

TEKTELIC IoT Solutions Overview



TEKTELIC Introduction

- Largest and most comprehensive portfolio of Carrier Grade LoRaWAN® Gateways designed to minimize operator Total Cost of Ownership for any deployment
- Trusted by 400+ customers worldwide who solve real problems with high-value IoT solutions
- Focused on our customer's success by guiding and helping them to deploy the most reliable and lowest-cost IoT networks (instead of selling more gateways they don't need)
- Simple to Deploy IoT Solutions that address Real Problems in three verticals: Facility Management, Asset Tracking, & Digital Medicine



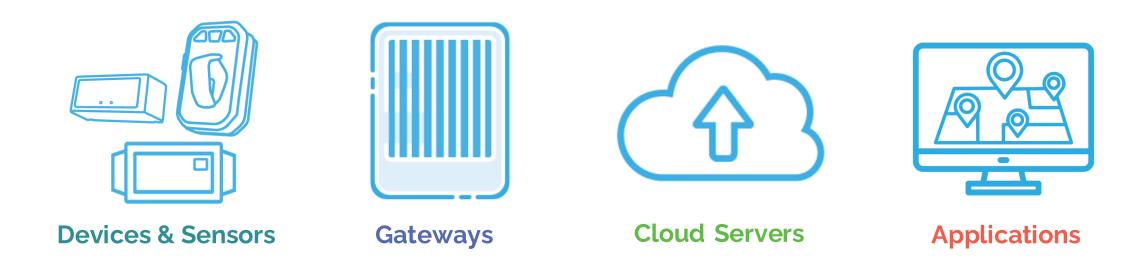
TEKTELIC Key Value

- Best Performance and Lowest Deployment & Operating Cost IoT Networks that last for 10+ years
- » Simple to Deploy IoT Solutions that address Real Problems in three verticals: Smart Buildings, Asset Tracking & Digital Medicine
- Exceptional Engineering, Customer Support & Guidance to address Customer Use Cases and Deployment Issues



LoRaWAN® Network Architecture

Low Total Cost of Ownership & Best-In-Class Performance Solutions



The only company that owns complete LoRaWAN network solutions



LoRaWAN® Network Features



Long Range

- » Greater than cellular
- » Deep indoor coverage
- » Star topology



Maximum Battery Life

- » Low power optimized
- » 10-20yr lifetime
- >>10x vs cellular M2M



Multi Usage

- » High capacity
- » Multi-tenant
- » Public/Private network



Low Cost

- » Minimal infrastructure
- » Low cost end-node
- » Open Software
- » Growing Eco-system



LoRaWAN® Differentiators and Benefits



Geolocalization

- » In/out door
- » Accurate
- » No Battery Impact



Bi-Directional (FDD)

- » Acknowledge
- » Scalable Capacity
- » Broadcast



Global Standard

- » Global Standard
- » True Mobility
- » Seamless
- » Roaming



Secure

- » Unique ID
- » Application
- » Network



TEKTELIC LoRaWAN® Portfolio













KONA Join Server

Gateways



KONA Mega Carrier-Grade 64-Channel LoRaWAN® Gateway



KONA Mega Ex Carried-Grade 64-Channel ATEX/Zone 2 LoRaWAN® Gateway



KONA Macro Carrier-Grade 16-Channel LoRaWAN® Gateway



KONA Macro Ex Carrier-Grade LoRaWAN® Gateway



KONA Photon Solar LoRaWAN® 16-Channel ATEX/Zone 1 Gateway for Autonomous Remote Deployments



KONA Strand Carrier-Grade 32-Channel LoRaWAN® Gateway



KONA Mobile Carrier-Grade 64-Channel LoRaWAN® Gateway for Mobile Applications



KONA Enterprise Outdoor Enterprise 8-Channel 8-Channel Gateway (6h LoRaWAN® Gateway



KONA Micro

Indoor Enterprise

Battery Backup)

