Wi-Fi HaLow

Application and proven ecosystem

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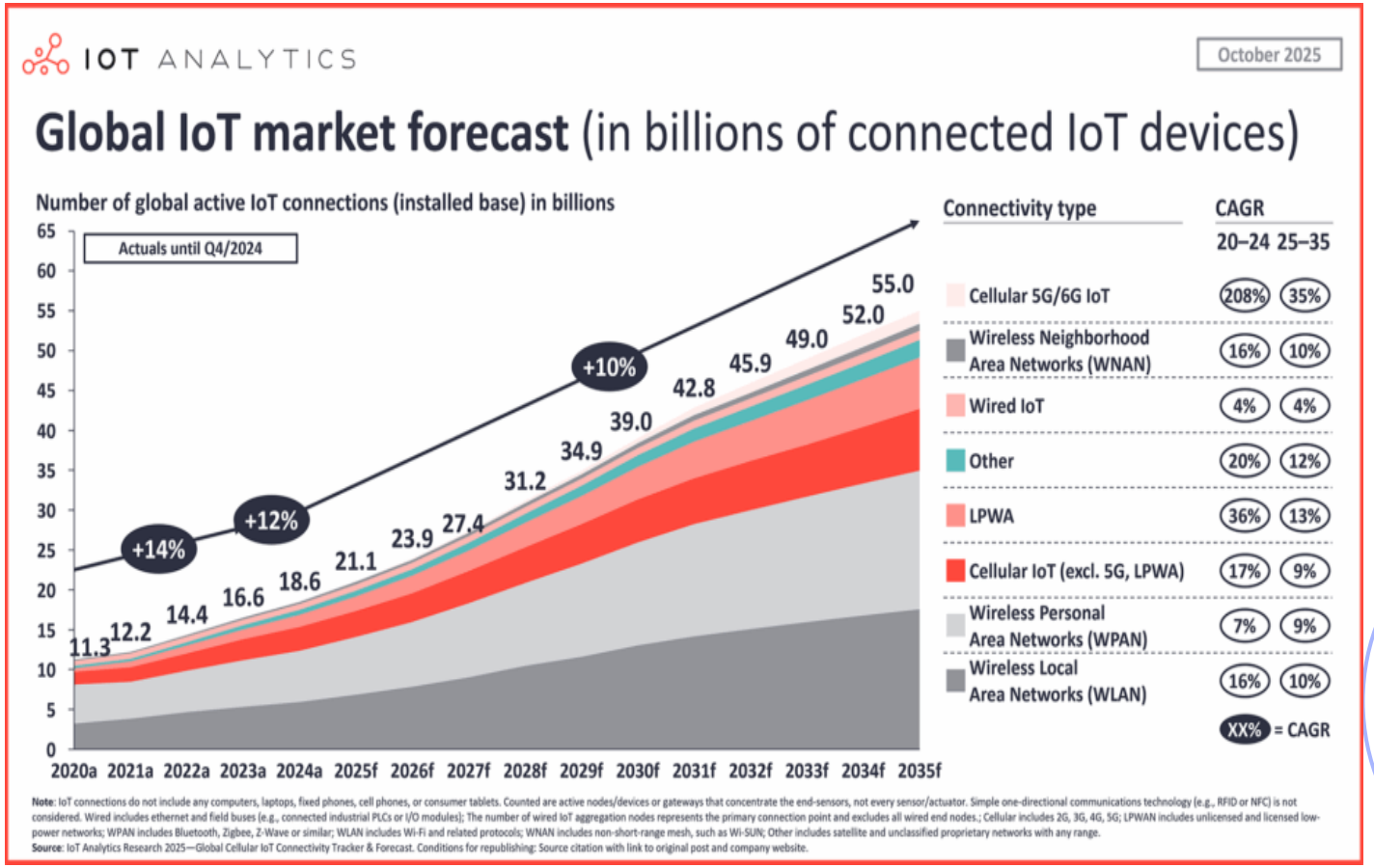
Wi-Fi Market Share in IoT

