

Solution Demonstration

The Power of Wi-Fi HaLow



Solution Demonstration

Use case #1:

Wireless video camera solution in indoor/outdoor buildings

Use case #2:

AI-enabled camera solution for med-range or difficult penetration areas

Use case #3:

Long Range Wi-Fi solution with EasyMesh Extension



Wi-Fi HaLow – Use case #1

Wireless video camera solution in indoor/outdoor buildings

Wireless video camera solution in indoor/outdoor buildings

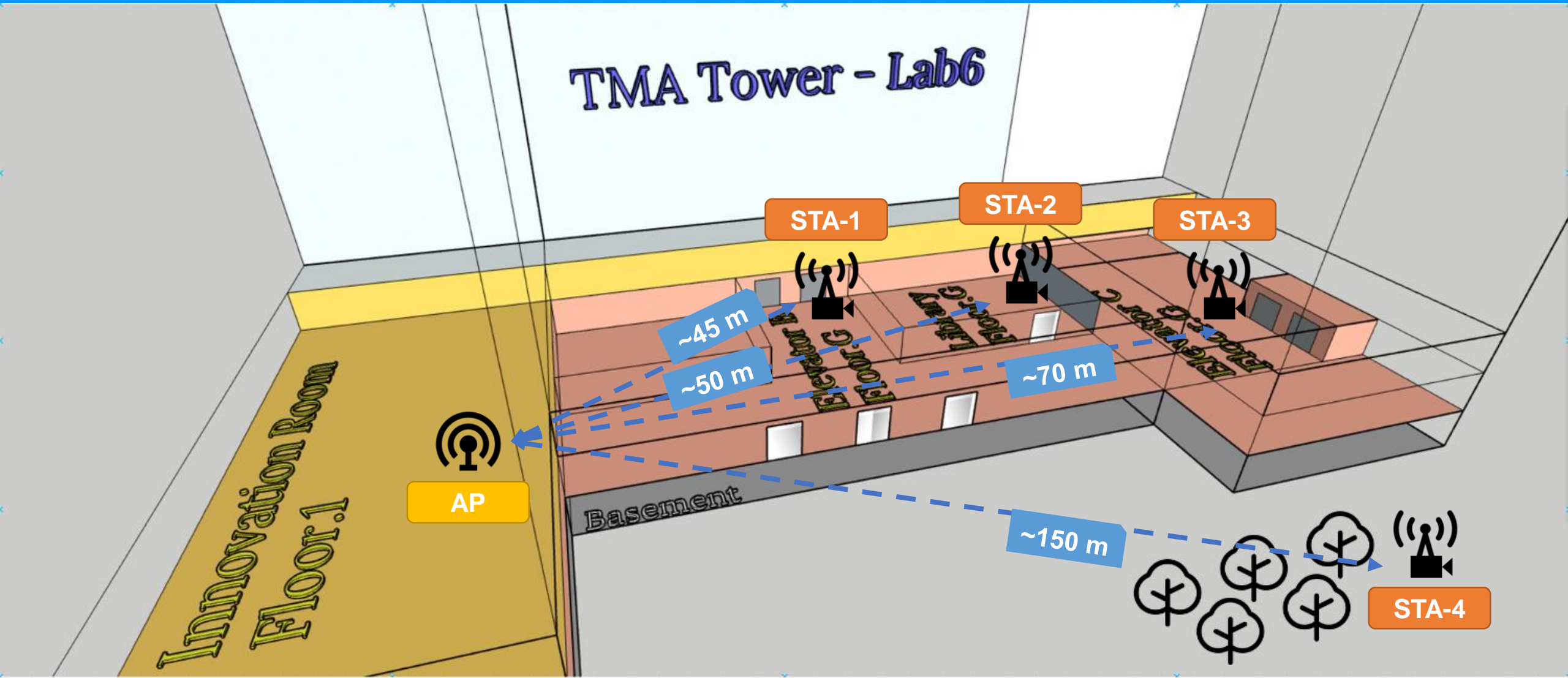
Objectives

- Demonstrate Wi-Fi HaLow's Effective Performance in the following scenario:
 - Covering medium ranges of 50-150 meters
 - Delivering high data rates for seamless video streaming
 - Enabling people detection and live video stream analysis

