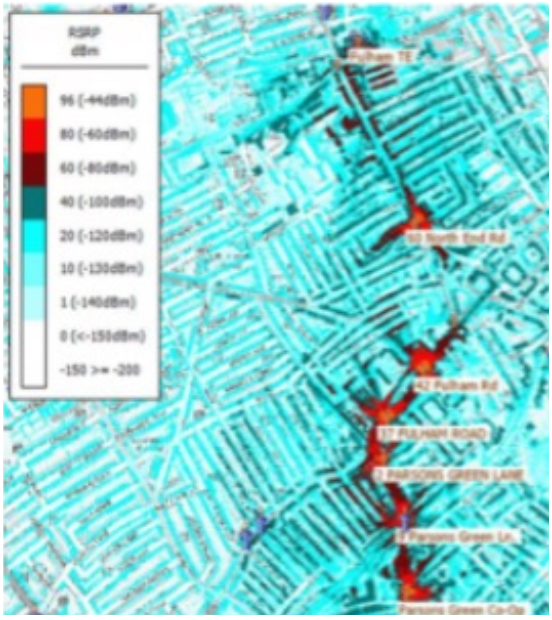


Fig. A5.3: RF Coverage from the proposed Macro and Micro cell sites in Fulham and Hammersmith

Appendix 6:
Cohort overview

Cohort 0 (7/2021-2/2022) At the first stage of SONIC Labs establishment five companies focused on integrating and testing their Open RAN products in lab and indoor mobile network settings to accelerate their commercialisation. This was the initial stage for Digital Catapult to setup (people, process & technology) and initiate vendor engagement and build lab environment for conducting testing activities.

Fig. A6.1: Cohort 0 vendors

Cohort 1 (8/2022-2/2023) systems were created from Open RAN products of six vendors (Fig. A6.2), with the focus on functional testing for multi-vendor Open RAN. The functional testing of multi-vendor Open RANs was conducted, the interoperability of RAN with third party Open RAN components (i.e., primarily Radio Unit, RU) was verified, and the basic End-to-End operation of Open RAN systems was validated.

Fig. A6.2: Cohort 1 vendors

Cohort 2 (11/2022-6/2023) consisted of Open RAN systems deployed using components from nine vendors (Fig. A6.3). The theme of Cohort 2 was functional testing, Proof-of-Concept for multi-vendor product integration, and performance testing. During this cohort, the interoperability of the main interfaces such as Fronthaul and Midhaul was verified, the End-to-End performance of systems was evaluated, and the deployment and performance evaluation of Open RAN systems based on the ARM platform was demonstrated.

Fig. A6.3: Cohort 2 vendors

Cohort 3 (3/2023-10/2023) Open RAN systems were formed from components of nine vendors (Fig. A6.4), and the focus of this cohort was on integration of RAN Intelligent Controller (RIC) with different Open RAN products. The functional testing of RIC was conducted in multi-vendor Open RANs, and its interoperability with third party Open RAN components (i.e. O-DU and O-CU) was verified. A number of shortcomings in O-RAN Alliance specifications, mainly with respect to backward compatibility of interfaces, were identified, and the resolutions were provided.

Fig. A6.4: Cohort 3 vendors

Cohort 4 (7/2023-1/2024) systems were created from Open RAN products of eight vendors (Fig. A6.5) and were designed around two themes. The first theme was about evaluation of the performance, scalability, and mobility testing in an indoor environment. Hence, the operation of Open RANs for these scenarios was verified, for example when O-DU(s) are operating with two O-RUs of another vendor, and the connection for the mobile phone is handed over between the cells. For the second theme, the focus was on functional testing of outdoor RU in the indoor lab environment.

Fig. A6.5: Cohort 4 vendors

Cohort 5 (4/2024-3/2025) systems were created from Open RAN products of seven vendors (Fig. A6.6). The theme of Cohort 5 was to evaluate Open RAN products at scale while also validating performance, handover, and mobility in reference networks. Cohort 5 composed of three phases of integration and testing for different multi-vendor Open RAN systems.

