



EXPLORING WHY 5G Private Networks are set to **REVOLUTIONIZE** **CONNECTIVITY** in Europe

By Thorsten Lutz, EU Solution Architect, Mobile Solutions Business Division at
Panasonic Connect Europe

WHITEPAPER

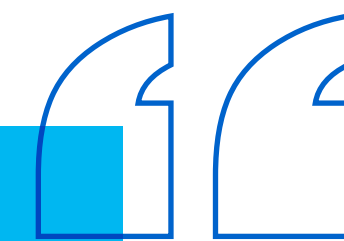
Intelligent industries are adopting **private** **5G networks**

In today's constantly evolving telecommunications landscape, a new technology has emerged that promises to revolutionise connectivity - 5G private networks.

Private 5G networks are emerging as the connectivity technology of choice for driving next generation enterprise transformation in a growing list of intelligent industries. According to a study by Accedian, three quarters of the manufacturing organisations in Germany, Japan, the UK and the U.S. aim to adopt private 5G networks by 2024.

Also known as a non-public 5G network, a private network uses 5G technologies to create a dedicated network with unified connectivity, optimised services, and a secure means of communication within a specific area. Combining the power of 5G with the flexibility and security of private networks, this emerging technology opens a world of possibilities for industries, businesses, and individuals alike.

In this whitepaper, we will delve into the benefits of 5G private networks, and contest some of the misconceptions around private 5G. We explore use cases and applications, examine the issues, and walk through the ideal set up and the potential private 5G holds for transforming the way businesses and their employees connect and communicate.



“According to a study by Accedian, three quarters of the manufacturing organisations in Germany, Japan, the UK and the US aim to adopt private 5G networks by 2024.”

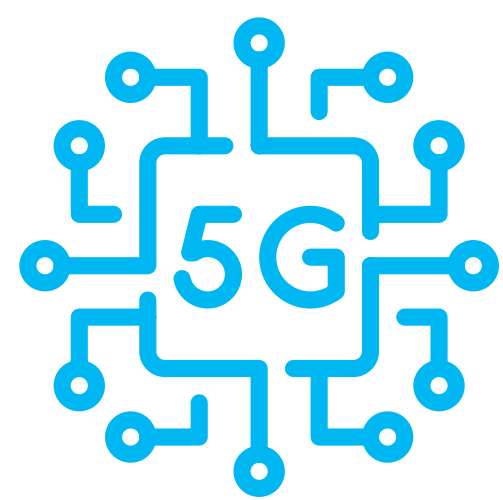
5G is being delivered today – but it's still an early adopter market

It may feel like the world has been talking about the potential benefits of 5G for a few years, but today 5G networks have now been delivered by more than 200 operators, spanning 83 countries around the globe. However, for many organisations thinking about tapping into the benefits of 5G, and particularly 5G private networks, it is still a relatively immature market.

To comprehend the benefits of 5G private networks, it is crucial to understand the underlying technology. 5G, the fifth generation of wireless technology, offers significantly improved performance over earlier network technologies;

download and upload speeds are faster, and it can support a greater number of devices, providing better capacity, reliability, and connectivity.

Typically, private networks provide dedicated, secure, and localised communication infrastructures, and by and large are employed by enterprises for their internal operations. The convergence of these two technologies has enabled 5G private networks, where organisations can leverage the benefits of both 5G and private networks within their own premises.



**TODAY 5G NETWORKS HAVE
NOW BEEN DELIVERED BY
MORE THAN 200 OPERATORS,
SPANNING 83 COUNTRIES**

The difference between 5G non-standalone and 5G standalone

Today mobile network operators (MNOs) are promoting 5G to consumers, with phones and devices regularly suggesting that they are “now connected to 5G”. But the reality for most consumers and businesses on public 5G is that it has been rolled out on existing 4G infrastructure. The industry calls this 5G non-standalone or 5GNSA. Unfortunately, this means that users frequently think they are getting all the benefits of 5G but, in reality, only the radio access network is upgraded to 5G, and it still uses 4G infrastructure for certain functions such as signalling and initial connection set up. In fact, mobile performance tests between a 5GNSA versus 4G show almost no difference at all.

While 5GNSA might offer enhanced capacity and be faster, the full potential for 5G lies in 5G standalone (5GSA) and enterprise adoption, where it offers unparalleled latency and performance, AR, VR, 3D videos, and real-time applications at speed.

The full 5G network architecture is designed from the ground up for standalone operation; both the core network and the radio access network are designed specifically for 5G. This means it operates independently without relying on 4G infrastructure, delivering faster data speeds, lower latency, and improved network efficiency due to its optimised 5G network architecture. It is worth noting that when setting up a private 5G network, you need a device with a chip that supports 5GSA.