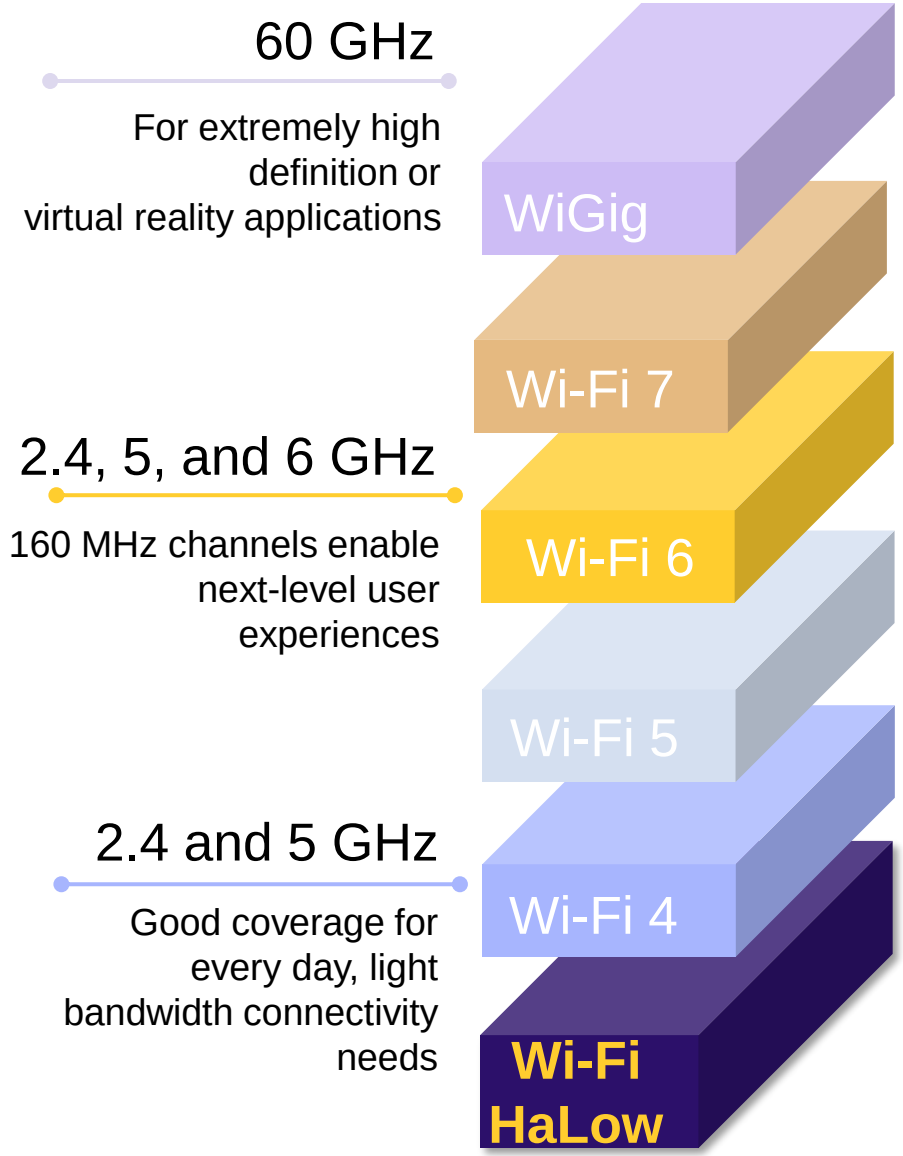


32%

Wi-Fi Market share

IoT Analytics

Wi-Fi supports IoT across multiple use cases and environments



Designed with IoT in mind

Wi-Fi HaLow addresses unique needs of IoT devices:

- Long range: approx. 1 km
- Multi-vendor interoperability
- Penetration through walls
- Easy setup without disrupting existing Wi-Fi networks
- Supports coin cell battery devices for months (or years)
- No need for proprietary hubs or gateways

100M

Wi-Fi HaLow devices predicted by 2029

Source: ABI Research, 2024

8K

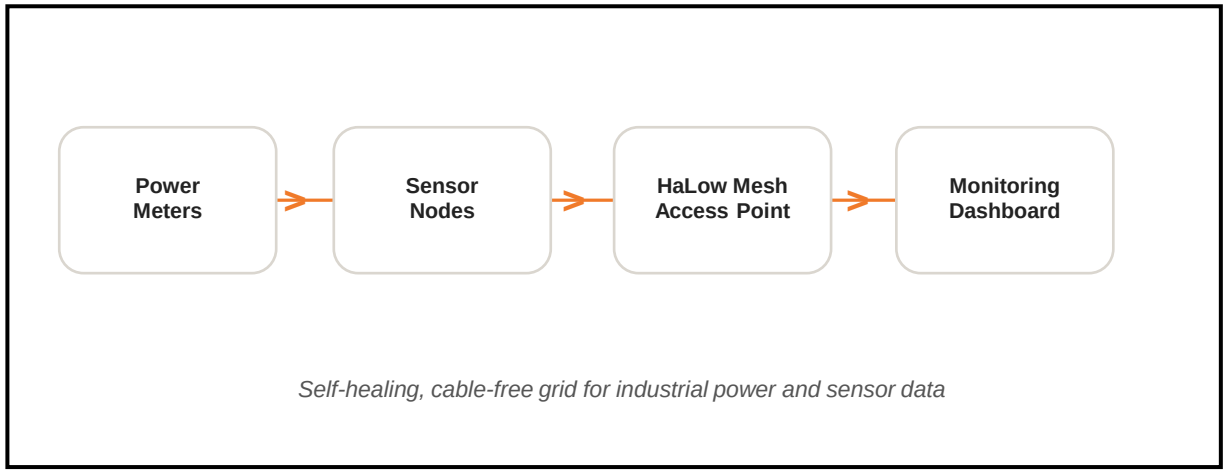
Devices supported by a single Wi-Fi HaLow AP

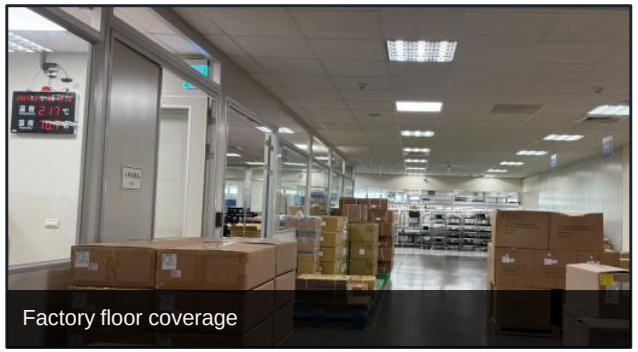
Case Study - Wi-Fi HaLow Industrial Power & Sensor Deployment

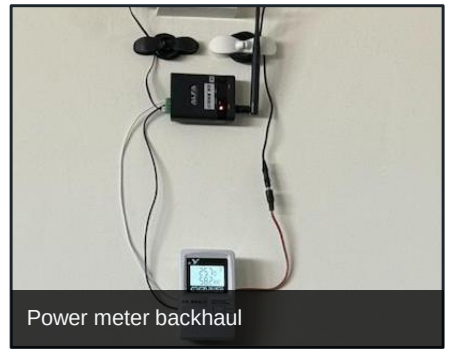
Before: Industrial power monitoring and sensor collection typically rely on extensive cabling across high-interference facilities. Metallic cabinets, reinforced concrete, and long cable routes increase deployment cost and complexity.