KONA Micro Lite Indoor Consumer 8-Channel LoRaWAN® Gateway

Facility Management



COMFORT Indoor Environment Monitoring



TEMPO Meeting Room **Booking Solution**



VIVID Indoor Environment & Occupancy Monitoring



MEMO Multi-Purpose Custom Display Tablet



BREEZE CO₂ & Indoor **Environment Monitoring**

TUNDRA

Cold Chain

Storage Monitoring



Leak Detection Sensor for Indoor Leak Monitoring



AURA & FLUX Smart AC Outlet & Switch for Building Automation and Control

Asset Tracking



SPARROW Indoor Enterprise Asset Tracker

SEAL

Wearable Outdoor

Safety Device &

Tracker



PELICAN Outdoor Enterprise Asset Tracker

SEAL EX

Wearable ATEX

Safety Device &

Tracker



PELICAN EX ATEX Enterprise Asset Tracker



ORCA Industrial Outdoor **GPS Asset Tracker**



STORK Indoor/Outdoor Low-Power GPS Asset Tracker





CHICKADEE Indoor/Outdoor Low-Power GPS Personnel Tracker



ROBIN Outdoor Safety Button & Tracker





eDOCTOR Wearable Vital Sign Health Monitor (Chest Band)



Wearable Vital Sign (Arm Band)

KONA Carrier Grade Gateway Portfolio - 1









KONA MEGA	KONA Mega Ex	KONA MACRO	KONA PHOTON
Full Duplex (FDD) – where available	Full Duplex (FDD) – where available	Full Duplex (FDD) – where available	TDD
Time Duplex (TDD)	Time Duplex (TDD)	Time Duplex (TDD)	Monocrystalline Solar Panel with Internal Lithium Battery
64+8 Rx & 2+2 Tx	64+8 Rx & 2+2 Tx	16 Rx & 2 Tx	8 Rx & 1 Tx
Receiver Diversity	Receiver Diversity		
Built-in RF Filters	Built-in RF Filters	Built-in RF Filters	Built-in SAW Filters
Lightning Protection	Lightning Protection	Lightning Protection	Lightning Protection
TDoA Localization	TDoA Localization	TDoA Localization	Integrated Cellular & LoRa Antennas
GPS with Hold-Over	GPS with Hold-Over	GPS with Hold-Over	GPS with Hold-Over
Ethernet, Optical, 3G/4G	Ethernet, 3G/4G	Ethernet, 3G/4G	3G/4G
IP67, -40°C to +60°C	IP67/ATEX/Class 1 Div 2, -40°C to +60°C	IP67, -40°C to +60°C	IP67, -40°C to +65°C
2 x 30 dBm (2 x 1W)	2 x 30 dBm (2 x 1W)	1 x 30 dBm (1 x 1W)	1 x 27 dBm (1 x 0.5W)
All Global Bands	All Global Bands	All Global Bands	All Global Bands

KONA Carrier Grade Gateway Portfolio - 2











STRAND MACRO	KONA MOBILE	KONA Enterprise	KONA MICRO	KONA MICRO LITE
Full Duplex (FDD) – where available	TDD		TDD	TDD
HFC (44-90 Vac)	12 VDC	Time Duplex (TDD)	12 VDC & POE	12 VDC
32 Rx & 1 Tx	64 Rx & 2 Tx	8 Rx & 1 Tx	8 Rx & 1 Tx	8 Rx & 1 Tx
Receiver Diversity				
Built-in RF Filters	Remote PA/LNA	Built-in SAW Filters	Built-in SAW Filters	Built-in SAW Filters
Lightning Protection	Lightning Protection	Lightning Protection		
TDoA Localization		Integrated Cellular & LoRa Antennas		
GPS with Hold-Over	GPS with Hold-Over	GPS with Hold-Over	4-6 Hour Battery	
DOCSIS Modem	Ethernet, 3G/4G	Ethernet, 3G/4G	Ethernet, 3G/4G	Ethernet
IP67, -40°C to +60°C	IP67, -40°C to +60°C	IP67, -40°C to +60°C	IP30, 0°C to +40°C	IP30, 0°C to +40°C
1 x 27 dBm (1 x 0,5W)	1 x 30 dBm (1 x 1W)	1 x 27 dBm (1 x 0.5W)	1 x 27 dBm (1 x 0.5W)	1 x 27 dBm (1 x 0.5W)
NA915	NA915, EU868	All Global Bands	All Global Bands	All Global Bands

