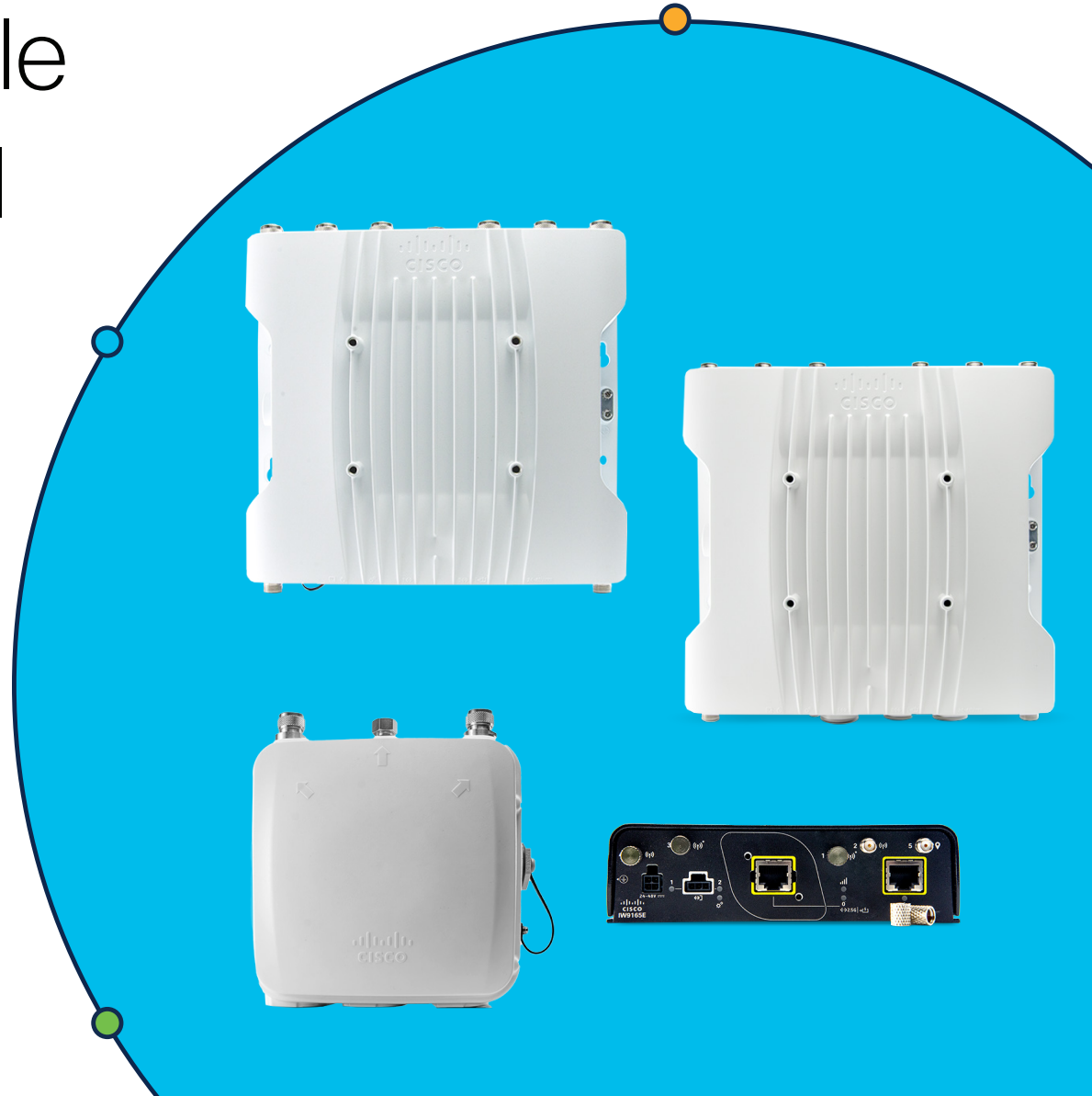
Cisco Ultra-Reliable Wireless Backhaul (URWB)



Ultra-reliable wireless is essential for critical applications

Automation is growing across industries. Autonomous vehicles, robots, and teleremote applications are becoming more prevalent as industrial organizations digitize their operations. Reliable wireless technologies are not only an enabler but critical to the success of these deployments. Mobile assets cannot tolerate dropped connections or network latency; lost packets can jeopardize safety, create line stoppages, and compromise productivity, with severe operational and financial consequences.

Reliable wireless also brings greater flexibility to the environment, while also potentially reducing costs and installation times to connect fixed assets. Fiber isn't available everywhere and can be prohibitively expensive to deploy and maintain. By using wireless technology:

- Factories can easily reconfigure product lines and adapt quickly to changing market demands.
- Ports, mines, and rail can extend their connectivity to wherever they need it to increase automation and provide critical services.