In the first phase, the staging phase, the aim of the integration and testing activities was to validate the functionality of outdoor O-RUs in lab environment before moving to installation of these O-RUs at outdoor street cabinets and conducting field trials.

In the second phase, the indoor testing phase, the Open RAN systems were integrated and tested using emulated and commercial Core networks. The E2E test cases were designed primarily to use these two setups for verification of the same Open RAN system for different scenarios, e.g. load testing with emulated Core network and mobility testing with commercial Core network.

The third and final phase of the Cohort 5, for the first time in SONIC Labs cohorts, the performance of multi-vendor Open RAN systems was validated on the outdoor testbed.

Fig. A6.6: Cohort 5 vendors

For **Cohort 6 (7/2025-3/2026)**, the testing activities were centred around O-RAN compliance and certification, which included interoperability and performance validation of Open RAN products (from vendors as presented in Fig. A6.8). Among the six systems considered for Cohort 6, two of them were considered for O-RAN E2E badging, two systems were under evaluation for O-RAN Fronthaul badging, and two systems (i.e. two O-RU) were considered for O-RAN Conformance certificate.

Fig. A6.7: Cohort 6 vendors

QUICK LINKS

Appendix 7:
Vendor engagement summary

	Cohort							
Company	**1**	**2**	**3**	**4**	**5**	**6**	**TAP**	**Alumini**
Benetel	✓		✓	✓		✓		✓
GREIGNS				✓	✓	✓	✓	✓
IS-Wireless	✓		✓	✓		✓	✓	✓
Antevia Networks						✓		
Accelleran		✓	✓	✓	✓	✓		✓
Pegatron					✓			✓
Airspan			✓	✓				
Capgemini	✓		✓	✓	✓			✓
VVDN Technologies		✓			✓			✓
Lions					✓			
Alpha					✓			
Vmware		✓	✓	✓				✓
WNC			✓	✓				✓
Liteon				✓				
Foxconn				✓				
Radisys		✓	✓					✓
Phluido		✓	✓					✓
CableFree	✓	✓						✓
ASOCS		✓						
Effnet	✓	✓						✓
SOLiD		✓						
SRS					✓			
University of York							✓	
zTouch							✓	
NetAI							✓	
Jet Connectivity							✓	

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Appendix 8: Technical report summary

Topic	Deliverable number	Description	Dissemination
Cohort 0	D2.1	Open RAN Benchmarking, Interoperability, Security and Resilience Testing Interim Report, Aug. 2021	Internal (Ofcom, DSIT)
	D2.2	Open RAN Benchmarking, Interoperability, Security and Resilience Testing Final Report, Feb. 2022	Internal (Ofcom, DSIT)
Cohort 1	D2.7.1	System integration of cohort 1 vendors into SONIC labs completed, Dec. 2022	Internal (Ofcom, DSIT)
	D2.8.1	Testing of Cohort 1 vendors completed, Mar. 2023	Internal (Ofcom, DSIT)
Cohort 2	D2.7.2	Commissioning report on Cohort 2 vendors integrated into SONIC Labs testbed, May 2023	Internal (Ofcom, DSIT)
	D2.8.2	Cohort 2 testing and lessons learnt report, July 2023	Internal (Ofcom, DSIT)
Cohort 3	D2.7.3	Commissioning report on Cohort 3 vendors integrated into SONIC Labs testbed, Sept. 2023	Internal (Ofcom, DSIT)
	D2.8.3	Cohort 3 testing and lessons learnt report, Oct. 2023	Internal (Ofcom, DSIT)
Cohort 4	D2.7.4	Commissioning report on Cohort 4 vendors integrated into SONIC Labs testbed, Nov. 2023	Internal (Ofcom, DSIT)
	D2.8.4	Cohort 4 testing and lessons learnt report, Jan. 2024	Internal (Ofcom, DSIT)
Cohort 1-4	D5.12.2	Test Exit report(s) and Lesson Learned, Mar. 2024	Internal (Ofcom, DSIT)
Cohort 5	CD10.1	Cohort 5 Staging completion report, Jul. 2024	Internal (Ofcom, DSIT)
	CD10.2	Cohort 5: Stream 1 (Indoor testing) completion report, Nov. 2024	Internal (Ofcom, DSIT)
	CD10.3	Cohort 5: Stream 2 (outdoor testing) completion report, Feb. 2025	Internal (Ofcom, DSIT)
	CD10.4	Cohort 5 Testing and Lessons Learnt Report, Mar. 2025	Internal (Ofcom, DSIT)