IoT Solutions Focus Areas



Smart Cities & Buildings



IoT in Healthcare



Asset Tracking



Smart Agriculture



Sample & Unique IoT Solutions





BREEZE & BREEZE-V

Schools



- Monitor CO2 levels to ensure a healthy, productive learning environment for students and staff
- Analyze HVAC to ensure optimal airflow through the building efficiency

Commercial Buildings



- Improve workplace productivity and employee health ensuring optimal ventilation and airflow in workplace settings
- Save costs by optimizing HVAC systems to ensure rooms are only being actively heated and cooled when necessary

Healthcare Facilities



- Ensure hospital rooms are being properly ventilated, reducing the risk of virus spread
- Improve patient, staff and visitor comfort by monitoring ambient indoor conditions



- Measures CO2, Temperature, Humidity, Atmospheric Pressure and Occupancy
- Small, Compact Design for Deployment Anywhere
- >> Zero-touch CO₂ Autocalibration
-) Implements pressure compensation to provide highly accurate CO2 readings
- Optional e-Ink display to visualize CO2, Temperature, Humidity and Battery Status
- 5+ year battery life

COMFORT & VIVID

Smart Office



- Occupancy monitoring to optimize space utilization and adjust heating, cooling, and lighting accordingly to save costs and energy when spaces are unoccupied.
- Monitor room and building utilization for predictive maintenance and optimized cleaning

Facility Management



- Leak detection monitoring to ensure rapid response to leak events, minimizing damage and reducing costs
- Pulse counting for water metering to manage and regulate water consumption, increasing efficiency and reducing costs

Hotels



- Reduce costs and enhance guest comfort by managing room lighting, heating and cooling based on occupancy
- Manage and optimize room cleaning schedules based on room utilization





- Temperature, Humidity & Light Monitoring
- Acceleration G-Force & Impact Monitoring
- Occupancy (VIVID)
- Open/Close Windows & Doors
- Pulse Counting (Meter Reading)
- Leak Detection
- Small, Compact Form Factor for Deployment Anywhere
- Discreet and Simple to Deploy
- >> 10+ year battery life

COMFORT Leak Detection

Water Tanks



- Installing leak detection sensors near hot water tanks enables early detection of leaks, preventing water damage and potential flooding
- Monitoring for leaks around water tanks allows for proactive maintenance, reducing the risk of damage to the building

Pipe Leaks

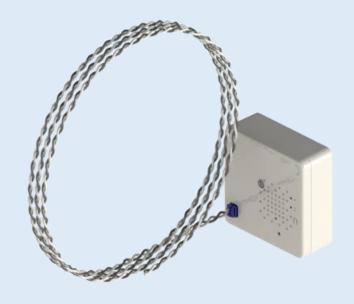


- Placing leak detection sensors along pipes helps identify weak points or potential areas of corrosion, allowing for timely repairs or replacements
- Detecting leaks along pipes helps minimize water waste and conserves resources by addressing leaks promptly and efficiently

Indoor Air Conditioning



- Early detection of leaks near indoor A/C units prevents water damage to the equipment and surrounding structures
- Monitoring for leaks around indoor A/C units helps preserve indoor air quality by preventing mold and mildew growth caused by moisture accumulation



- 10+ Year Battery Life
- External Leak Rope or Probe
- Small, Compact Form Factor for Deployment Anywhere
- Discreet and Simple to Deploy
- » Alerts and Alarms for Leak Events

TUNDRA

Supermarkets



- Ensure optimal temperature for food storage, maintaining product quality and preventing spoilage and waste
- Early warning for malfunctioning fridges and freezers allowing for corrective action before food is spoiled

Restaurants



- Ensure that refrigerators and freezers maintain proper temperatures to comply with food safety regulations, prevent foodborne illnesses and maintain product quality
- Log temperature data as evidence of compliance during health inspections, demonstrating a commitment to food safety protocols

Medical Facilities



- Monitor cold storage areas for medications and pharmaceuticals to prevent degradation and ensure potency
- Maintain precise temperatures in vaccine storage units to safeguard vaccine efficacy and comply with strict storage requirements



