

Mission-Critical Coverage at Scale

Altai Super WiFi Delivering Mission-Critical Connectivity
for Mega Utility Site



Seamless Connectivity

67 outdoor APs deployed across 3 phases and 3 sites—engineered for wide-area plant roads, pavements, and nearby zones.



Robust coastal backhaul

Three 5 GHz point-to-point links up to 4.96 km, optimized for coastal paths with controlled cutover and day-one-consistent performance.



Designed for harsh environments

IP67, corrosion-resistant hardware; wind-rated mounts; comprehensive lightning/surge protection; disciplined grounding.

"Mission-Critical Infrastructures Connected with RELIABILITY"

Background: Major Asian Utility Provider

This major utility stands as a pillar of progress and development, having served as one of Asia's longest-standing and most influential electricity providers. For over a century, it has been instrumental in powering the region's rapid industrialization, urbanization, and economic prosperity, illuminating homes and fueling businesses across its extensive service area. Its deep roots in the energy sector have positioned it as a vital contributor to societal advancement and a benchmark for reliable utility services.

Serving for Over a Century

It has been a cornerstone of its region's energy supply for over a century.

Extensive Service Area

Supplies electricity to millions of citizens every day.

Vertically Integrated Model

Operating a complete model covering generation, transmission, distribution, and customer services.

World-Leading Reliability

Delivers exceptional service quality, with an average of well under one minute of unplanned customer minutes lost per year.

This high-availability, high-density operating context underscores why **resilient, wide-area communications coverage is mission critical** to sustaining service continuity and safety.





Business Challenge

Providing stable, pervasive wireless across a mega-scale coastal plant is uniquely hard. The site needed resilient outdoor coverage where conventional Wi-Fi often fails.

Wide, dispersed outdoor areas

Switchyards, fuel/tank farms, seawater intake/outfall, and open yards need long-range coverage with minimal dead zones.

Obstructions and LOS limits

Boiler houses, tall stacks, gantries, and multi-level pipe racks create shadowed and hard-to-reach zones.

Multipath and reflections

Steel structures and nearby seawater surfaces cause fading and unstable links.

Harsh coastal weather

Salt-laden air, high humidity, typhoons, lightning, and high winds stress hardware and RF stability.

Mobility at scale

Crews and vehicles moving across large zones require seamless roaming without session drops.

Mixed traffic and bursts

Concurrent CCTV, voice, telemetry, and contractor devices during outages demand QoS and capacity headroom.

Spectrum and coexistence

DFS/radar near coastal areas and coexistence with private radio and LTE/5G constrain channel planning.

Installation constraints

Permit-to-work rules, hazardous-area zoning, and limited shutdown windows restrict deployment timing and placement.

Technical Challenges

Coverage gaps from RF complexity

Unexpected terrain and dense metallic structures blocked LOS and created severe multipath, producing dead zones.

High-altitude placement effects

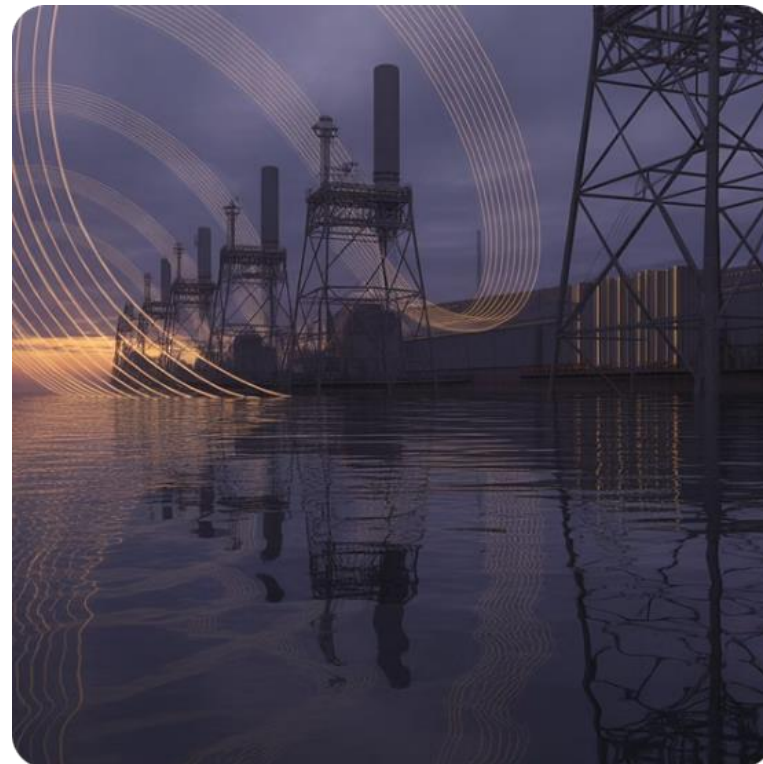
While minimizing near-field obstructions, elevated APs introduced uneven coverage—weak near-end, stronger mid-range, tapering at the far edge.

