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DESIGN STUDY

Private 5G for a vehicle assembly plant: 180 AMRs, 400 handhelds and 250 sensors on one standalone network

Complete design on current platforms

CAPABILITY	INDUSTRY	SETTING
Mobility	Manufacturing	Vehicle assembly plant
DOCUMENT	**VERSION**	**DATE**
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WRITTEN BY

Mark Winston, Principal Network Architect

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Document control

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Sign-off	"An engagement under this design is signed by the practice lead before any build proceeds."		

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CONVENTIONS

Source tags. [S] figure read from the vendor's own current page on Sep 24, 2026, or on Sep 27, 2026 where the text says so · [S*] figure from a page summary or trade press where the vendor's page could not be opened or was not read in full · [A] design assumption, to be confirmed by the signing engineer · [T] design target: the record's outcome figure and anything derived from it. No figure comes from any engagement, file or asset. A row with more than one tag is counted once: as a published figure if any tag is [S] or [S*], otherwise as an assumption if any tag is [A], otherwise as a design target.

Table 1. Revision history

Date	Version	Change
Sep 27, 2026	1.0	First issue.
Oct 10, 2026	1.1	Approval line now reads: approved by the Founder, issued by Symbeeo. Mark Winston remains the author.

1 · Scope

Who it is for. The plant engineering director of a vehicle assembly plant whose autonomous mobile robots stop every time they roam between Wi-Fi access points, whose OT team will not put line-side traffic on the office network, and who needs every handheld and robot on one managed footing before a second shift of automation arrives.

Typical buyer [A]. One vehicle assembly plant, 120,000 m² under roof: body shop, paint, final assembly and a logistics hall, three shifts. 180 autonomous mobile robots (AMRs) moving parts line-side; 400 rugged handhelds; 60 forklift-mounted tablets; 250 cellular sensors on tooling and conveyors. Existing Wi-Fi 6 for offices stays and is out of scope.

What is in. The private 5G standalone network indoors across the four halls, the on-site core, the data networks and their hand-off to the OT firewall, eSIM and SIM provisioning through the UEM, the handheld model, and the hall-by-hall cut-over. **What is out.** Office Wi-Fi; the AMR fleet manager and robot hardware; the OT firewall and plant core (SRA-SEC-001, SRA-NET-001); the UEM platform choice (SRA-MOB-001 D5).

Assumptions. Ericsson is the private 5G vendor [A]. The jurisdiction issues a local 5G license for the site and it is granted before first emission [A]. Each AMR carries a 5G module supplied by the robot maker, standalone-capable [A]. Every hall has a single-mode fiber route to one core room [A].

Related documents, read Sep 24, 2026.

- Ericsson Private 5G product page (undated page; read in full Sep 27, 2026) — https://www.ericsson.com/en/private-networks/ericsson-private-5g
- Ericsson Private 5G portfolio listing — https://www.ericsson.com/en/portfolio/enterprise-wireless-solutions/private-5g
- Ericsson Private 5G on Ericsson's enterprise wireless site: Radio Dots with "virtually no handoffs", on-premises controller with dual-mode 4G/5G core, two per site (undated page; read in full Sep 27, 2026) — https://cradlepoint.ericsson.com/products/ericsson-private-5g/
- Honeywell CT70 mobile computer — https://automation.honeywell.com/us/en/products/productivity-solutions/mobile-computers/handheld-computers/ct70-mobile-computer
- Fierce Network, "Ericsson gets aggressive with private 5G products in 2026" (March 12, 2026; read in full Sep 27, 2026) — https://www.fierce-network.com/wireless/ericsson-launching-raft-private-5g-products-2026
- SRA-MOB-001, SDD-MOB-001, STP-MOB-001 (Symbeeo), v1.0 of Sep 27, 2026

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1c · Public implementations this design follows

Table 2. Public implementations this design follows

Implementation	Who published it · date	What it settles for this design	URL
A UK vehicle maker's plant runs Ericsson Private 5G for vision systems, IoT sensors and production tools on its vehicle production lines, replacing wired networks ("cut the copper"), with automated guided vehicles in view and fast swap of connected tools	Ericsson press release · February 12, 2025 · public deployment	the design's shape — Ericsson Private 5G inside a vehicle assembly plant — is in production at a named manufacturer; it does not settle R5 or R6, which stay design targets and a measured need	https://www.ericsson.com/en/news/2025/2/ericsson-private-5g-to-support-jlrs-digital-manufacturing-transformation
Ericsson's 2026 private 5G plans: 33 radios added in 2025, "EP5G Elements" entry basebands, and an "air-gapped" release later in 2026 that "doesn't depend on the cloud in any way"	Fierce Network, trade report quoting Ericsson · March 12, 2026 · vendor documentation, used to build our own design	§4.2 and §6: the air-gapped release is noted, not relied on	https://www.fierce-network.com/wireless/ericsson-launching-raft-private-5g-products-2026