Now: ALFA Network hardware with Wi-Fi HaLow (802.11ah) provides a sub-1GHz wireless backbone over 1 km. A mesh architecture relays power, voltage, temperature, humidity, and sensor data across the facility without additional repeaters.

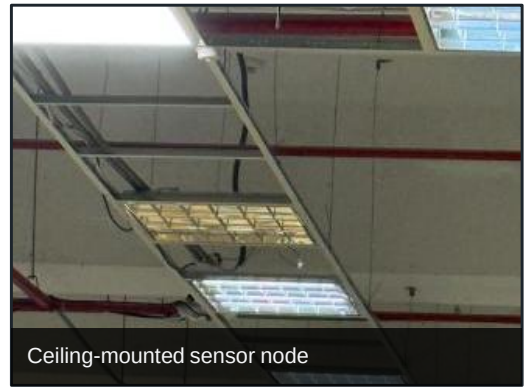
ALFA Network Solution




Factory floor coverage


Power meter backhaul

Power cabinet monitoring


Ceiling-mounted sensor node

Key Value

Lower cabling cost | Mesh coverage | Massive sensor scalability

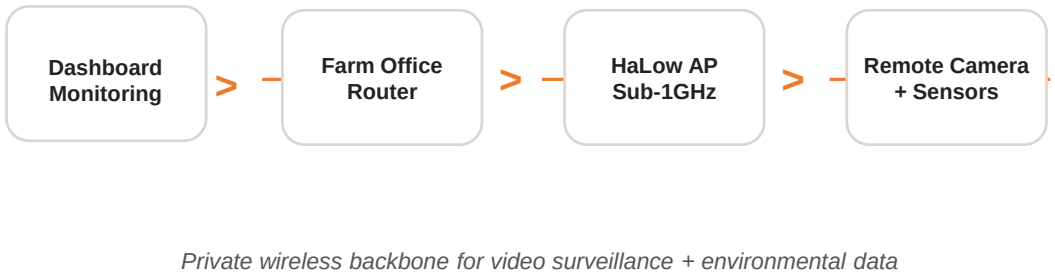
Wi-Fi HaLow replaces expensive industrial wiring with reliable long-range connectivity for power and environmental monitoring.

Case Study - Wi-Fi HaLow Smart Agriculture & Remote Surveillance

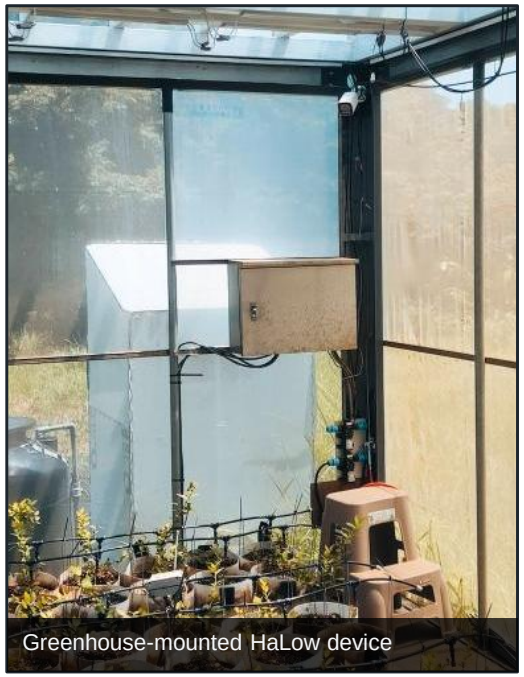
Before: Agricultural plots and greenhouses require remote IP camera monitoring and sensor data backhaul, but standard Wi-Fi cannot reliably cover long distances or penetrate greenhouse structures. Wired infrastructure is expensive, while 4G/5G adds recurring data costs.

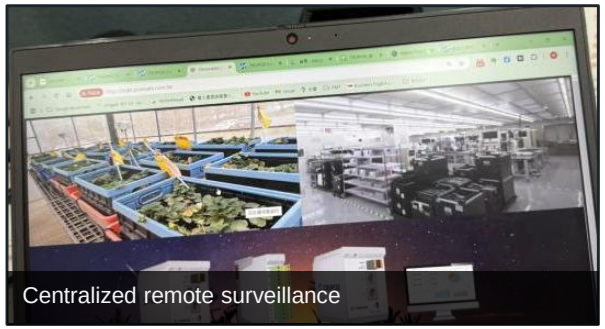
Now: By deploying ALFA Network hardware with Wi-Fi HaLow (802.11ah), the farm builds a private sub-1GHz wireless backbone for HD camera monitoring over 1 km+ and soil moisture / pH sensor backhaul.

