HIGHWAY 9 NETWORKS

Wi-Fi + Private 5G: Better Together

How deploying Private 5G as a complementary overlay transforms enterprise connectivity

The debate between Wi-Fi and Private 5G misses the point. Modern enterprises don't have to choose. Wi-Fi remains indispensable for general-purpose indoor connectivity. Private 5G, deployed as a complementary overlay, fills the gaps Wi-Fi simply cannot: seamless outdoor mobility, mission-critical OT automation, and deterministic low-latency for high-speed industrial devices.

The Highway 9 Mobile Cloud is purpose-built to unify both technologies under a single management platform — so your IT and OT teams get the right network for every device, everywhere on your site.

Technology at a Glance: Strengths Side by Side

WI-FI 7 (802.11BE)	DIMENSION	PRIVATE 5G (CBRS)
2.4 / 5 / 6 GHz unlicensed	**Spectrum**	CBRS 3.5 GHz lightly licensed
Indoor, short-to-medium range	**Coverage Range**	Indoor + seamless outdoor
Variable; contention-based (CSMA/CA)	**Latency**	Consistent <10ms; scheduled access
Shared, susceptible to interference	**Interference**	Dedicated spectrum; minimal interference
WPA3 + RADIUS/802.1x	**Security Model**	SIM/eSIM hardware root of trust
Client-controlled; drops >25 mph	**Mobility**	Network-controlled; seamless handoffs
Laptops, tablets, printers, phones	**Best For**	AGVs, AMRs, drones, OT machinery

Why Private 5G as a Complementary Overlay?

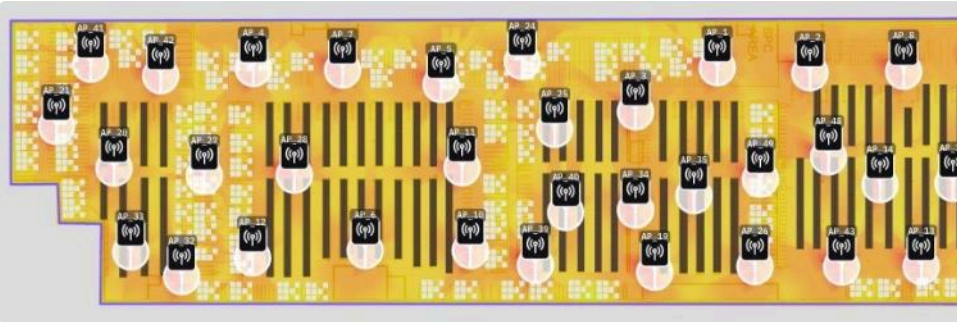
Private 5G is not a replacement for Wi-Fi — it is a precision instrument for the use cases where Wi-Fi reaches its limits. Each technology belongs in a specific part of your enterprise:

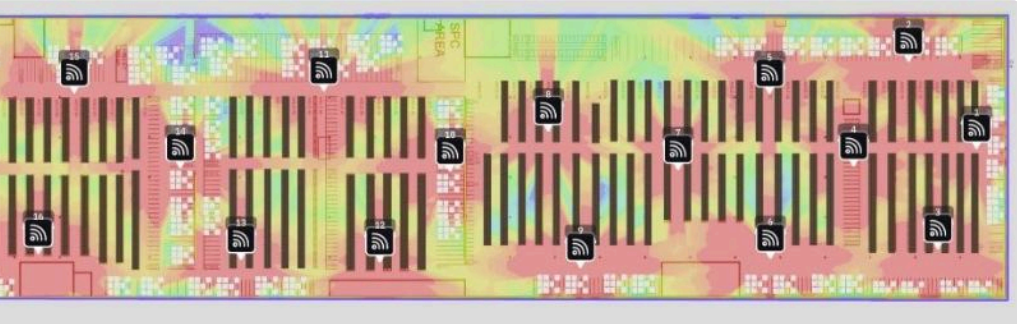
WI-FI 7 EXCELS HERE	PRIVATE 5G OVERLAY COMPLETES IT
Office spaces, conference rooms, cafeterias	Industrial floors with metal interference
High-density indoor internet for employees	Outdoor yards, ports, distribution centers
Laptops, printers, non-critical smartphones	AGVs, AMRs, high-speed forklifts, drones
Localized high-bandwidth data transfer	Strict QoS for real-time OT automation
Guest access and general IT workloads	Seamless roaming across indoor/ outdoor boundaries