Diagram



Model Configuration in TMA Building (1/2)



Model Configuration in TMA Building (2/2)

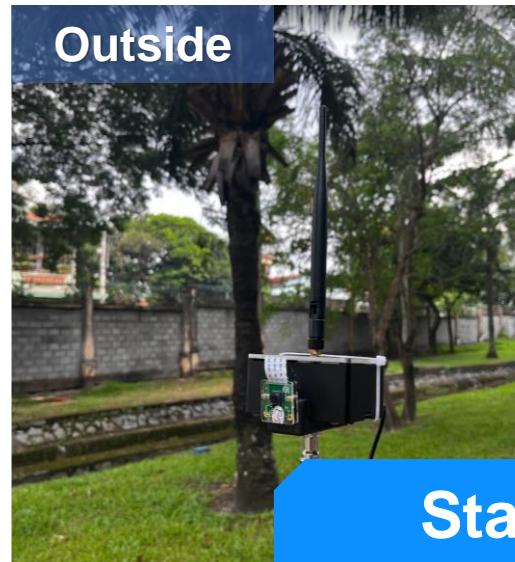
Devices

- CCTV/Camera
- **Morse Micro HaLow modules**

Features

Enhanced Surveillance and Control in Restricted Zones

- Continuous 24/7 Monitoring and Identification within Restricted Areas
- Identification of Unauthorized Individuals
- Human Detection and Counting



Station (STA) demo devices

Results and the obtained parameters



Video Demo



Results

Testing Access Point (AP) - Station (STA) segments	Impediments	Avg. PHY throughput (Mbps)		Notes
		UDP	TCP	
Inno. Room – Library (Floor G) (NLOS~50m)	1 cement wall + 2 glass walls + trees outdoor	4.07	3.48	GOOD for 720p video
Inno. Room – Elevator Block B (Floor G) (NLOS~45m)	1 cement wall + 2 glass walls + trees outdoor	3.95	3.47	GOOD for 720p video
Inno. Room – Elevator Block C (Floor G) (NLOS~70m)	2 cement walls + 3 glass walls + trees outdoor	3.12	2.58	GOOD for 360p video
Inno. Room – Street outdoor (Outdoor) (NLOS~150m)	2 cement walls + many big trees outdoor	2.43	1.92	GOOD for 360p video

Highlights:

- ✓ Wi-Fi HaLow specification: 2 MHz channel in ISM band (920-922 Mhz)
- ✓ **Excellent Video Clarity within 50-70 meters; Beyond this range, Wi-Fi HaLow surpasses LoRaWAN and conventional Wi-Fi, providing impressive data transfer rates**

The background features a network diagram with various Wi-Fi symbols (circles and rectangles containing signal waves) connected by lines. A person's hand is visible on the right side, holding a small device. The overall theme is wireless technology and network connectivity.