Different types of 5G network

As you may be starting to realise, not all 5G is equal. As well as standalone and non-standalone 5G, there are also three different types of 5G network: public, sliced, and private.



Here at **Panasonic Mobile Solutions**, we have developed a 5G private network architecture (5G Campus) offering from the ground up – with devices with a 5GSA chip which means it is true 5GSA – bringing all the control and security our customers need while offering the full capabilities of private 5G to organisations.



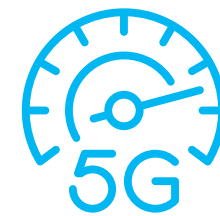
Click each icon for details of use cases and industries where private 5G really comes into its own.

There are plenty of advantages of 5G private networks and here we delve into these in a bit more detail:



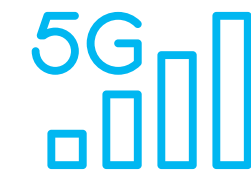
Ownership:

The network is owned and operated by the private organization that deploys it, delivering localized coverage within a specific area.



Enhanced Speed and Capacity:

5G private networks provide significantly faster speeds and increased bandwidth compared to previous generations. This allows for seamless data transfer, quick response times, and efficient handling of high-volume workloads, leading to higher mobility, faster download and upload speeds.



Low Latency:

With ultra-low latency, 5G private networks enable real-time communication and mission-critical applications that demand instant or faster response times. This has profound implications for industries such as healthcare, manufacturing, and autonomous vehicles.



Improved Security and Control:

Private networks offer enhanced security and control over data transmission, making them suitable for industries that handle sensitive information. 5G private networks build upon this by integrating advanced encryption protocols and secure network slicing, providing a secure and isolated environment for critical operations. This delivers better reliability and more robust security and the ability to prioritize traffic and allocate resources as needed.



Extended use of Mobile Devices:

Mobile devices provide portability, enhanced connectivity, improved productivity, secure communication, and efficient device management within private network environments. By leveraging the strengths of both mobile devices and 5G private networks, organizations can unlock the full potential of these technologies, driving innovation and transforming the way they operate.

Advantages of 5G Private Networks

Best Applications and Use Cases

For high mobility, logistically complex industries, from airports to high-tech manufacturing, 5G is a revolutionary technology and the potential applications of 5G private networks are vast and varied, spanning across industries and sectors. It can offer high speed mobility with uninterrupted connectivity, real time communications and applications, flexibility without cables, and support for IoT Devices and applications, all with enhanced security.

For example, it's ideal for airports and ports where there are lots of large, sometimes

moving, obstructive metal objects that can block other communication technologies. It enables manufacturing facilities to quickly reconfigure and connect production lines. It's perfect for utility companies to deploy remote and automated monitoring and maintenance systems using the Internet of Things (IoT).

Additionally, Private 5G networks have a role to play in bridging the digital divide. As the networks cover a small area and don't cost as much to build as a public network, priority can be given to underserved communities.



VDC claims

“the majority of respondents (over 50%) across all industry verticals indicated security features as a top selection criterion when evaluating private network solutions. As digitalisation occurs across the board, there is increased need to protect internal data and address the rising threat of cybersecurity attacks.”*





Use cases of industries where private 5G really comes into its own.



Smart Manufacturing:

5G private networks enable real-time monitoring and control of machinery, improving operational efficiency, and enabling predictive maintenance. With reduced latency and higher reliability, manufacturers can optimize their processes, enhance worker safety, and achieve higher levels of automation.

According to the VDC report “the top limitations that manufacturers face with their current networks are security, speed/performance and reliability. The deployment of private wireless networks can address these limitations and better enable critical workforce applications.”*



Airports:

5G private networks in the airport industry present a multitude of benefits. From enhancing the passenger experience to optimizing operational efficiency, ensuring safety and security, enabling smart infrastructure, and streamlining airport operations and maintenance, 5G private networks have the potential to revolutionize the way airports function. Embracing this emerging technology can position airports as leaders in connectivity, providing a seamless and efficient travel experience for passengers while improving overall airport operations.





Ports and Harbors:

One of the primary advantages of 5G private networks in ports and harbors is the provision of ultra-fast and reliable connectivity. With higher speeds and lower latency, 5G enables real-time data transfer, facilitating seamless communication and information exchange between various stakeholders, including port authorities, shipping companies, and logistics providers. In addition, 5G private networks can play a significant role in promoting environmental sustainability in ports and harbors: by enabling smart energy management systems and monitoring devices, these networks allow for efficient utilization of resources, such as electricity and water.