- Measures Temperature and Humidity in Cold Storage Environments
- Wide Temperature Range -40C to +85°C
- Multiple Variants for Flexible Deployment
- Rugged IP67 Design for Deployment in Harsh Conditions
- Designed for simple installation
- >> 15+ year battery life

TEMPO

Corporate Meeting Rooms



- Real-time Outlook and Google calendar integration to optimize meeting room usage
- Detailed analytics about room utilization and demand, can be used to save HVAC and cleaning costs

Schools & Universities



- On-the-spot and online bookings to simplify classroom and study room reservations
- Calendar integration reduces administrative efforts for efficient usage

Clinics & Healthcare Facilities



- Immediate room availability on TEMPO tablet supports on-the-spot reservations for healthcare professionals
- Identify peak usage, optimizing staff and room allocation for efficient clinic operations.



- End-to-End Solution including e-Ink display tablet, and full featured application
- Integrated with Outlook and Google Calendar
- Displays real time room availability
- Allows users to "grab" a room using Display
- >>> Customizable layout & visualization
- >> Fully wireless, can be deployed anywhere
- Generates room utilization analytics
- 1+ year battery life

MEMO

Smart Office



- Enables effective messaging and announcements
- Supports custom messaging and graphics to align with corporate branding

Retail



- Long battery life ensures cost-effective and uninterrupted retail signage
- Versatile graphics capture customer attention, enhancing sales impact
- Supports customizable and dynamic product promotions.

Healthcare Facilities



- Displays current patient information, reducing the need for paperbased communication
- Automates clinic management activities, freeing up staff for patient-focused support



- Custom texts, messages and graphics
- Fully wireless, can be deployed anywhere
- Multi-language support
- Displays high-value sensor data
- Customizable layout & visualization
- 1+ year battery life

AURA & FLUX

Building Automation



- Control the power supply to appliances, lights, and equipment remotely to optimize energy usage and reduce utility costs based on occupancy schedules and demand patterns
- Monitor energy usage and operating status of building appliances, enabling predictive maintenance and reducing downtime.

Industrial



- Remotely control power to industrial machinery, tools, and equipment to optimize usage, reduce energy waste during idle periods, and improve overall operational efficiency
- Monitor industrial equipment utilization and schedule maintenance activities, increasing productivity and minimizing downtime

Smart Home



- Remotely control lights, appliances, and devices from anywhere, providing convenience, flexibility and peace of mind for homeowners
- Monitor energy usage of individual devices and appliances to Orometer optimize usage and reduce utility bills





- Building Automation and Control
- » Reduced Energy Consumption
- Simple Installation
- Can Integrate with any Smart Building System
- Tamper Resistant



SPARROW

Hospitals and Healthcare Facilities



- Reduce time spent searching for critical equipment in hospital workflows.
- The built-in accelerometer aids preventive maintenance by monitoring equipment usage patterns.





- Providing immediate insights into asset whereabouts for efficient decisionmaking.
- Real-time monitoring reduces theft risk, unauthorized use, and may lower insurance and replacement costs.

Warehouses



- Optimizes inventory management with accurate, real-time asset tracking.
- Improve asset visibility across warehouses.
- Enhances insights into asset utilization for efficient warehouse operations.



- Accurate indoor positioning via BLE (~2 meters)
- Long range wireless communication
- Tampering and movement detection
- Small form factor for simple deployment
- Accelerometer for event-based tracking
- 5+ year battery life



PELICAN & PELICAN EX

Smart Manufacturing



- Real-time tracking optimizes asset flow on the production floor
- Prevents asset loss by ensuring constant visibility across manufacturing operations

Warehouses



- Track and monitor warehouse equipment (forklifts, boom lifts, inventory carts) both indoors and outdoors
- Monitor the flow of goods within the warehouse to optimize picking routes, reduce picking times, and improve order accuracy

Industrial, Oil & Gas



- PELICAN Ex provides constant visibility in challenging and hazardous environments
- Enhances operational efficiency, safety, and prevents asset loss



- Hazardous (Class 1 Div 2 /ATEX) Compliant
- Accurate location (~2 meters)
- Long range wireless communication
- Multiple mounting options
- Easy to deploy and operate
- Ruggedized and weatherproof IP67
- -40C to +85C temperature range
- Hazardous (Class 1 Div 2 / ATEX) condition
- 15+ year battery life (PELICAN)
- 5+ year battery life (PELICAN Ex)