Real-World Results: 350,000 sq. ft. Distribution Center for a Leading Manufacturer

The leading US manufacturer and distributor of ceramic, porcelain, and stone tiles was running its production and distribution facility on Wi-Fi alone. The network could not keep pace with growing automation, AGV deployments, and complex logistics. Here is what happened when Private 5G was added as a complementary overlay:

Wi-Fi Only Architecture Dense AP deployment (49 APs) with uneven, patchy coverage—requiring high overlap to compensate for signal loss across racks and aisles.





Wi-Fi + Private 5G Overlay Private 5G achieves uniform, aisle-to-aisle coverage with ~60% fewer nodes (19 vs 49).

~60% Fewer Network Nodes

- **Wi-Fi Only:** 49 APs
- **Private 5G:** 19 radios

→ 30 fewer devices

~40-50% Lower Infrastructure Cost

- Fewer APs → fewer switches, ports, and cabling
- Reduced install complexity across large floor space

Up to 3x Better Coverage Efficiency

- Wider coverage per ratio
- Fewer dead zones across aisles & racks

>30% Reduction in Power & Maintainence

- Fewer active devices
- Lower failure rates and support overhead

100%

Facility coverage achieved across production floor, warehouse, and outdoor yard

0 drops

Connectivity failures for forklift-mounted tablets after Private 5G overlay

↑

Inventory accuracy — real-time tracking restored across the entire facility

✓

Future-proof scalability for AGVs, robots, and AI-driven quality control

WI-FI ONLY — THE CHALLENGES	WI-FI + PRIVATE 5G OVERLAY — THE OUTCOMES
▪ Inconsistent coverage on production floors and in hard RF warehouse zones	▪ Full facility coverage — production floor, warehouse, and outdoor yard
▪ Signal degradation outdoors — costly trenching required for more APs	▪ Zero connectivity drops for forklifts, AGVs, and mobile robots
▪ Variable latency disrupted automated forklifts, robots, and IoT sensors	▪ Real-time inventory tracking restored — accuracy significantly improved
▪ Existing network unable to scale for planned AI and automation expansion	▪ Network now scales seamlessly as new IoT and automation is added

Highway 9's Mobile Cloud has been a game-changer for our facility. The performance and reliability of the network have far exceeded our expectations. We've seen a significant reduction in downtime and an improvement in real-time inventory and production tracking. Most importantly, we now have the security and scalability we need to continue growing and adopting new technologies."

▪ *IT Director*
Leading Flooring Manufacturer

Customer Stories: The Synergistic Approach in Action

These organizations deployed Private 5G as a targeted overlay on their existing Wi-Fi infrastructure — getting more out of both technologies:

CASE STUDY 1

MANUFACTURING & DISTRIBUTION

Leading Flooring Manufacturer

CHALLENGE

A large-scale ceramic, porcelain, and stone tile production and distribution facility was entirely reliant on Wi-Fi. The expansive plant created chronic connectivity problems: forklift-mounted tablets dropped connections on the production floor, outdoor yard coverage required prohibitively expensive fiber trenching, and variable Wi-Fi latency disrupted automated guided vehicles and IoT quality-control sensors.

THE HYBRID SOLUTION

Highway 9 deployed a Private 5G network as a complementary overlay on the existing infrastructure — not replacing Wi-Fi, but extending deterministic, low-latency coverage into every hard RF zone, warehouse aisle, and outdoor area that Wi-Fi could not reliably reach. Administrative and office areas retained Wi-Fi for standard IT workloads. The Private 5G network was purpose-configured for the facility's AGVs, forklifts, robots, and IoT sensors.

IMPACT

Full facility coverage — production floor, warehouse, and outdoor yard. Zero connectivity failures for forklift-mounted tablets and AGVs. Inventory accuracy significantly improved through reliable real-time tracking. Network now scales seamlessly as new IoT devices and automation technologies are added.