Topic	Deliverable number	Description	Dissemination
Cohort 6	D7.1	Cohort 6 interim testing report, Nov. 2025	Internal (Ofcom, DSIT)
	D7.2	Cohort 6 final testing report, Mar. 2026 (to be submitted)	Internal (Ofcom, DSIT)
T&M	D2.3.1	Automated Test and Measurement Design, Nov. 2021	Internal (Ofcom, DSIT)
	D2.4.1	Commissioning Report on the Build of the Test and Measurement Platform, April 2023	Internal (Ofcom, DSIT)
	D2.5.1	Updated SONIC Labs Test and Measurement Platform and Specification, Nov. 2023	Internal (Ofcom, DSIT)
	D2.6.1	Commissioning report on updates to the build of Test and Measurement Platform, Mar. 2024	Internal (Ofcom, DSIT)
	D2.1.3	Test campaign for interoperability and end to end integration, April 2022	Internal (Ofcom, DSIT)
	D2.2.1	Design of Test and Measurement Platform, July 2022	Internal (Ofcom, DSIT)
Site 3	D1.3.3	Commissioning Report – Indoor Reference Network (Site 3), April 2025	Internal (Ofcom, DSIT)
Site 4	D1.4.3	Phase 1 Commissioning report on Site 4 Reference Network, Jan 2024	Internal (Ofcom, DSIT)
	D1.4.5	Commissioning report on Site 4 Outdoor Reference Network, April 2025	Internal (Ofcom, DSIT)

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Topic	Deliverable number	Description	Dissemination
Lab build	D1.1.1	Overall SONIC Labs reference architecture, use case descriptions and deployment scenarios, April 2022	Internal (Ofcom, DSIT)
	D1.2.1	Design of the common infrastructure and distributed compute completed, June 2022	Internal (Ofcom, DSIT)
	D1.2.7	Dedicated Open RAN sites #1 & #2 completed, March 2023	Internal (Ofcom, DSIT)
	D1.3.1	Indoor location selection criteria and process, July 2022	Internal (Ofcom, DSIT)
	D1.3.2	Indoor reference network high level Design, June 2022	Internal (Ofcom, DSIT)
Plugfest	D5.1	O-RAN Spring 2025 Plugfest	Internal (Ofcom, DSIT)
	D5.2	O-RAN Autumn 2025 Plugfest	Internal (Ofcom, DSIT)
Academic publication	NA	Experimental Study of End-to-End (E2E) Performance for Multi-Vendor 5G Open RAN Systems in Indoor and Outdoor Urban Environments, 2026 (submitted)	Public
Academic publication	NA	Interoperability Assessment of Fronthaul and E2 Interfaces for Multi-Vendor Open RAN Systems, Oct. 2025	Public
Academic publication	NA	Maximising Energy Efficiency in Large-Scale Open RAN: Hybrid xApps and Digital Twin Integration, Dec. 2025	Public
Academic publication	NA	Performance Assessment of 5G Private Networks with Shared Spectrum in Deep-Urban Environments, May 2025	Public
Academic publication	NA	Experimental Evaluation of Multi-Vendor 5G Open RANs: Promises, Challenges, and Lessons Learned, Oct. 2024	Public