Both rows were read in full on Sep 27, 2026. The product facts the design uses (dual-mode core, data kept on site, cloud portal, Radio Dots with "virtually no handoffs", two on-premises controllers per site) come from Ericsson's two product pages, which carry no publication date; they were read in full that day and are listed under Related documents. The air-gapped row is a trade report [S*], not Ericsson's own page.

2 · Requirements register

Table 3. Requirements register

#	Requirement	Value	Source
R1	Endpoints	180 AMRs · 400 handhelds · 60 forklift tablets · 250 sensors = 890; ceiling 1.5×	[A]
R2	Floor area	120,000 m² under roof, four halls, 12–18 m roof height	[A]
R3	Network type	5G standalone, core on site	[S] Ericsson Private 5G; SRA-MOB-001 D3 (a)
R4	Indoor coverage	RSRP ≥ −95 dBm, SINR ≥ 13 dB on 95 % of AMR routes and aisles	[T]
R5	AMR handover	no AMR safety stop caused by a radio handover over one shift	[T]
R6	AMR command round trip	≤ 20 ms at the 99.9th percentile, device to fleet manager	[A] robot maker's stated need
R7	Plant WAN down	every line-side data network keeps working for ≥ 8 h	[T]
R8	Handheld	Wi-Fi 7 and 5G, IP65 or better, repeated 1.8 m drops to concrete	[A]; SRA-MOB-001 R16 plus Wi-Fi 7 and 5G

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#	Requirement	Value	Source
R9	Spectrum	local license on file before first emission	[A]; SRA-MOB-001 R8
R10	OT separation	AMR and sensor data networks reach the OT zone only through the OT firewall	[A]; SRA-SEC-001
R11	Device credential	per-device SIM or eSIM plus certificate; no shared key	SRA-MOB-001 R11
R12	Cut-over	hall by hall; no hall loses AMR service for more than one shift break	[T]
R13	Lost handheld	wiped and SIM barred ≤ 15 min after report	SRA-MOB-001 R18

Thirteen rows; one carries a vendor figure, six are design assumptions, four are design targets, and two restate an SRA-MOB-001 requirement for this design.

3 · Architecture overview

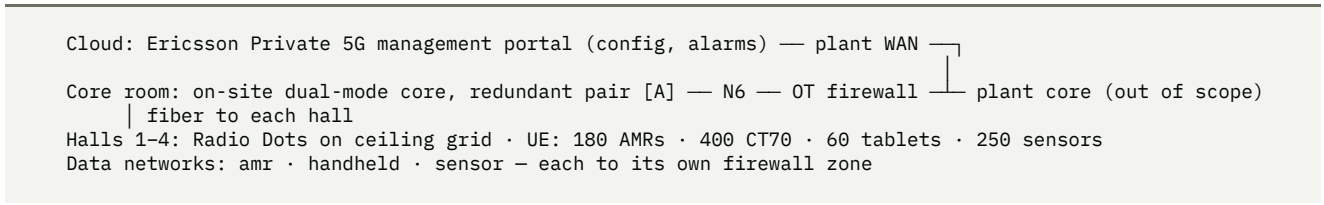


Figure 1. Plant private 5G network

One standalone network for everything that moves. Office Wi-Fi stays where it is; the halls get cellular because an AMR crossing 120,000 m² at walking pace makes hundreds of Wi-Fi roams a shift, and each roam is a chance to trip its safety stop. User traffic breaks out in the core room; only management touches the cloud [S].

Table 4. Architecture overview

Role	Product (exact model)	Qty	Capacity used	Why this unit
Private 5G system	Ericsson Private 5G, size from the vendor's survey	1	890 devices at issue, 1,335 at ceiling [A]	on-site dual-mode core, SA, data on site [S]
Indoor radio	Ericsson Radio Dot (model from the vendor's design)	130 [T]	one per ~920 m² [A]	small ceiling radio, "virtually no handoffs" [S]
Rugged handheld	Honeywell CT70	400	one per operator on shift ×1.2 [A]	Wi-Fi 7 certified, 5G FR1 incl. n48, IP68/IP65 [S]
Forklift tablet	model from the buyer's comparison	60	—	SRA-MOB-001 D6 [A]
AMR 5G module	supplied by the robot maker	180	—	SA-capable [A]

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4 · Design by subsystem

4.1 Radio plan.

Radio Dots on the ceiling grid at 10–12 m in high-bay halls, lower on the mezzanines [A]. 130 Dots across 120,000 m² is one per about 920 m² [A]; the count is set by the vendor's predictive design with racking, body-in-white fixtures and paint booths modeled, then fixed by a walk survey. Rejected: outdoor-style macro radios on the walls — steel racking shadows the aisle floor where AMRs run (R4).