Wi-Fi HaLow – Use case #2

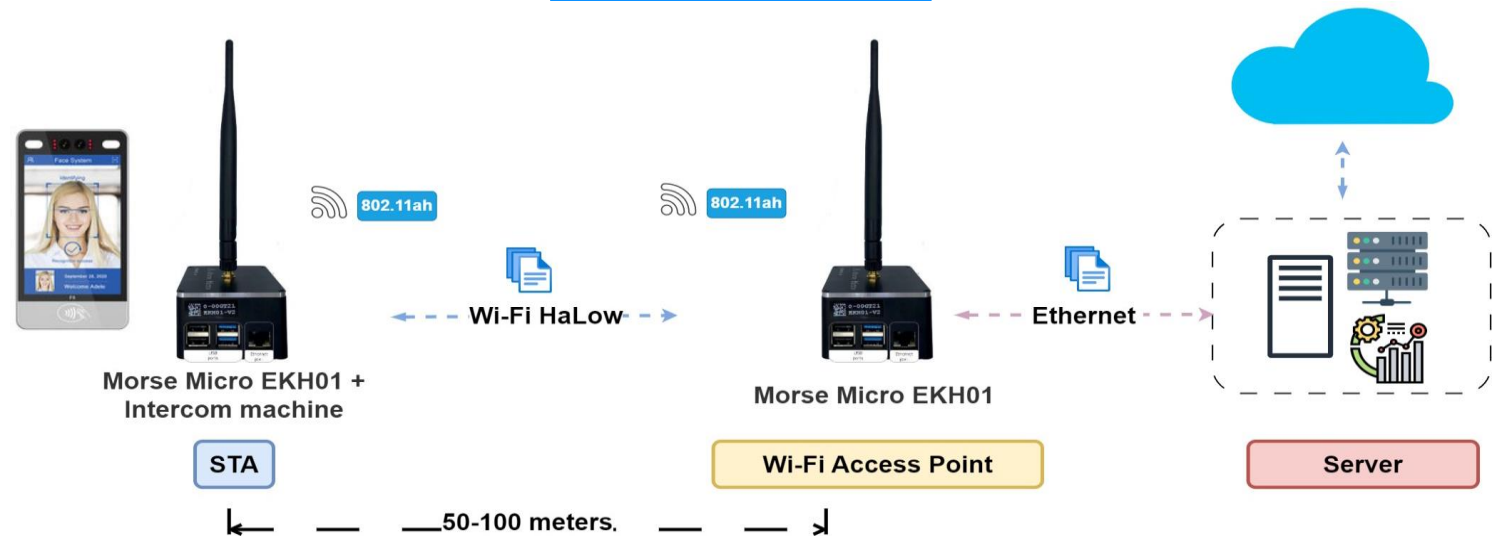
AI-enabled camera solution for med-range or difficult penetration areas