Harsh environmental conditions

Corrosive chimney gases, salt-laden coastal moisture, high wind loads (typhoon seasons), and electrical disturbances from lightning (surges, EMF fluctuations).

Mixed service demands

Concurrent CCTV, metering, and staff traffic required stable throughput, prioritization, and roaming under variable load and interference.



The Solution

Precision RF design

Conducted detailed site surveys (RF heatmaps, spectrum scans, attenuation tests); refined antenna heights, sectorization, and channel/power plans.

Targeted densification

Deployed outdoor APs at vantage points and shadow zones; extended street-level picocell coverage to smooth near-to-far signal variations.

Ruggedized deployment

Used IP67, corrosion-resistant APs and mounts rated for high wind loads; implemented lightning/surge protection, grounding, and arrestors.

Traffic engineering

Segmented traffic and tuned QoS to prioritize critical services; optimized load balancing and seamless roaming for consistent user experience.

Macro Anchor at 200m with Street-Level Precision

To establish a reliable macro anchor, our engineering team mounted **A8-Ein(ac) units at approximately 200 meters on the chimney top**—an approach akin to a cellular macro layer. Recognizing the RF challenges at this altitude, the team conducted predictive modeling and on-site measurements, optimized antenna tilt, sectors, and channels, and then extended coverage with street-level picocells for targeted densification. This layered design converts a high-altitude anchor into uniform, high-capacity coverage across the service area.





Inside the solution

Altai Technologies delivered a unified, outdoor-optimized Wi-Fi solution across three key locations, balancing macro coverage for wide areas with targeted microcells for shadow zones. The design emphasizes reliability in coastal conditions, simple operations, and capacity for CCTV, metering, and staff connectivity.

Power Plant - Coverage area: Outdoor roads and pavements across the entire plant 50 APs deployed, delivered in 3 phases - Applications: CCTV, noise monitoring, staff-generated traffic	Site A - Coverage area: ~50% of the village, including staff dormitory 11 APs deployed - Applications: Smart metering, staff-generated traffic	Site B - Coverage area: ~30–40% of the village 6 APs deployed - Applications: Smart metering, staff-generated traffic
---	---	--

High-Capacity P2P Backhaul

In addition to AP coverage, Altai implemented **three Point-to-Point backbone links** to interconnect key sites and provide resilient backhaul.

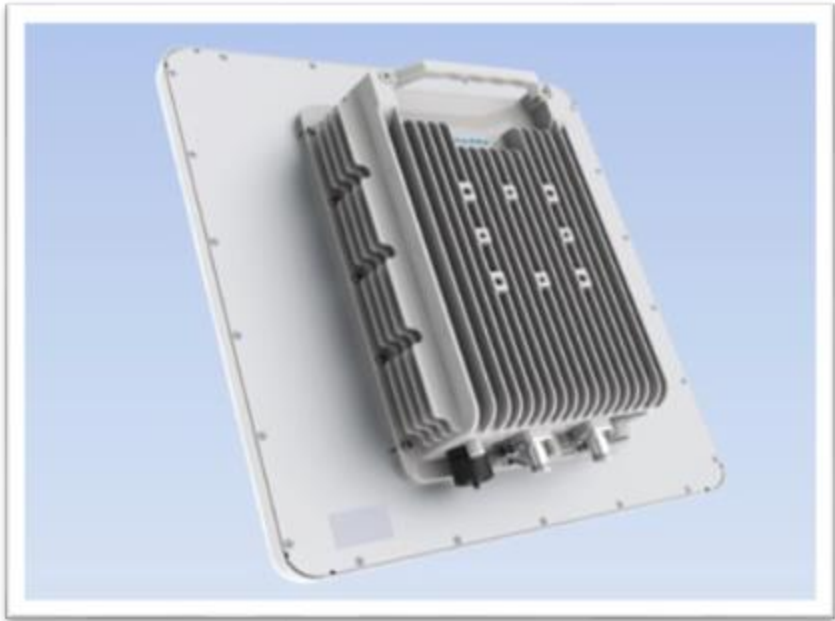
Link 1	Connecting the Electric Tower to the Chimney on Power Plant location over 4.96 km , engineered for long-range 5 GHz backhaul with directional antennas and alignment optimized for coastal paths.
Link 2	Bridging from the Electric Tower to Site A over 3.73 km , designed as a high-capacity 5 GHz link with coordinated channel/power planning to integrate into the broader backhaul topology.
Link 3	Providing a 900 m connection between the Chimney and Site B ; it is fully commissioned and online, delivering signal strength and data rates consistent with initial deployment (day-one) performance.

Key Products deployed



Altai A2 WiFi Access Point/Bridge

Altai A2 is a rugged dual-band 2x2 802.11ac outdoor AP/bridge delivering long-range Wi-Fi and high-throughput backhaul. Up to 867 Mbps (5 GHz) + 300 Mbps (2.4 GHz), ~500 m 2.4 GHz LOS access, and up to 20 km bridging.