4.2 Core and management.

Ericsson Private 5G carries a dual-mode 4G/5G core and runs 5G standalone [S]. The core pair sits in the plant's core room on A/B power [A], which keeps user traffic on site [S] and meets R7 as long as the core is not waiting on the cloud to admit a device. The management portal is cloud-based [S]; with the WAN down the portal is unreachable and changes wait [A]. An air-gapped release is reported for later in 2026 [S*]; the design does not depend on it. Rejected: a carrier-hosted core — fails R7.

4.3 Data networks and OT hand-off.

Three data networks: amr (AMRs to the fleet manager), handheld (CT70 and tablets to MES and warehouse apps), sensor (conveyor and tooling sensors to the historian) [A]. Each lands on its own firewall zone (R10). AMR traffic gets the low-latency QoS class the vendor's core offers [A]; R6 is measured, not assumed.

4.4 Handhelds.

Honeywell CT70: Wi-Fi 6E and Wi-Fi 7 certified, 802.11be, 5G FR1 across bands including n48, n77 and n78, CBRS as an option [S]. IP68/IP65; multiple 2.4 m drops to concrete booted and 1.8 m without a boot; 3,000 tumbles at 0.5 m [S]. Android with planned support through Android 19; Qualcomm QCS/QCM6690 [S]. The CT70 uses 5G in the halls and Wi-Fi 7 in offices and the canteen, one managed device on both (SRA-MOB-001 §4.4). Rejected: Wi-Fi-only handhelds — they would keep the office SSID in the halls.

4.5 Provisioning.

eSIM profiles pushed to CT70s and tablets through the UEM; physical SIMs for sensors; AMR modules take eSIM or SIM per the robot maker [A]. Every device also holds a UEM-issued certificate (R11). A lost CT70 is wiped from the UEM and its SIM barred in the core from one runbook step (R13) [A].

4.6 Hall-by-hall cut-over.

Sequence per hall: Dots installed and surveyed; ten AMRs moved to 5G for one week with Wi-Fi left configured as fallback; then the hall's fleet moved in one shift break; Wi-Fi SSID for AMRs removed from that hall after 14 days [A]. Four halls at three weeks each is about 12 weeks [A].

5 · Failure behavior

Table 5. Failure behavior

Failure	Behavior	Source
One Radio Dot down	neighboring Dots cover the gap at lower signal; AMRs keep running	[A]
One core node down	the redundant node carries registered devices	[A] redundant pair; SRA-MOB-001 F4

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Failure	Behavior	Source
Plant WAN down	line-side traffic continues on site; cloud portal unreachable; changes wait	[S] data on site; [A] behavior
Spectrum license lapses	radios must stop transmitting; AMRs stop; Wi-Fi fallback only where still configured	[A]
UEM unreachable	devices keep last policy; no new enrollments	SRA-MOB-001 F7
AMR module fails	robot stops safely; fleet manager reroutes others	[A] robot maker's behavior

6 · Limits

- The 130-Dot figure is a design target; the vendor's predictive design and a walk survey set the count.
- R6's 20 ms is the robot maker's stated need, not an Ericsson figure; it is proved by measurement in the pilot hall.
- WAN-down behavior of admission and re-registration is to be confirmed in writing by Ericsson before signature; the cloud portal is the only management path read.
- The air-gapped release is [S*], from a trade report of March 12, 2026; it is not relied on until Ericsson publishes it. The Radio Dot claim was read from Ericsson's own page on Sep 27, 2026.
- Spectrum rules are the jurisdiction's; the design fixes none of them.

7 · Lessons learned

None yet — this is a design study; populated after the first build against it.

8 · The author

WRITTEN BY

Mark Winston

Principal Network Architect

CCIE, CISSP, CCSP, CCISO, CISM, Adopting Zero Trust (Forrester)

Signed off by Edwin Ozer, Founder.

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SYMBEEO

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hello@symbeeo.com · symbeeo.com

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Figures are as published by their sources on the dates given in this document; figures marked [A] are assumptions.

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