ORCA

Industrial Equipment Tracking



- Indoor and outdoor tracking of high-value industrial equipment
- Monitor equipment movement and utilization for predictive maintenance





- Precise real-time indoor and outdoor location for comprehensive asset traceability across diverse locations
- Track and monitor containers during loading, unloading, and in-transit

Fleet Management



- Optimizes routes, ensuring efficient navigation and reducing operational costs
- Facilitates proactive maintenance scheduling, enhancing asset longevity and minimizing unexpected breakdowns



- Accurate GPS Outdoor & Indoor location
- Long range wireless communication
- Easy to deploy and operate
- Ruggedized and weatherproof (IP-67)
- -40C to +85C temperature range
- Accelerometer for event-based tracking
- 5 year battery life (Outdoor and Indoor)



SEAL & SEAL EX

Lone Worker Safety in Construction



- SEAL continuously tracks workers in real-time using GPS and BLE, ensuring heightened safety on construction sites
- Geofencing capabilities provide custom audible and visual alerts, heightening worker awareness

Mining Worker Safety



- SEAL's altitude measurement ensures worker safety in mining, addressing challenges of varying terrain
- Audible and visual alerts reduce the risk of accidents for mining workers

Industrial Work Sites



- Detects incidents or falls, triggering rapid emergency response for worker safety in industrial facilities
- Ensures safe operation in challenging industrial conditions, providing workers with a reliable safety solution



- Accurate GPS Outdoor & Indoor location
- Fall and motion detection
- » Altitude and height measurement
- Settable audible and visual alarms
- User configurable SOS button
- Optional Safety Harness Clip Detection
- Ruggedized and weatherproof (IP-67)
- -20C to +60C temperature range
- Hazardous Environment Rating (Class 1 Div 2 /ATEX)
- >> Up to 15 month battery life



STORK

Construction Sites



- Continuous location tracking of high-value construction equipment including motion alerts, movement patterns and geofencing
- Monitor the location and usage and fleet vehicles, trucks, and trailers for optimized routes, improve fuel efficiency, and preventative maintenance





- Track and monitor warehouse equipment (forklifts, boom lifts, inventory carts) both indoors and outdoors
- Monitor the flow of goods within the warehouse to optimize picking routes, reduce picking times, and improve order accuracy

Supply Chain Logistics



- Track and monitor pallets and other shipments during loading, unloading and in-transit
- Gain visibility into the environmental and external conditions (ie. impact) the shipment has been exposed to in transit



- Outdoor Positioning via Low-Power GNSS
- Indoor Positioning via BLE and Wi-Fi Sniffing
- Optional 12V External Power
- Accelerometer
- » Rugged IP67 Design
- Small Form Factor for Diverse Deployments
- 5+ Years Battery Life



CHICKADEE

Construction Sites



- Monitoring the location of workers at all times to ensure their safety, analyze movement patterns and setup restricted area alerts
- Access control to ensure only authorized personnel are accessing restricted or hazardous areas of the worksite

Hospitals



- Tracking of healthcare personnel to ensure worker safety and to optimize workflows
- Monitor the location of patients within the hospital facility, to ensure their safety and provide timely assistance if needed

Office Workers



- Access control to enforce entry to restricted areas and gain insights into employee movement patterns
- Monitor the occupancy of office spaces, conference rooms, and collaborative areas to optimize space utilization and enhance office safety



- Outdoor Positioning via GPS & Low-Power GNSS
- Indoor Positioning via BLE and Wi-Fi Sniffing
- Optional 12V External Power
- Accelerometer
- Optional RFID
- Wearable Badge Form Factor
- SOS Button for Real-Time alerts
- 6+ Months Battery Life (Rechargeable)



FINCH

Hotels



- Hotel staff can quickly and discreetly notify the front desk in case of emergencies such as medical incidents, security threats, or accidents
- Helps hotels adhere to legal requirements and industry standards related to guest and staff safety and security, reducing liability risks associated with emergency situations.