ALFA Network Solution



Private wireless backbone for video surveillance + environmental data


Greenhouse-mounted HaLow device


Centralized remote surveillance


Outdoor greenhouse site


Soil moisture / pH sensor

Key Value

1 km+ HD video monitoring | Cable-free deployment | Soil sensor integration

This deployment proves Wi-Fi HaLow can provide the throughput needed for remote video monitoring with the range of a private IoT network.

Case Study - Wi-Fi HaLow Smart City Deployment

Before: Municipal monitoring normally depends on trenching, fiber or copper cabling, and complex wiring across traffic-light corridors. These upgrades are expensive, slow to install, and difficult to scale in dense urban areas.

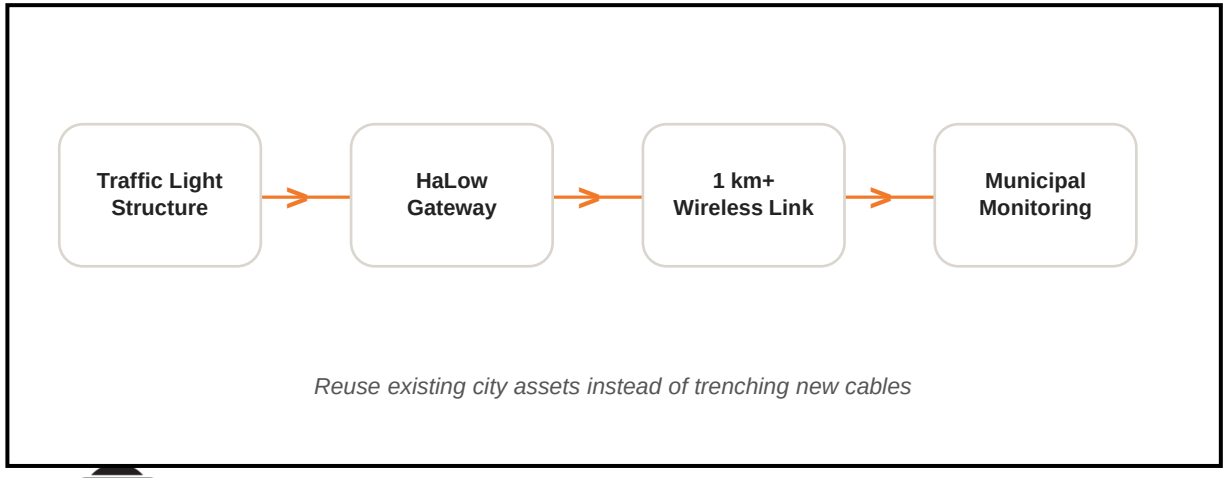
Now: In Medellin, Colombia, ALFA Network hardware with Wi-Fi HaLow (802.11ah) creates a long-range sub-1GHz wireless backbone. Gateways are mounted on existing traffic-light systems, connecting city devices wirelessly over 1 km+.


Traffic-light corridor deployment


Gateway installed on existing pole


Pole-mounted HaLow antenna

ALFA Network Solution



Reuse existing city assets instead of trenching new cables

Key Value

No trenching | Plug-and-play mounting | Sub-1GHz penetration

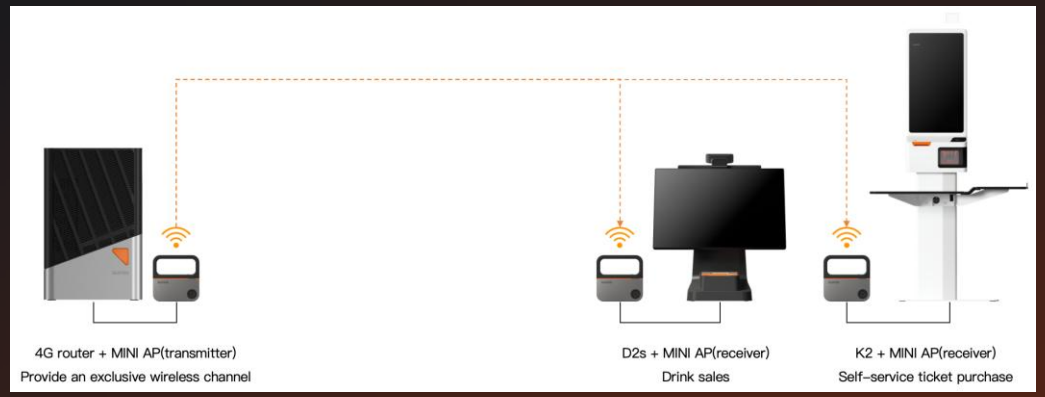
This smart city deployment shows how Wi-Fi HaLow can replace costly urban cabling with scalable long-range wireless connectivity.