AI-enabled camera solution for med-range or difficult penetration areas

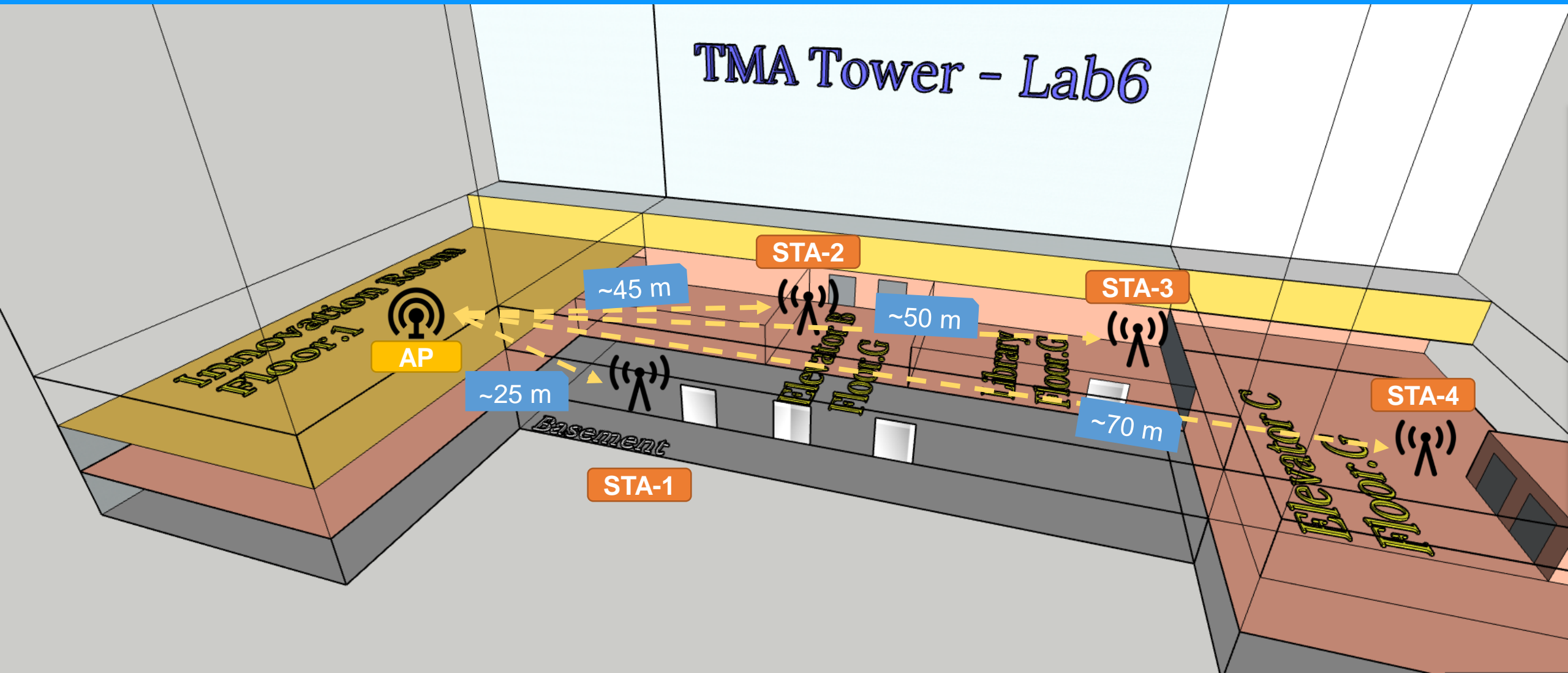
Objectives

- Show Wi-Fi HaLow's Impressive Performance in this scenario:
 - Effective at medium ranges (50-150 meters)
 - Ability to penetrate walls and obstacles
 - Perform Edge AI-enabled face recognition using quality video inputs

Diagram



Model Configuration in TMA Building (1/2)



Model Configuration in TMA Building (2/2)