Schools



- Students and Staff can send a notification if they feel unsafe or require immediate assistance
- Students can be monitored for presence and safety on the bus when commuting to and from school

Long Term Care Facilities



- Residence can call for assistance in the case of falls, medical emergencies or if any support is needed
- Allows staff to call for assistance or report incidents promptly, enhancing their safety and security while performing their duties



- Panic Button
- Indoor Positioning via BLE
- Small Discreet Form Factor
- Clipped to Belt or Lanyard
- 5 Year Battery Life



ROBIN

Industrial Oil & Gas



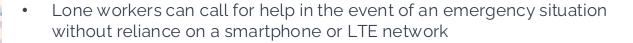
- Workers can call for help in case of accidents, medical emergencies, hazardous situations or security threats
- Offshore personnel can activate the panic button to alert crew members and initiate search and rescue operations in the event of a man overboard situation

Construction Sites





- Enhanced worker safety, faster emergency response and improved incident management at construction sites
- Provides the company with insights into worker presence, activity and movement patterns
- Workers can check-in when they have arrived at the remote worksite





- Panic Button
- Outdoor Positioning via BLE
- Rugged IP67 Design
- Wearable Form Factor Clipped to Belt or Lanyard
- 15 Year Battery Life



oTin Healthcare

eDoctor

Hospitals



- Streamlines medical personnel efforts, reducing workload of manual vital checks
- Optimize resource utilization in hospitals
- Enhance the accuracy and quality of patient care

Remote Patient Monitoring



- Extended range connectivity allows monitoring in larger homes and outdoor spaces
- Continued respiratory monitoring after discharge from the hospital
- Peace of mind for family regarding the well-being of aging individuals at home

Long-Term Care



- Reduces overall healthcare costs for nursing homes
- Continuous monitoring provides detailed insights of residence respiratory health
- Ensures timely responses to specific needs.







KEY FEATURES

- Long range wireless communication
- 24/7 autonomous operation
- End-to-End Patient Monitoring Solution with Application
- Vital signs data and analysis
- Alarm setting and monitoring
- Simple to Use
- No reliance on Smartphone or Cellular Network
- 3 month battery life

CORE FUNCTIONS

- Body Temperature
- Heart Rate, HRV and Rhythm
- Respiratory Rate
- Chest Expansion
- Body Position
- Activity

eBeat

Hospitals



- Streamlines medical personnel efforts, reducing workload of manual vital checks
- Optimize resource utilization in hospitals
- Enhance the accuracy and quality of patient care

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- 24/7 autonomous operation
- End-to-End Patient Monitoring Solution wit Application
- Vital signs data and analysis
- Alarm setting and monitoring
- Simple to Use
- No reliance on Smartphone or Cellular Network
- y 4 month battery life

CORE FUNCTIONS

- SPO2 (Blood Oxygen)
- Body Temperature
- Heart Rate, HRV and Rhythm
- Respiratory Rate



KIWI & CLOVER

Greenhouses



- Microclimate monitoring to ensure optimal Temperature and Humidity conditions specific to the crop for increased yields
- Soil Moisture monitoring to optimize irrigation and reduced water waste

Commercial Crops



- Ambient environment monitoring to ensure ideal crop placement and optimized yields
- Integrate with automated irrigation systems for optimized watering based on real-time soil conditions

City Parks & Golf Courses



- Monitor soil moisture conditions for optimized water truck route planning
- Monitor ambient environmental and soil conditions to assess the health and vitality of grass and plants within the park