Transportation and Logistics:

In the transportation industry, 5G private networks can enable seamless communication between vehicles, infrastructure, and traffic management systems. This enables efficient traffic flow, enhanced safety through vehicle-to-vehicle communication, and optimization of logistics operations. According to the VDC report "security, reliability and coverage are overwhelmingly the leading connectivity features driving the adoption of private wireless networks; the adoption of private networks will help logistics organizations scale operations for more device adoption and to outdoor environments."*



The Evolving Landscape of 5G Private Networks in Europe

The EU Commission's 5G Action plan states that operators should extend 5G networks to all urban areas and major roads and railways by 2025 and populated areas by 2030. As a result, Europe is witnessing rapid expansion of 5G private networks as organisations recognise the potential advantages they offer. While comprehensive data on the exact number of 5G private networks across Europe is not readily available, several countries have taken significant strides in their adoption.

*" Private 5G/LTE Networks: Assessing the Opportunity for Private Networks by Industry and Use Case" issued by VDC Research, March 2023.



Germany, a frontrunner in industrial manufacturing, has been at the forefront of implementing 5G private networks. Companies such as Volkswagen, Bosch, and Siemens have deployed private networks within their manufacturing facilities, optimising operations, and improving efficiency.



Sweden, known for its innovative approach to technology, has also embraced 5G private networks. The country has established testbeds and pilot projects to explore the potential of this technology in various sectors, including manufacturing, healthcare, and transportation.



In the **United Kingdom**, 5G private networks have gained traction in sectors like logistics, ports, and utilities. Organisations such as Associated British Ports and Thames Water have implemented private networks to improve their operations and enhance connectivity.

The growing adoption of 5G private networks in Europe can be attributed to the array of benefits they provide. Industries such as manufacturing, healthcare, transportation, logistics, airports, and energy are leveraging these networks to streamline operations, improve efficiency, and foster innovation.

The best set up for 5G

There are two types of 5G frequency bands. Sub-6 (frequencies below 6GHz), which offers good coverage and can penetrate obstacles relatively well, is more suitable for WAN coverage. The second type is 5G millimetre wave or mmWave (high-frequency bands typically above 24GHz), which provides extremely high data transfer rates but has limited coverage and can be impacted by obstacles such as buildings and walls. In Europe, only sub-6 is currently available, however in the U.S. there are trials with mmWave, but as yet no devices in the market that support it.

Customers looking to establish a 5G private network should be aware of the application processes and necessary paperwork they must complete to run their own 5G private network. Local country authorities want to know when and how networks are being implemented, and regulations and frameworks will vary from country to country. But it is important to note that each country has its own licensing requirements, technical specifications, and specific restrictions.

Many believe that for 5G to work effectively, it requires a big antenna to provide coverage to a wide area. But, in fact, the opposite is true. A campus of multiple, connected small antennas and cells will deliver a much more efficient network – without the unsightly and intrusive large antenna.

To utilise a private 5G network, devices need two criteria; a chip that supports the licensed sub-6 band, and a license for the chip to support 5GSA. We have manufactured and designed two devices that are equipped for Private 5G – the TOUGHBOOK G2 and the TOUGHBOOK 40 – each sporting our own TOUGHBOOK tested and manufactured antenna. We can offer customers 5G hardware and software 'out-of-the box', and we guide them through the process of setting up their private 5G network. Additionally, our rugged hardware devices are built to withstand incredibly challenging environments.

Organisations may also require devices to have secure communication protocols and encryption capabilities to ensure security is upheld.

To realise the full potential of 5G private networks, organisations should choose a strategic partner with European and global capabilities, dedicated engineering and service teams, who are capable of creating customised solutions.



With a simple onsite visit from our 5G specialists, it's possible to review each customer's requirements, understand the purpose and use cases for the private network and then define what infrastructure is required.

5G Private Networks are Poised to **Change** our **Business Lives**



5G is the future and will become the dominant network technology. As the world becomes increasingly interconnected, the emergence of 5G private networks offers a glimpse into a future where ultra-fast, secure, and localised communication becomes the norm.

With its ability to empower industries and optimise transportation, 5G private networks hold immense promise. However, it is essential to address the challenges and ensure widespread adoption for these networks to reach their full potential.

The convergence of 5G and private networks is poised to reshape the way we connect and communicate, and it will transform many aspects of our business lives. With private 5G networks, enterprises can now benefit from new technologies, secure additional revenue streams and maximise efficiencies – today and well into the future.

Panasonic Mobile Solutions are pioneers supporting the adoption of 5G private networks across Europe, combining the best of 5G network benefits with Panasonic TOUGHBOOK devices built for 5GSA and the technical support from experienced industry vendors.

Interested in finding out more or **running a pilot?**



Discuss 5G private networks with Panasonic consultants and specialists, [here](#).

Panasonic CONNECT

TOUGHBOOK