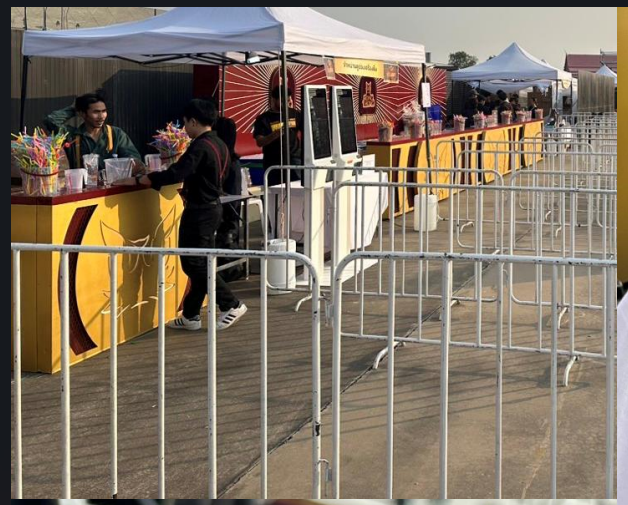
Case Study - A concert event in Thailand

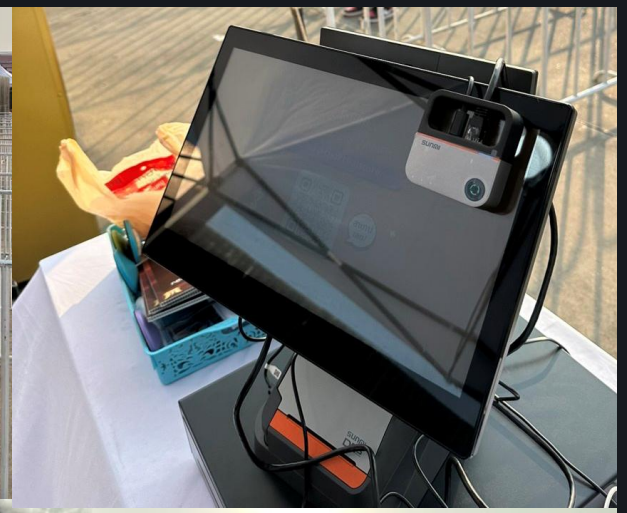
Before: A Thai concert network service provider uses 4G mobile Wi-Fi. However, due to the high concentration of the people and equipment onsite, the wireless network connection satiability remains a challenge.

Now: SUNMI Hyper Wi-Fi(based on Wi-Fi HaLow) solution able to cover an entire concert with only one 4G router and MINI AP (AP mode) as the transmitter, plus the MINI AP(Client mode) as the receiver at ticket gates and beverage sales points, combined with SUNMI desktop POS terminals, providing smooth progress of self-service ticket purchasing and merchandise sales at the concert.

SUNMI Solution





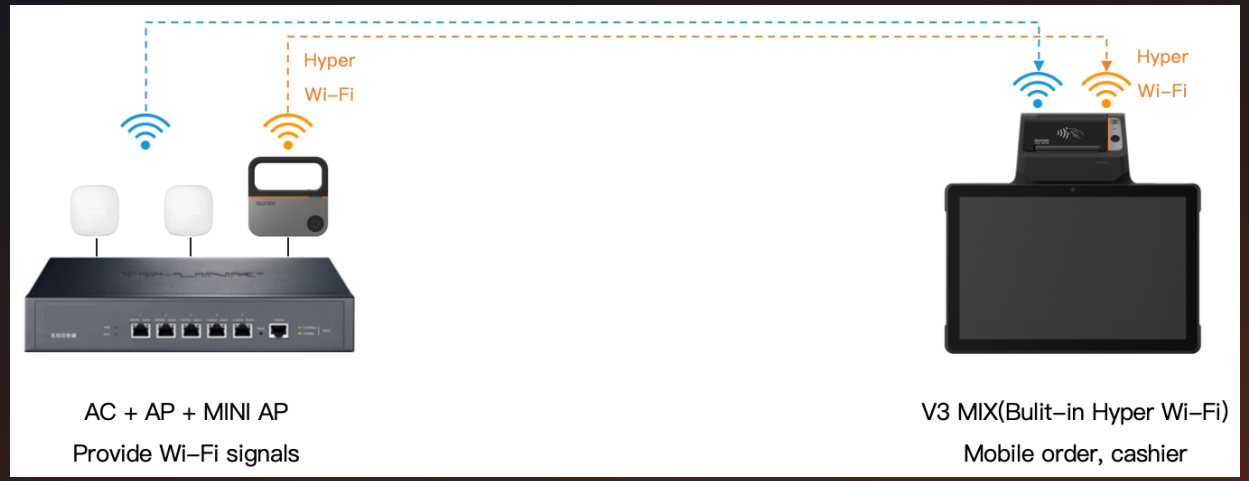


Case Study – Classic hotel and restaurant in Europe

Before: Traditional hotel restaurant and bar indoor plus outdoor setup. Network solution have signal dead zone due to the ancient architechture, and outdoor are LAN solution requires expensive investment and professional equipment to be effective.

Now: Without modifying the existing AC+AP network topology, the hotel simply adds a Hyper Wi-Fi(Based on Wi-Fi HaLow) MINI AP, together with SUNMI V3 MIX smart terminal and its seamless link switching between Wi-Fi 4/5 and Wi-Fi HaLow to make all needed business network transition - orders and payment effectively everywhere.