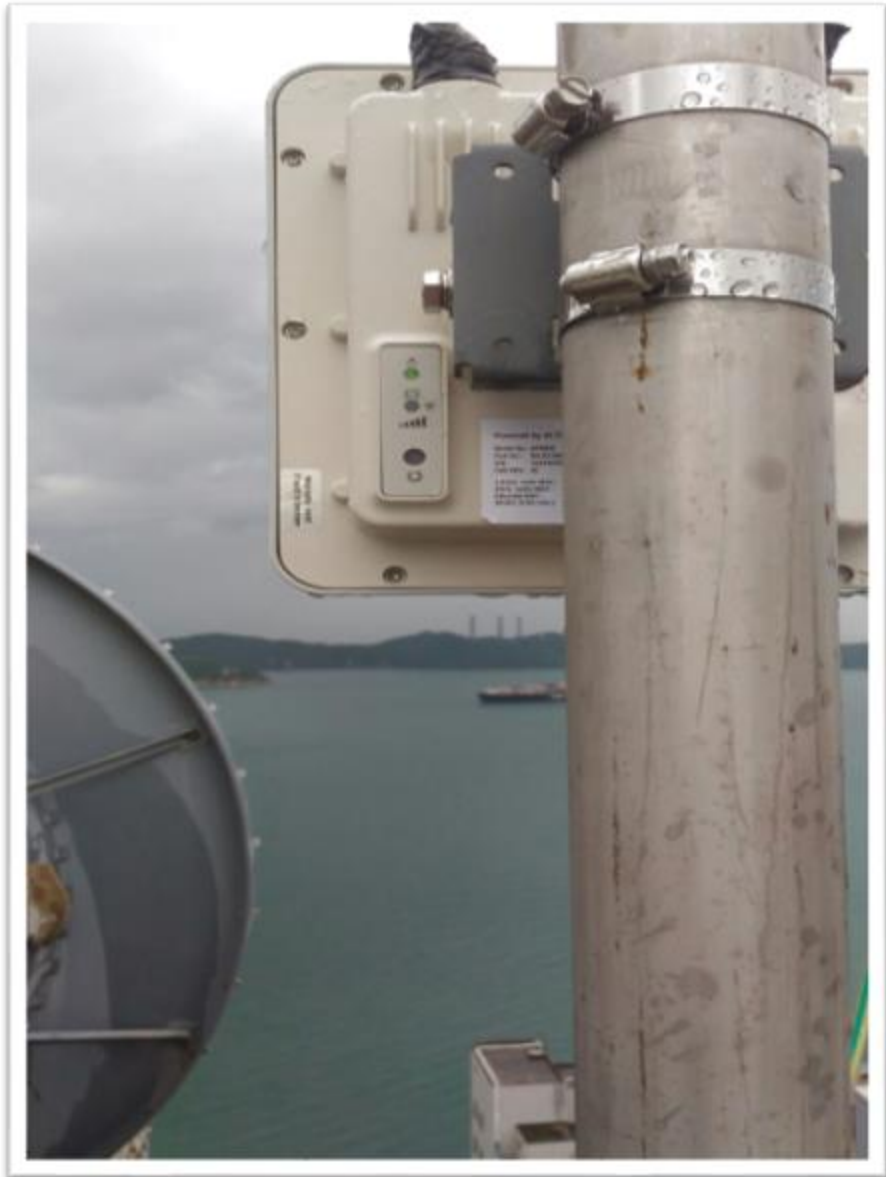
Altai A8-Ein (ac) Super WiFi Base Station

Altai A8-Ein (ac) is an outdoor 802.11ac Super WiFi base station with an integrated multi-beam 8x8 smart antenna for maximum range and coverage. It delivers up to 1,167 Mbps, strong NLOS performance, and can cover up to 5x range/10x area of standard APs, cutting site count dramatically.



Altai A3-Ei Dual-band 3x3 802.11ac WiFi AP

Altai A3-Ei is a rugged dual-band 3x3 802.11ac outdoor access point with built-in 2.4 GHz and 5 GHz sector antennas, delivering up to 1.75 Gbps (450 Mbps + 1300 Mbps) and strong NLOS micro-coverage.



Closing the Day, Not the Signal — Stay Connected on the Way Home

To support commuting staff on the utility-operated ferry, our engineering team deployed **jetty-mounted APs engineered for reliable, vessel-focused coverage**. We oriented and tuned antennas to project a strong, direct signal into the ferry's interior, validated with on-site measurements and client-side testing. This design ensures continuous internet access during embarkation and transit—critical in an isolated island environment with limited cellular coverage—so operational staff stay connected on their way back to a warm home.

Conclusion

This project stands as a successful showcase of **Altai's market-leading Super WiFi innovations**, delivered by a professional technical team that executed a complex, mission-critical outdoor deployment with precision and resilience. By integrating high-capacity backhaul, wide-area AP coverage, and robust network design, the solution empowers a mega utility infrastructure while elevating everyday connectivity. The result is a **future-ready platform that combines reliability, performance, and scalability**—supporting essential operations today and enabling smart-city services tomorrow.

Contact our wireless experts TODAY!



Phone

+852 3758 6000



Email

info@altaitechnologies.com

Get Started Today