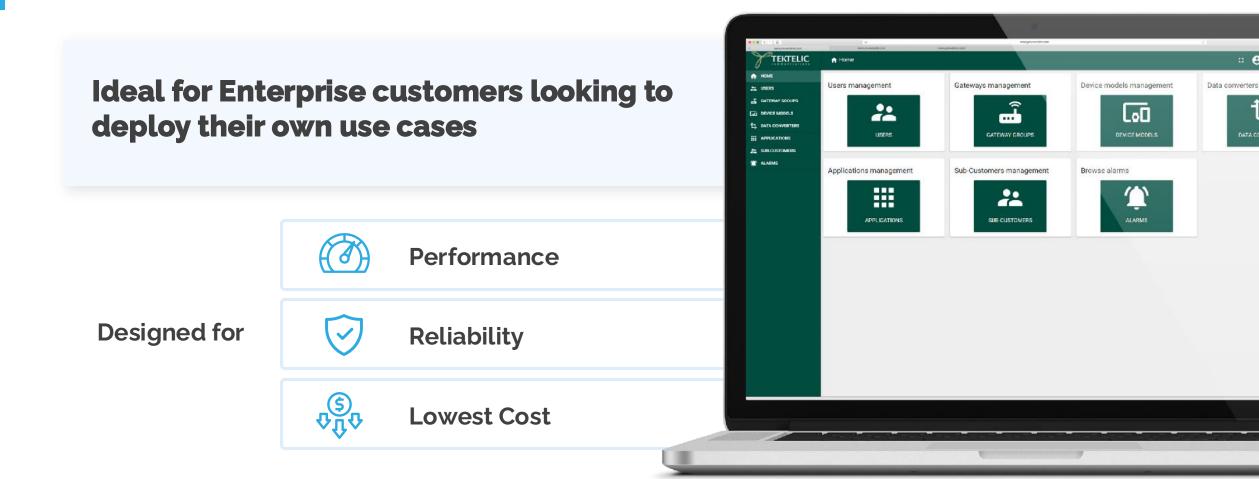


- Accurate Soil Moisture monitoring
- Ambient temperature and humidity monitoring
- Integrated Lux meter for ambient light conditions
- Easy to deploy and use
- Multiple mounting options (KIWI & CLOVER)
- Integrated with Irrometer Watermark© sensor and 3rd party soil thermistors (KIWI)
- » Ruggedized and weatherproof
- 10+ year battery life



Applications & Servers

KONA Core Network Server

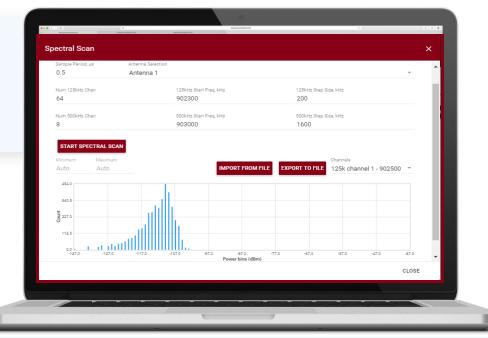


KONA Element OA&M Server



Designed to simplify LoRaWAN® Gateway management

KONA Element Server is a comprehensive LoRaWAN® Network tool designed to configure, monitor and optimize the performance of all LoRaWAN® Gateways in a customer network.