Appendix 9: Community of Practice

Activity	Purpose/focus	Benefits to participants	Outcomes/ insights	Notable groups involved
Market Insights Webinar (Cohort 5 & TAP)	Raise awareness of UK Open RAN market, opportunities & challenges	Policy and commercial insights; understanding ecosystem needs	100% positive feedback; increased interest in lab collaboration and testing insights	Vodafone, Virgin Media O2, Deutsche Telekom AG, Three
Go to Market Webinar (Cohort 5)	Deepen knowledge of Open RAN deployments and practical implementation	Real-world deployment insights; discussion with experts	Strong positive feedback; valued expert examples on QoS, operations, and cost-effectiveness	Fujitsu, Capgemini, industry analysts
SDK & VIAVI Training (TAP)	Build technical capabilities using VIAVI RIC Tester	Hands-on deployment, testing and evaluation knowledge	Improved skills in T\&M capability, energy efficiency use cases, and app performance evaluation	VIAVI, SONIC Labs, Digital Catapult
Community of Practice – Shared Cell Indoor Deployment	Expand understanding of shared-cell indoor Open RAN use cases	Insight into practical deployment challenges across different sectors	Significant knowledge increase (from 23% baseline); 73% satisfaction	G REIGNS, Cohort 5, programme alumni
AI in Open RAN: Energy Efficiency Challenge	Explore AI role in automation & energy efficiency	Knowledge building on AI-driven Open RAN applications	88% reported increase in AI awareness; 80% attributed improvement to session	TAP participants, Cohort 5
O-RAN Alliance Certification & Badging	Build understanding of certification requirements	Clearer pathways for achieving O-RAN badges and certificates	Addressed strong participant demand; improved readiness for deployment	O-RAN Alliance, Cohort 5, TAP vendors

Activity	Purpose/focus	Benefits to participants	Outcomes/ insights	Notable groups involved
System Integrator Research	Identify challenges and blockers in integration	Better understanding of integration complexity and requirements	Highlighted challenges (complexity, security, cost); shaped later upskilling session	System integrators across the industry
Investor Seminar	Raise investor awareness of Open RAN opportunities and challenges	Insights into investment trends & telecom innovation	Positive feedback; improved understanding of market demand and strategic focus areas	Investors, Digital Catapult, sector stakeholders
CoP–Testing Multi-vendor Operability	Support collaboration and address integration challenges	Neutral space for sharing experiences and learning	Agreed need for better testing setups, transparency, and RF chamber availability	Cohort 5, Digital Catapult
CoP–RIC Functionality	Discuss RIC challenges, best practices & future development	Understanding of RIC scope, automation, and xApp/rApp development	Identified need for more use cases, interoperability work, and collaboration on RIC-controlled functions	York University, G REIGN, JET Engineering
System Integrator Upskilling Session	Share research insights and foster cross-ecosystem collaboration	Open discussions, technical demonstration, stronger integration understanding	Highlighted importance of integrators; future focus areas (real-time RIC, security)	Open RAN experts, Digital Catapult, SONIC Labs
Network Licence & Business Models Seminar	Strengthen commercial awareness and scaling strategies	Guidance on investment, sales cycles, and partnership models	83% rated experience "Good"; improved understanding of business models; desire for real-world case studies	CGI, Digital Catapult, Cohort 5 & TAP

Appendix 10:
Annual report summary (2025–2026)

Delivering maturity:

The final year of the programme marked a significant consolidation of SONIC Labs as a nationally recognised capability for open and interoperable networks. The programme strengthened the UK's position as a trusted source of engineering led evidence, deepened collaboration across the ecosystem, and delivered measurable progress in the maturity, interoperability and assurance of Open RAN technologies.

National role:

Digital Catapult's designation as the UK's first Open Testing and Integration Centre (OTIC) was a defining milestone, formally embedding SONIC Labs within the international network of accredited Open RAN laboratories and elevating the UK's profile as a credible contributor to global Open RAN assurance. As highlighted in the final programme report, "Achieving OTIC status has raised the UK's international profile," and provided operators and vendors with a trusted mechanism for repeatable, standards aligned validation beyond the end of the programme.