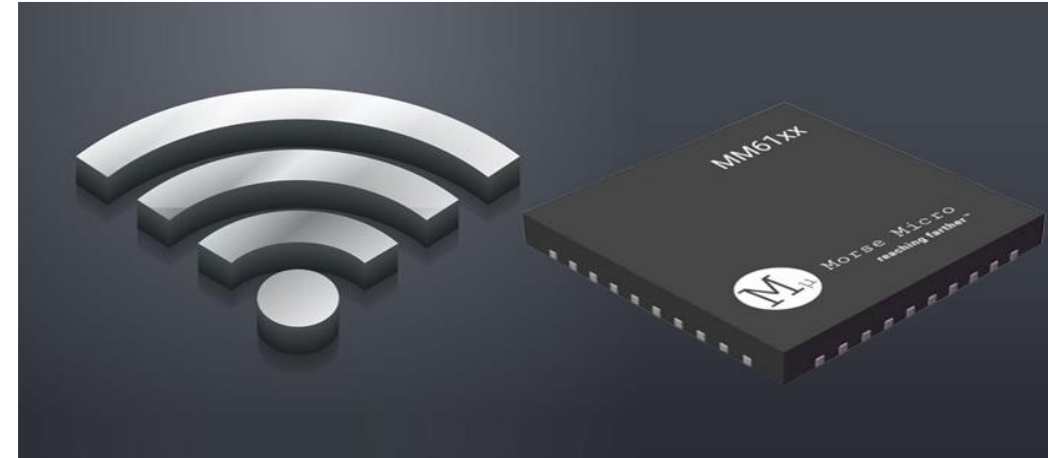
Devices

- T-Access
- **Morse Micro HaLow modules**

Features

Personnel Access Management through an Administrative Security Control Platform

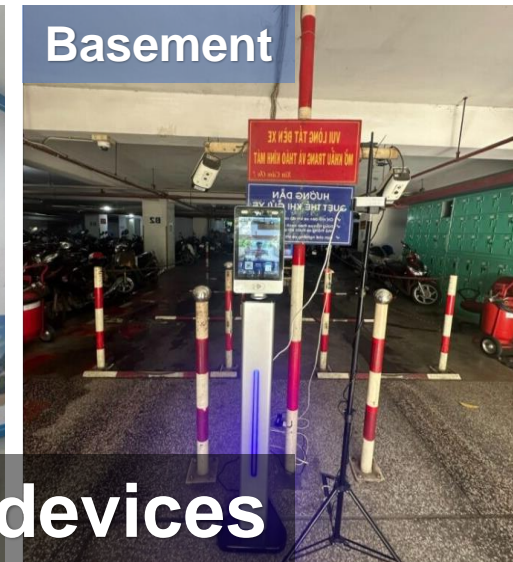
- Authorize entry and grant access within specified zones
- Track the access history of personnel
- Transmit data and alerts to the server administration



Main door



Elevator Area



Basement

Station (STA) demo devices

Results and the obtained parameters



Video Demo



Results

Testing Access Point (AP) - Station (STA) segments	Impediments	Avg. PHY throughput (Mbps)		Notes
		UDP	TCP	
Inno. Room – Library (Floor G) (NLOS~50m)	1 cement wall + 2 glass walls + trees outdoor	4.07	3.48	GOOD for 720p video
Inno. Room – Elevator Block B (Floor G) (NLOS~45m)	2 cement wall + 2 glass walls	3.95	3.47	GOOD for 720p video
Inno. Room – Elevator Block C (Floor G) (NLOS~70m)	2 cement wall + 3 glass walls	3.12	2.58	GOOD for 360p video