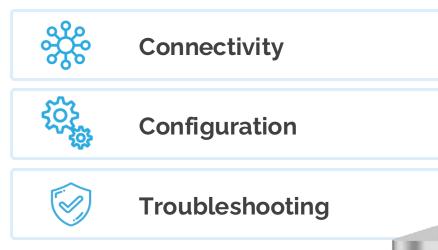


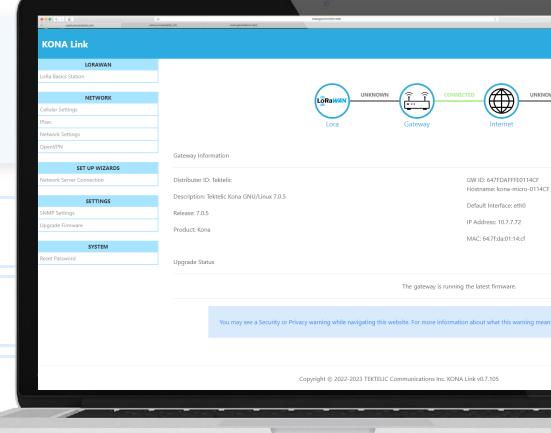


KONA Link



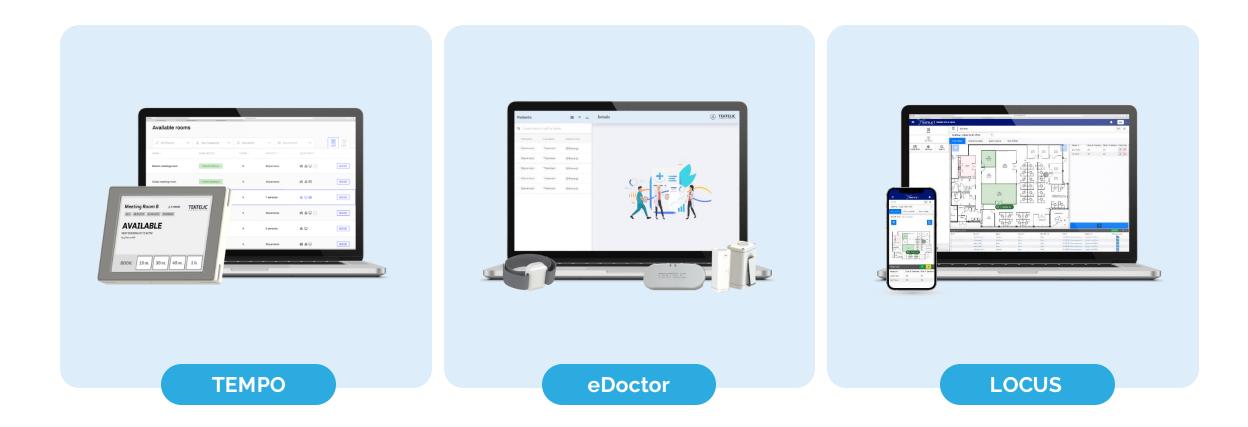
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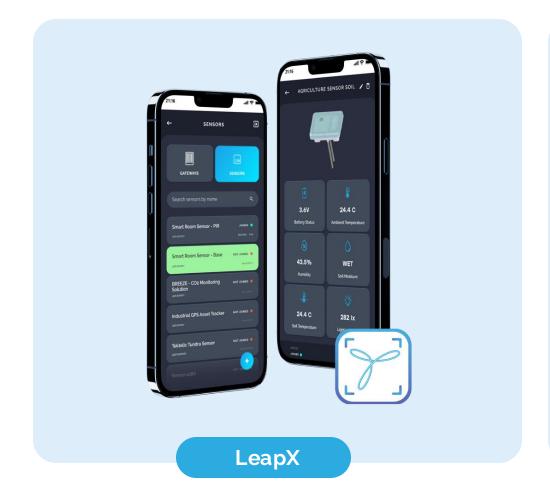


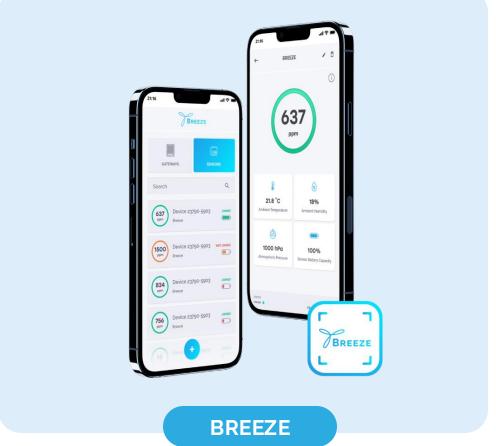


Integrated Applications



Mobile Applications







LeapX Application



Out-of-the-box Solution

Simply test your solution in seconds



Data At your Fingertips

Real-time sensor data

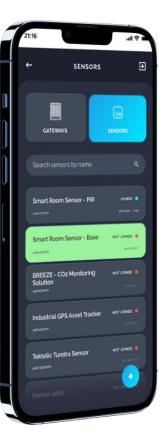


Open Solution

Open API for quick integration











TEKTELIC Summary

- The only company in LoRaWAN ecosystem that developed all Network elements
- » Most extensive portfolio and market share of Carrier Grade LoRaWAN Gateways optimized for operator lowest Total Cost of Ownership
- Devices and Solutions focused on high-volume and high-value Enterprise use-cases
- Setting additional Sales and Support offices in the Middle East, Asia and Latin America to expand global sales
- » 2023-25 R&D investment focused on Application development to offer customers complete IoT solutions, Digital Medicine solutions for Hospital and Remote Patient Monitoring, and introduction of Cellular IoT Devices
- Continue with 30%+ IoT Products and Solutions Revenue Growth over 3-5 years



TEKTELIC LoRaWAN® Solutions

The ideal solution for Public and Private Network Operators that require a Carrier Grade and Cost Effective IoT solutions that scale with business.