Programme highlights (2025-2026)

Technical leadership and evidence generation

During this period, SONIC Labs continued to expand its technical testbed capabilities across its four complementary sites (see lab build section), enabling distributed, realistic and repeatable testing conditions. The programme undertook more than **80 structured product and system level tests** and contributed to the creation of **50 fully integrated Open RAN systems** over its lifetime.

Complex scenarios—including mobility, scalability, multi-vendor E2 interoperability, and DU/CU performance under load—were validated through the indoor and outdoor reference networks. These insights contributed directly to operator confidence by demonstrating the actual performance and behaviours of Open RAN solutions under realistic conditions and allowed policymakers to distinguish between ambition and deployable readiness:

"The programme generated firsthand experience-based insight… helping ground expectations, contributing to the separation of hype from reality."

Advancement of certification and assurance

Cohort 6 delivered significant progress toward a formal Open RAN assurance capability. SONIC Labs completed technical evaluation of six systems aligned with ORAN Alliance certification and badging guidance, awarding **seven badges and certificates** during the period.

This transition to certification aligned processes supported a notable increase in product readiness: **around 60%** of systems tested were considered suitable for certification submission by programme close, representing a **50% uplift from onboarding**.

Energy efficiency and AI-enabled RAN innovation

The Technology Access Programme (TAP) delivered practical demonstrations of energy efficient Open RAN operation, including RIC-enabled sleep modes and DU/CU compute optimisation. Findings from participants showed **measurable energy savings** under controlled test conditions and provided early evidence on the role of AI-enabled optimisation in UK mobile networks.

Strengthening UK and international collaboration

Ecosystem engagement remained a core strength of SONIC Labs. The programme supported collaboration between MNOs, neutral hosts, vendors, system integrators, academia, standards bodies and government stakeholders. During the year:

- International engagement deepened through MoUs with **ITRI (Taiwan), EANTC (Germany) and C DOT (India);**
- Collaboration with the **US NTIA** expanded knowledge sharing, test harmonisation, and cross-laboratory methodology alignment;
- Digital Catapult hosted PlugFest activities involving **30+ vendors** and more than **200 test cases**.

SONIC Labs' role as a convener of telecommunications innovation was consistently highlighted by participants and partners, demonstrating its value as a neutral platform for structured, engineering led collaboration.

Impact on vendors and the UK market

Evidence collected across cohorts showed clear impacts on vendor capability:

- Vendors reported an average **1.5 TRL increase**, with product roadmaps accelerated by **6–9 months**.
- **70%** of vendors indicated improvements in interoperability.
- **72%** reported new commercial leads or partnerships linked to their participation.
- International vendors gained a clearer route into the UK market through SONIC Labs' neutral guidance and repeatable testing methodologies.

As Ofcom noted:

> "SONIC Labs has been a vital testbed… expanding the range of suppliers that can be used in telecommunications infrastructure."

Marketing and communications with impact

Across 2025–2026, SONIC Labs delivered an comprehensive marketing and communications programme designed to raise the profile of its technical achievements, international collaborations, and emerging OTIC-aligned capabilities. Activity focused on reputation building, impact amplification, and stakeholder engagement, supported by high performing digital content and strong event visibility. This included standout online performance—such as a 9.9% LinkedIn click-through rate for posts in April 2025, far above industry norms—and consistently high engagement with SONIC Labs webpages, which became some of the most visited on the Digital Catapult site. Communications efforts also translated complex engineering outputs into accessible narratives through technical blogs, reports, and thought leadership content.

Events also played a major role in strengthening SONIC Labs' presence. The Open Future Networks Showcase Event attracted high attendance and strong engagement, while MWC 2025 generated more than 240 industry connections—an increase of 130% over the previous year—supported by an immersive stand experience that highlighted the programme's capabilities.

Media activity provided broad visibility for key milestones, including OTIC designation, international MoUs, cohort launches, and technical insights. These efforts collectively reinforced SONIC Labs' credibility across industry, government, and global stakeholders, helping shift its visibility from time-limited programme milestones to long-term capability awareness, including the launch of its Test-as-a-Service offering.