SUNMI Solution



Wi-Fi HaLow for commercial use

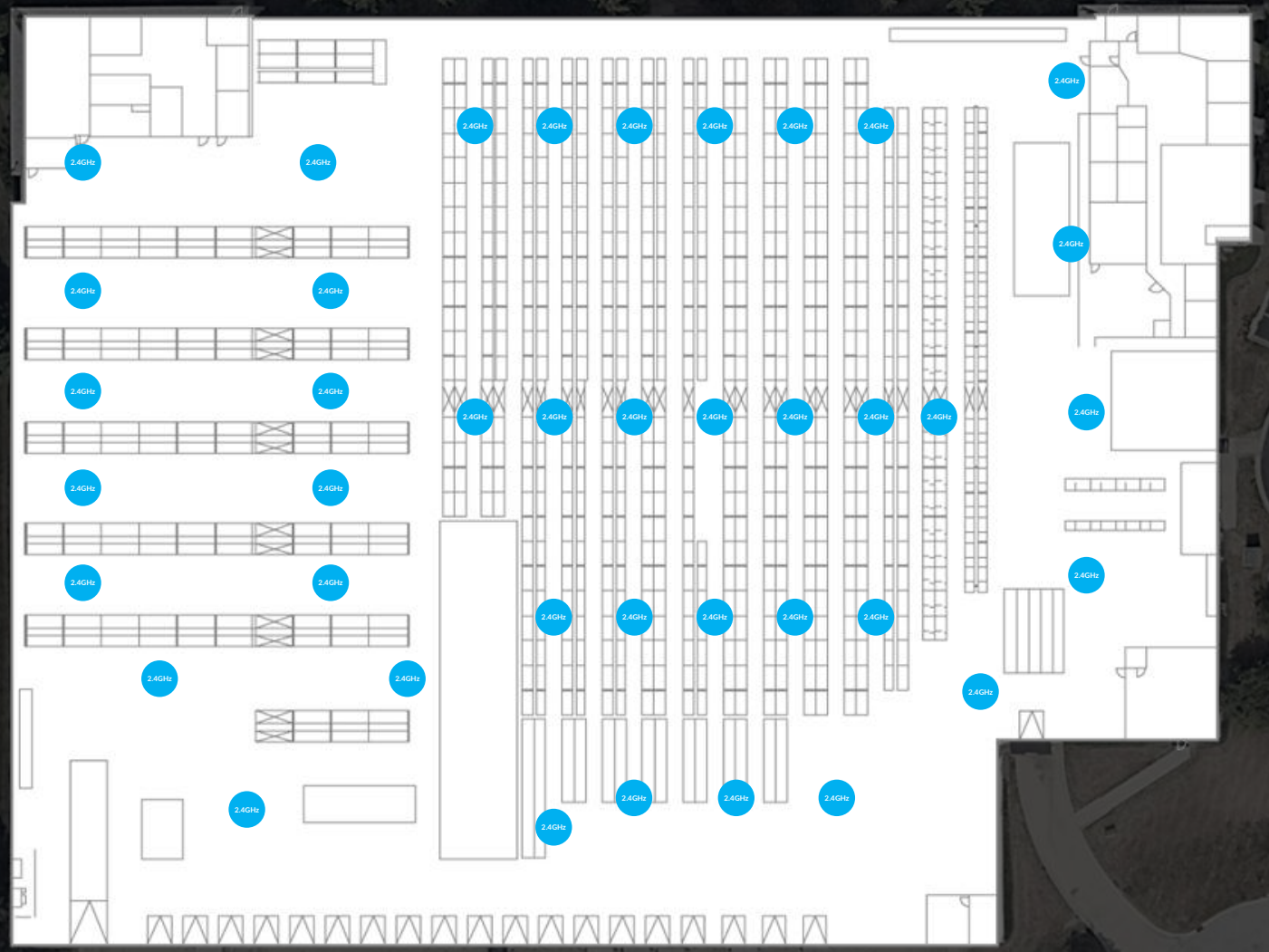
Current

40x Wi-Fi 6 access points required for indoor coverage

Poor signal and dropouts

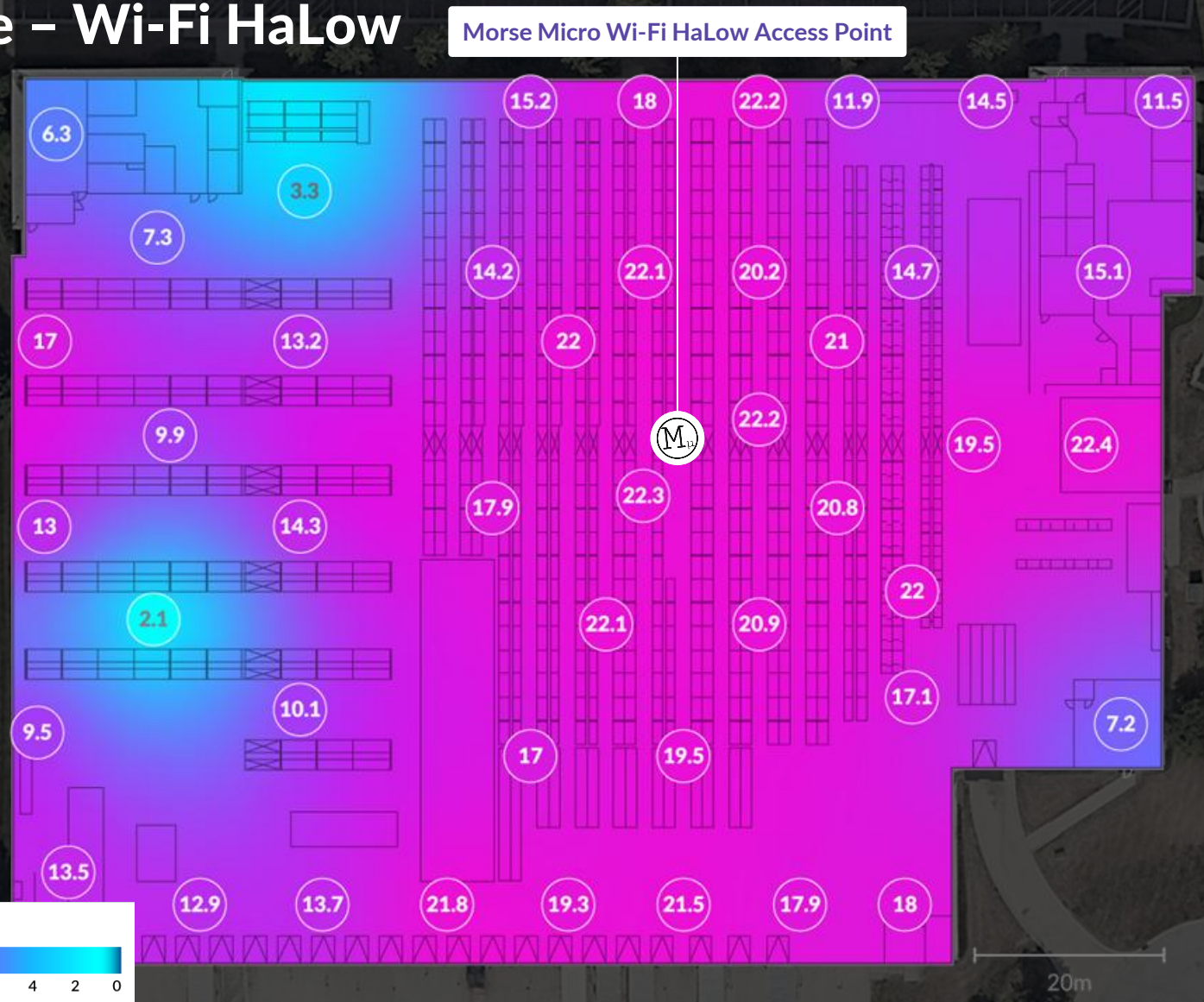
Internal Coverage – 2.4 GHz

Poor and unreliable connectivity with 40x 2.4GHz APs



Internal Coverage – Wi-Fi HaLow

One Morse Micro Wi-Fi HaLow AP covered the entire warehouse with a strong reliable signal