CASE STUDY 2

HIGHER EDUCATION

Research University

CHALLENGE

A leading research university had strong Wi-Fi indoors — in lecture halls, labs, and dorms — but significant dead zones across outdoor quads, parking areas, and between buildings. Campus safety systems, emergency communications, and field research tools were all affected. Public cellular could not fill the gaps reliably, and extending outdoor Wi-Fi would require costly infrastructure builds across the campus grounds.

THE HYBRID SOLUTION

Highway 9 introduced Private 5G as a campus-wide outdoor overlay. Students and faculty continue using Wi-Fi for high-density indoor connectivity, while Private 5G provides seamless, secure mobility across the full campus footprint — including outdoor research areas, campus police vehicles, and emergency blue-pole systems. The solution integrated directly with the university's existing Azure AD, MDM, and firewall infrastructure.

IMPACT

Campus-wide secure connectivity achieved without replacing any existing Wi-Fi. Emergency and safety systems now operate with zero dead zones. IT staff time saved significantly through automated multi-tier integrations. Research workloads and edge AI applications gain the reliable, low-latency connectivity they require.

CASE STUDY 3

MANUFACTURING / INDUSTRY 4.0

Auto Manufacturer

CHALLENGE

A US automotive manufacturing facility was undertaking a major Industry 4.0 transformation — deploying autonomous mobile robots, AI-driven quality inspection cameras, and connected torque tools across the production floor. Legacy Wi-Fi, prone to metal interference and contention-based access delays, could not meet the deterministic latency requirements for automated production lines or provide reliable coverage across the large outdoor campus surrounding the facility.

THE HYBRID SOLUTION

Wi-Fi was retained for employee devices, administrative areas, and general IT workloads. Highway 9 Mobile Cloud was deployed as the industrial backbone overlay — starting with the highest-priority zones and expanding incrementally, use case by use case. Private 5G provided scheduled, interference-free access for AMRs, quality inspection systems, connected tools, and outdoor yard operations.

IMPACT

Eliminated production downtime caused by connectivity failures. Reliable low-latency connectivity enabled AI-driven quality control at line speed. Outdoor campus covered with a small number of Private 5G APs — no trenching required. Platform scales naturally as automation expands, managed from a single cloud console.

The Highway 9 Mobile Cloud: One Platform, Both Networks

Highway 9 is the only mobile cloud platform purpose-built to unify Private 5G and Wi-Fi under a single management layer — giving enterprises full control without the complexity of two separate infrastructure silos.

UNIFIED MANAGEMENT

Single pane of glass for both Wi-Fi and Private 5G. Apply policies, SLAs, and security rules across every device from one interface.

CLOUD-NATIVE CORE

5G core and management platform delivered as a cloud service — no on-prem hardware complexity. Scales with your operations.

SEAMLESS INTEGRATION

Connects with enterprise IT systems and edge compute platforms via standard APIs. Works with your existing infrastructure.

DEVICE FLEXIBILITY

SIM/eSIM management for Zebra, Honeywell tablets; Cradlepoint/Sierra routers; AGVs, drones, and industrial sensors.

Getting Started: A Structured Deployment Path

1. **Assess & Design**

   Map your floor plan and use cases. Identify where Wi-Fi is sufficient and where Private 5G is needed as an overlay. Highway 9 provides RF planning and site survey support.

2. **Deploy the Overlay**

   Install Private 5G access points in targeted zones — industrial floors, outdoor yards, mobility corridors. No need to replace existing Wi-Fi infrastructure.

3. **Integrate via Mobile Cloud**

   Connect both networks to the Highway 9 Mobile Cloud. Define per-device and per-application policies to automatically route traffic to the right network.

4. **Manage & Optimize**

   Monitor both networks from a unified dashboard. Set SLAs for critical OT devices, automate failover, and optimize continuously with cloud-based analytics.

Ready to Experience Wi-Fi + Private 5G — Better Together?

Let Highway 9 help you design a hybrid mobile cloud architecture tailored to your enterprise. Start with a site assessment or pilot program to see real-world results before full deployment.

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