Inno – Motorbike Parking Lot (Basement) (NLOS ~25m)	1 cement wall + 2 cement floors	3.16	2.68	GOOD for 360p video

Highlights:

- ✓ Wi-Fi Halow specification: 2 MHz channel in ISM band (920-922 Mhz)
- ✓ **Exceptional Ability to Penetrate Obstacles with Consistent High Data Rates: Suitable for a Variety of Applications Despite Challenges such as Walls, Glass, and Trees.**

A blue-themed graphic with a network diagram. The diagram features several Wi-Fi symbols (three curved lines above a dot) enclosed in rectangular and circular boxes. These boxes are interconnected by solid and dashed lines, representing a mesh network. The background includes faint, light-blue geometric shapes and lines, suggesting a technical or digital environment. A person's hand is visible on the right side, holding a small object, possibly a Wi-Fi antenna or a small device, which is also connected to the network diagram.

Wi-Fi HaLow – Use case #3

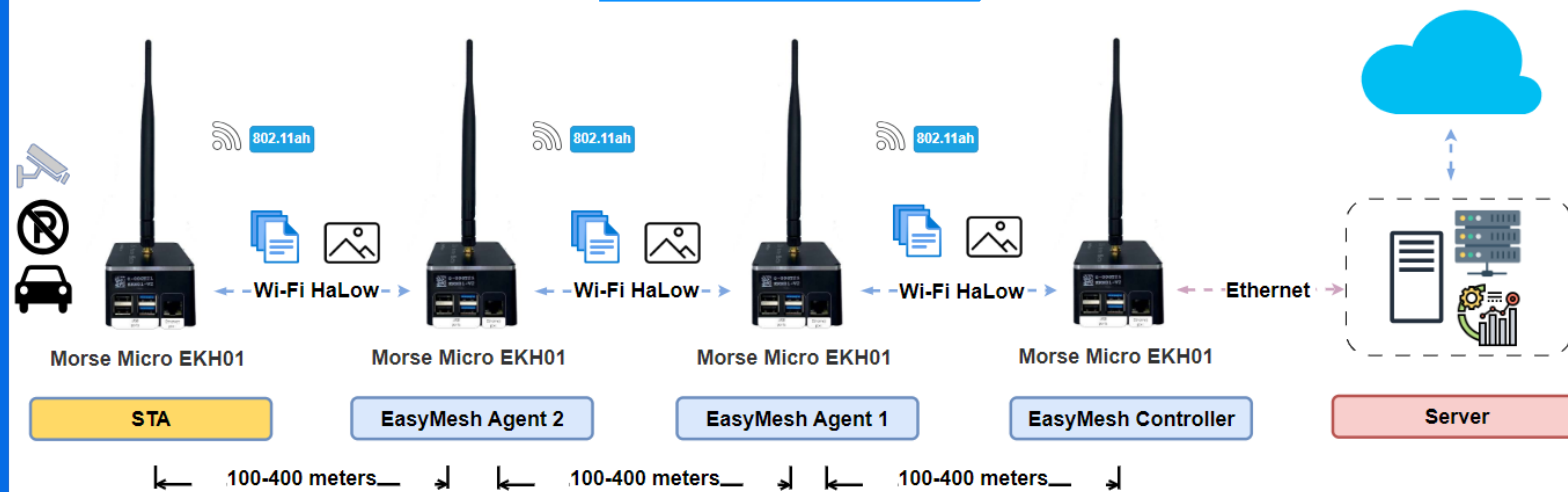
Long Range Wi-Fi solution with EasyMesh Extension