Programme significance

ACCELERATED MATURITY:

SONIC Labs moved beyond experimentation to deliver assured, reproducible evidence on deployability, performance, interoperability and system stability–core components of the UK Government's diversification strategy.

INFORMED POLICY:

Insights generated during the year supported policymakers and regulators by providing clarity on vendor viability, standards maturity, deployment challenges and assurance needs. SONIC Labs played a central role in shaping expectations around Open RAN's near-term capabilities and long-term potential.

GLOBAL RECOGNITION:

International partners consistently recognised the UK's leadership through SONIC Labs, elevating the UK's contribution to global Open RAN testing practices and demonstrating the value of its neutral, multistakeholder model.

Conclusion

Across 2025–2026, SONIC Labs has become a **nationally significant capability** that supports the UK's current telecommunications priorities while laying the groundwork for the next generation of open, software driven and AI enabled network technologies. The foundations established through this programme will continue to inform policy, strengthen supply chain resilience, and support the UK's leadership in advanced connectivity systems over the coming decade.

Glossary

A1	A1 interface interconnects the SMO Non-RT-RIC with Near-RT RIC
ACT	Advanced Connectivity Technologies
AI	Artificial Intelligence
ARM	Advanced RISC (Reduced Instruction Set Computer) Machine (formerly Acorn RISC Machine) a family of (RISC) architectures designed for low-power, efficient processors.
ASP	Average Selling Price
C-DOT	Centre for Development of Telematics (India)
CoP	Community of Practice
CPU	Central Processing Unit
CTR	Click Through Rate
CU	Central Unit
DCMS	Department for Culture, Media and Sport
DDoS	Distributed Denial of Service
DfT	Department for Transport
DSIT	Department for Science, Innovation and Technology (from February 2023)
DU	Distributed Unit
E1	Digital transmission link in telecommunications
E2E	End-to-End
EANTC	European Advanced Networking Test Centre
ETSI	European Telecommunications Standards Institute
EU	European Union
F1	Standardised interface that connects the gNB Centralised Unit (gNB-CU) to the gNB Distributed Unit (gNB-DU)
GCOT	Global Coalition of Telecoms
gNB	gNodeB (Next Generation Node B)
HRV	High Risk Vendor
ICT	Information and Communications Technology
IoT	Internet of Things
ITRI	Industrial Technology Research Institute (Taiwan)
MIMO	Multiple Input, Multiple Output

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ML	Machine Learning
MNO	Mobile Network Operator
MoU	Memorandum of Understanding
MWC	Mobile World Congress
Near-RT	Near real-time
nGRG	Next Generation Research Group
Non-RT	Non real-time
NTN	Non-Terrestrial Networks
O-CU	Open Central Unit
O-DU	Open Distributed Unit
O-RU	Open Radio Unit
O1	Standardised logical interface defined by the O-RAN Alliance that connects the SMO platform to the RAN infrastructure
Ofcom	Office of Communications–the UK regulator
Open RAN	Open Radio Access Network
OTIC	Open Testing and Integration Centre
R&D(&I)	Research and Development (and Innovation)
rApps	Specialised software applications running on the non-RT RIC
RF	Radio Frequency
RIC	RAN Intelligent Controller
RU	Radio Unit
SME	Small-and medium-enterprises
SMO	Service Management and Orchestration framework
SONIC	SmartRAN Open Network Interoperability Centre
T&M	Test and Measurement
TAP	Technology Access Programme
TIP	Telecom Infra Project
TRL	Technology Readiness Level
TSI	Technology Security Initiative
UE	User Equipment
UKTL	UK Telecommunications Lab
vRAN	Virtualised Radio Access Network
xApps	Specialised software applications running on the near-RT RIC

CATAPULT Digital

For more information about SONIC Labs and Digital Catapult's work, email **info@digicatapult.org.uk**

Or visit our website **www.digicatapult.org.uk**