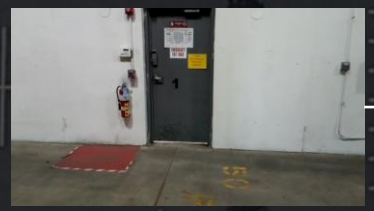


UDP uplink throughput – Mbps

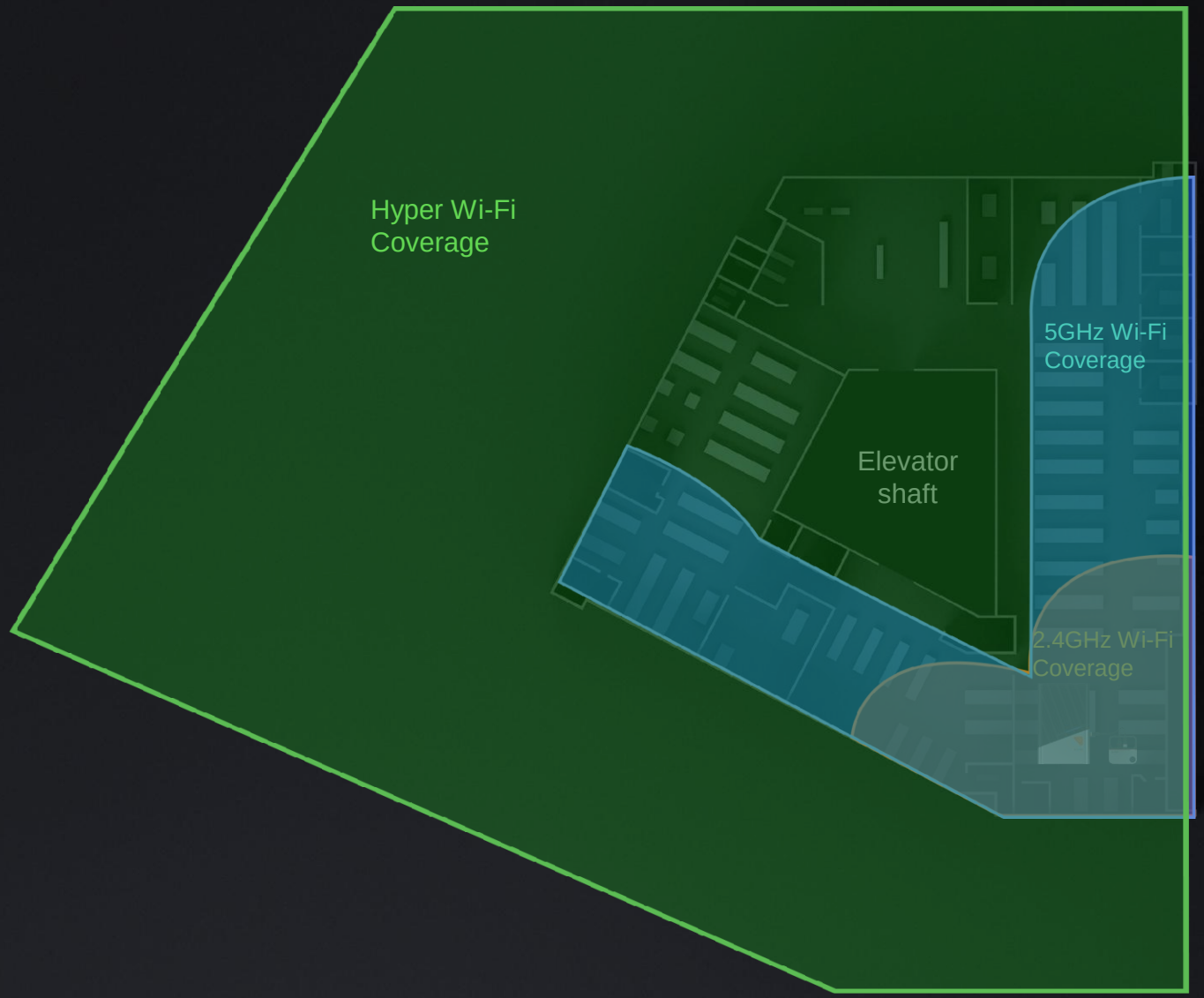
22 20 18 16 14 12 10 8 6 4 2 0

9 streaming cameras

Enough throughput for 9 continuously streaming cameras



Real-world test data ...



12000m²
Indoor office environment

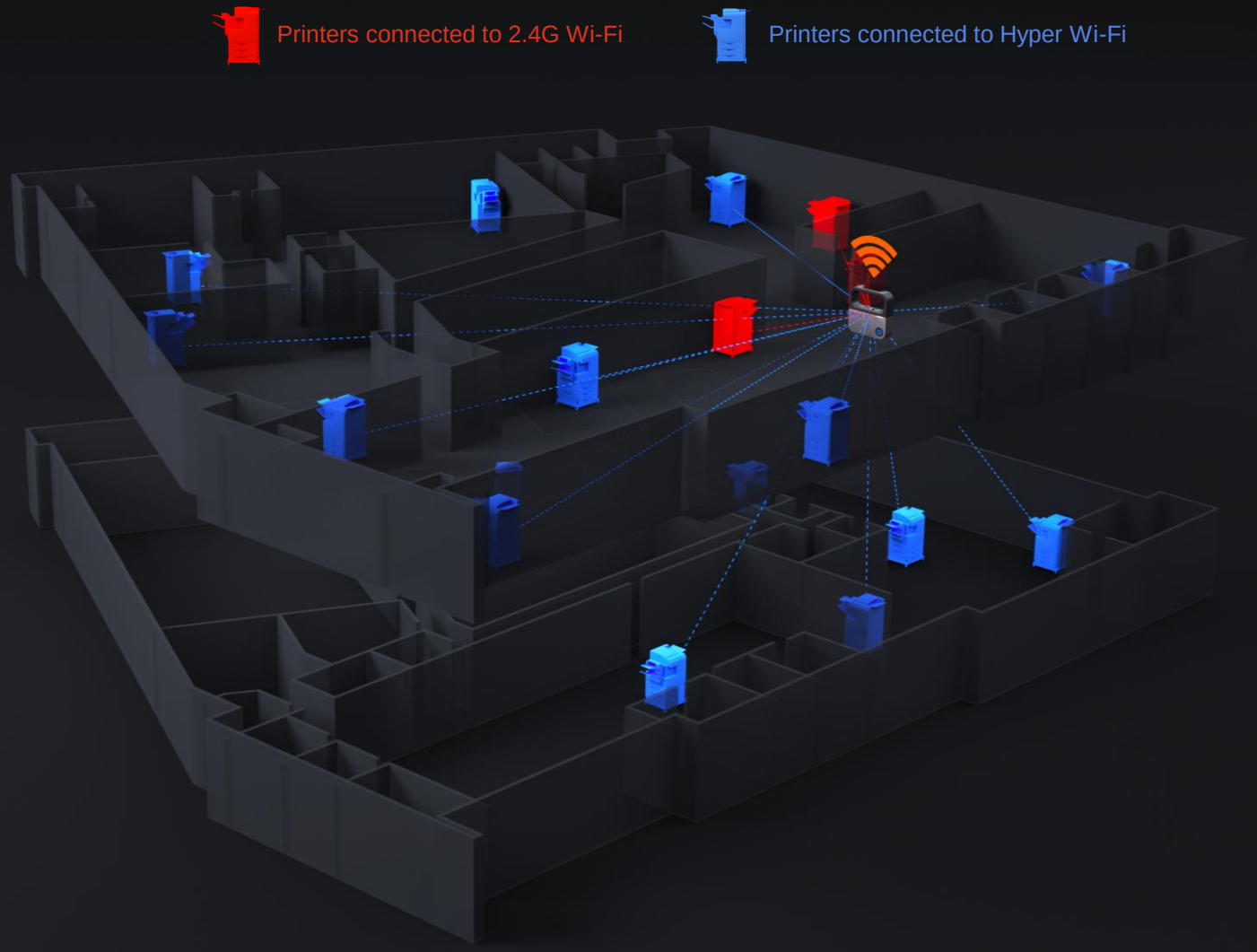
Average speed 1.97Mbps
Provides stable support for real-time business applications

Further, but more stable

24 hours continuous stress test

With **Hyper Wi-Fi**
the order loss rate is **0%**
and the average delay is about **200ms**

With **2.4G Wi-Fi**
the order loss rate is as high as **3.29%**
and the average delay is more than **850ms**



Wi-Fi HaLow use cases

Smart homes and buildings

Industrial automation control

Industrial IoT

Connected agriculture

Healthcare devices

Smart cities

Join and collaborate

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