Long Range Wi-Fi solution with EasyMesh Extension

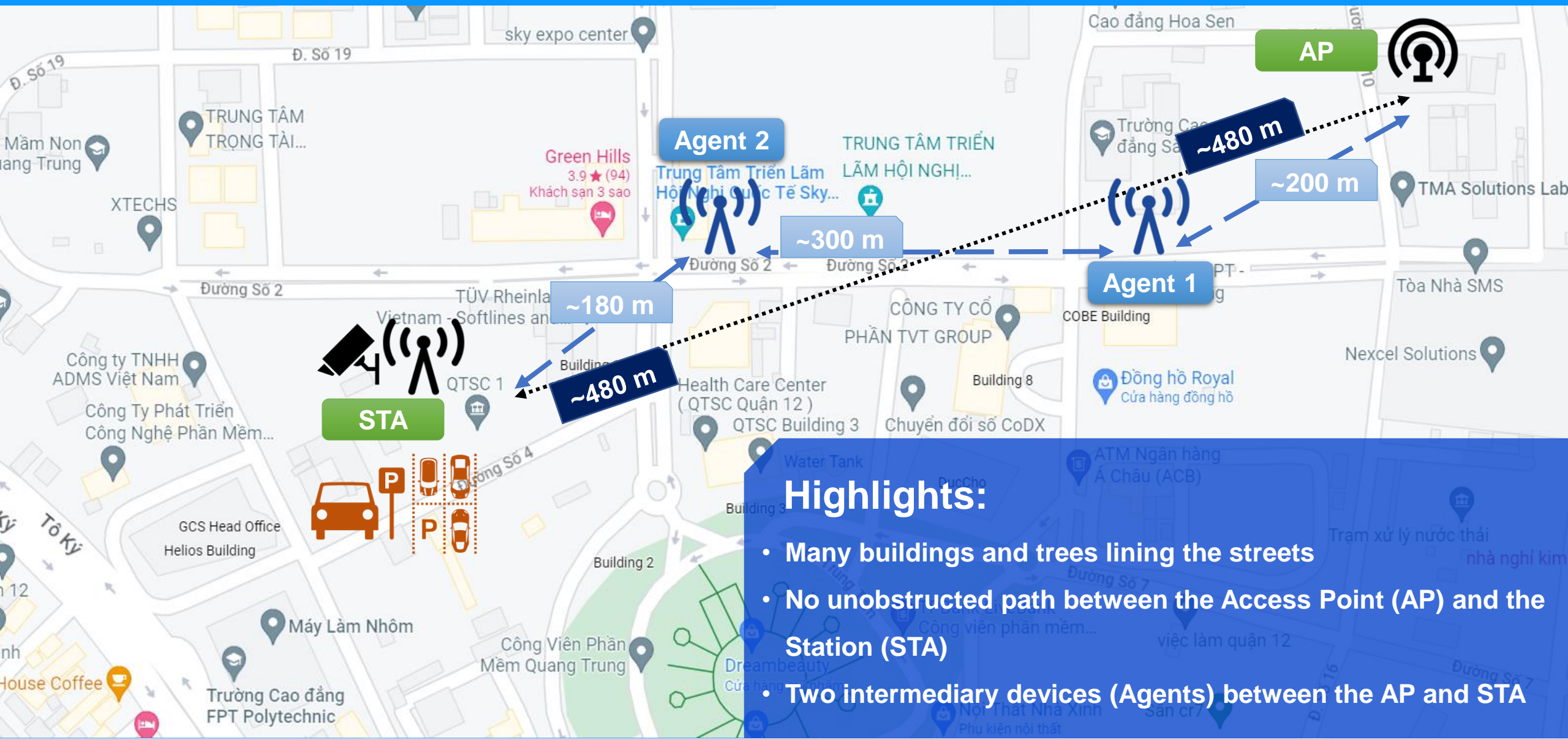
Objectives

- Wi-Fi HaLow's Strong Performance in the following scenarios:
 - High to Extremely High Range: Approximately 500 meters to 1 kilometer
 - Applications that require Low to Moderate Data Rates
 - Edge AI-enabled vehicle parking monitoring using quality captured images

Diagram



Model Configuration in QTSC (1/2)



Highlights:

- Many buildings and trees lining the streets
- No unobstructed path between the Access Point (AP) and the Station (STA)
- Two intermediary devices (Agents) between the AP and STA

Model Configuration in QTSC (2/2)

Devices

- CCTV/Camera
- **Morse Micro HaLow modules**

Features

Vehicle Parking Surveillance through Vehicle Parking Platform

- Identifying moving and stationary cars/bikes
- License plate recognition for unauthorized parking
- Transmitting data and alerts to the server administration



Results and the obtained parameters



Video Demo



Results

Testing Access Point (AP) - Station (STA) segments	Impediments	Avg PHY throughput (Mbps)		Notes
		UDP	TCP	
From AP to Agent #1 (NLOS~200m)	1 cement wall + trees	4.25	3.41	GOOD to transfer high-data-rate applications, ex: 720p live-video
From AP to Agent #2 (NLOS~400m)	Trees & Buildings along the street	1.72	1.34	still GOOD for moderate-data-rate applications, ex: 360p live-video
From AP to STA (NLOS~480m)	Trees & Buildings along the street	1.19	0.85	AP ↔ STA 500m in a direct line, GOOD to transfer HD image/IoT data

Highlights:

- ✓ Wi-Fi Halow specification: 2 MHz channel in ISM band (920-922 MHz)
- ✓ **Improved Coverage with Wi-Fi HaLow EasyMesh: Expansive Reach and Consistent Medium Data Rates, Surpassing Hurdles like Walls and Trees, Delivering Exceptional Throughput at Distances approximately 500 meters**

Conclusion

Wi-Fi HaLow, showcased in three compelling demos, has proven its adaptability and innovation:

In outdoor buildings, the Wi-Fi HaLow-enabled video camera solution delivers top-tier connectivity and video quality in mid-range

The Edge AI-enabled camera solution excels in med-range and challenging areas that require multiple penetrations, offering advanced image analysis and security

Long Range Wi-Fi, coupled with EasyMesh Extension, extends coverage, overcoming obstacles, and ensuring dependable connectivity.

Wi-Fi HaLow's potential in diverse applications is evident, promising a transformative future in wireless communication and IoT applications



Appendix

Wi-Fi EasyMesh

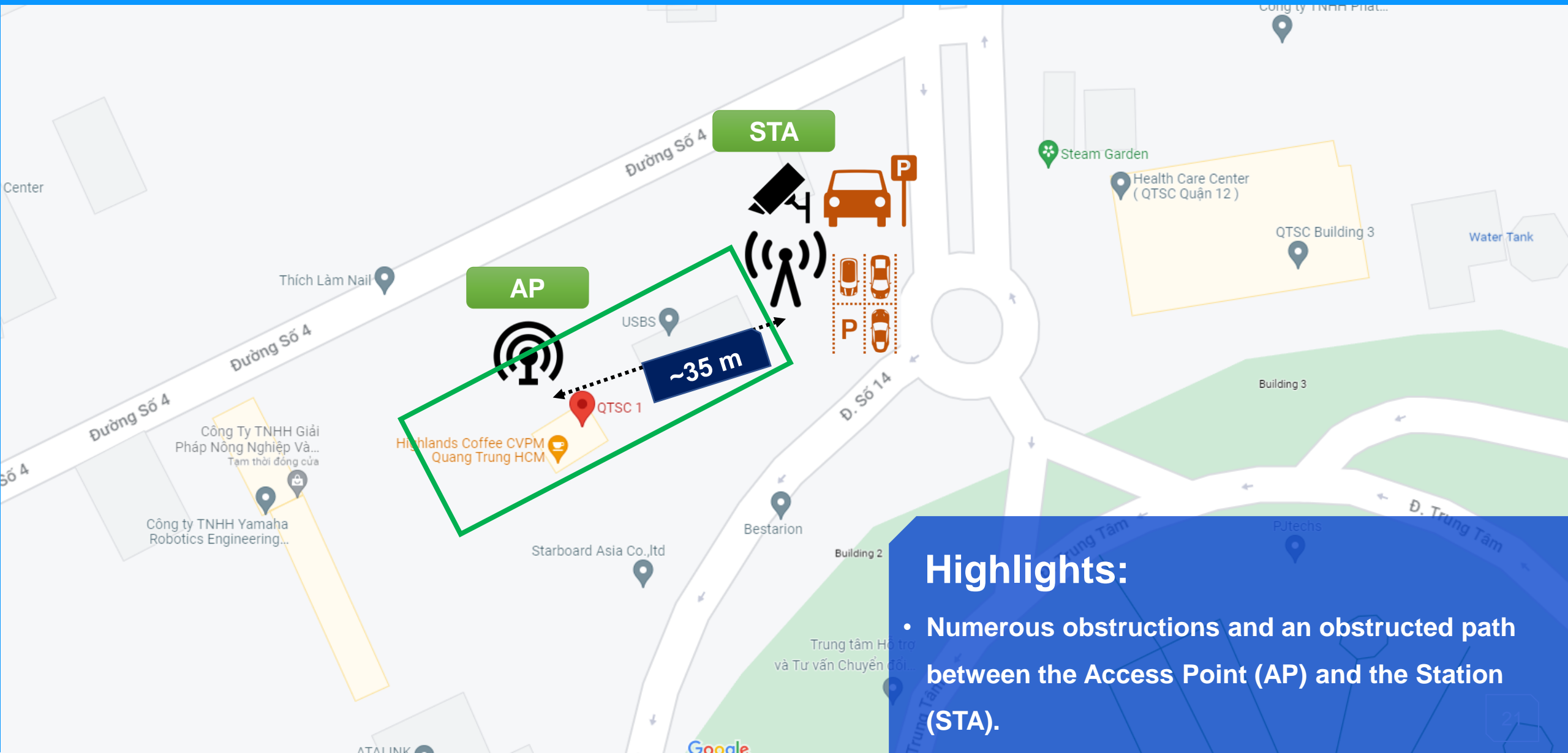
Key capabilities offered by Wi-Fi EasyMesh

- Multiple APs providing extended coverage and throughput enhancement
- Easy setup by delivering seamless, secure device onboarding and configuration
- EasyMesh uses a controller to manage the network, which consists of the controller plus additional APs, called agents
- EasyMesh allows users to pick access points from multiple vendors

Current EasyMesh implementation from Morse Micro

- The current implementation supports up to 4 agents in addition to the controller, with at most 2 agents between the controller and a station.

Wi-Fi HaLow QTSC-1 Car Park



Highlights:

- Numerous obstructions and an obstructed path between the Access Point (AP) and the Station (STA).



Thank you!