Cisco®'s Ultra-Reliable Wireless Backhaul (URWB) technology addresses these complex fixed and mobile use cases, delivering advantages across the network:

- Provides multigigabit high-throughput performance, connects moving assets, and links locations that need temporary connectivity.
- Delivers ultra-low latency, zero loss, and seamless handoffs.
- Extends 802.11 technology and uses unlicensed spectrum, reducing costs and complexity and making it easy to deploy pretty much anywhere.
- Since URWB is based on the 802.11 standard, IT and OT teams find it easy to understand and deploy.

URWB supports different architectures:

- **Mobility:** Connectivity between radios deployed on vehicles and fixed structures or just between vehicles is generally used to connect Automated Guided Vehicles (AGVs), autonomous mobile robots (AMRs), trains, and other moving assets.
- **Fixed infrastructure:** Connectivity between radios attached to fixed structures – poles, towers, buildings, etc. – is generally used to support wireless backhaul, physical surveillance, and more. The layout and data communication can be implemented through Point-To-Point (PTP), Point-To-Multipoint (PTMP), and mesh topologies.

Let's talk about reliability

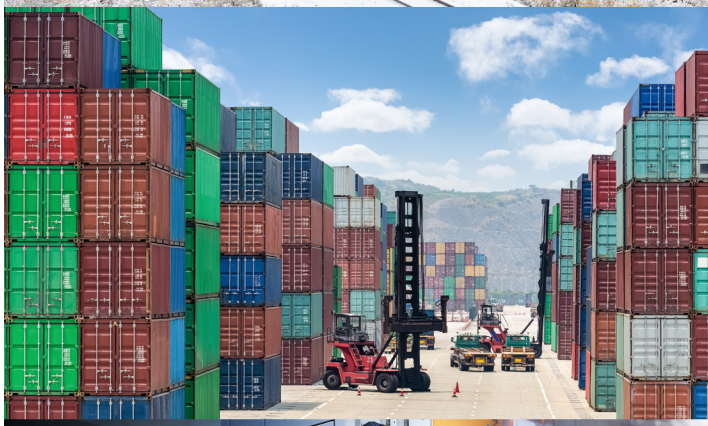
Reliability is mandatory for industrial wireless automation. Applications such as AGVs and AMRs, cranes, and teleremote applications need real-time response. Any delay or loss in connectivity causes productivity to slow or stop, and safety can be jeopardized.

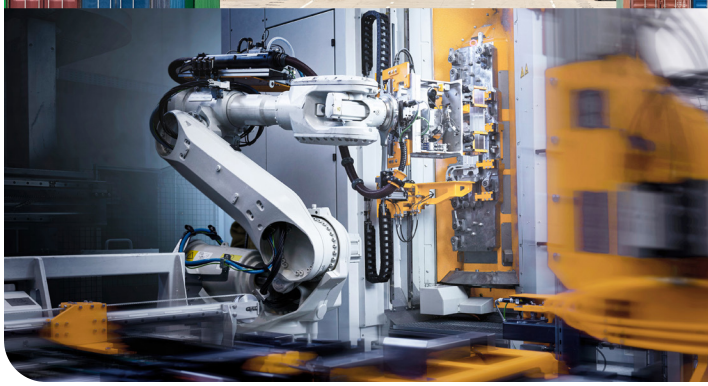
Reliability for wireless connectivity for critical moving assets is achieved by a solution that delivers:

- Low packet loss and error rate
- Low, predictable latency
- Seamless handoffs between access points
- RF spectrum interference mitigation in "noisy" and dynamic environments

Cisco URWB extends Wi-Fi technology to deliver ultra-low latency and ultra reliability to support mission-critical applications in different industries and to connect devices such as trains, buses, subways, remotely controlled cranes, AGVs, and autonomous mobile robots. URWB extends your core network, supporting your protocols from Layer 2 and above all the way to the devices, much like wired connectivity, allowing the network to scale in size without compromising reliability and availability. This is possible due to a few factors:

- URWB uses a specialized implementation of the Multiprotocol Label Switching (MPLS)-over-wireless links, created to overcome the limits of standard wireless protocols when transmitting any IP-compatible traffic with very low latency in a mobility context.
- URWB delivers a "make-before-break" handover, enabling moving vehicles to establish a reliable connection with the next access point along their path before losing connectivity to the current one.
- With Multipath Operations (MPO) technology, URWB can deliver uninterrupted connectivity to fast-moving devices by sending high-priority packets via redundant paths on uncorrelated frequencies at the same time to multiple access points. It can duplicate protected traffic up to eight times, exploiting time, spatial, and frequency diversity. This functionality, combined with cutting edge hardware capability, can further reduce latency and improve reliability, addressing both interference and hardware failures.



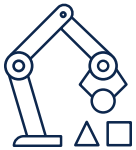


Industries are embracing URWB to increase productivity and safety

Cisco URWB has been helping organizations from different industries to achieve their business goals with dependable wireless connectivity for their most critical applications.

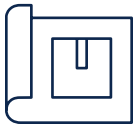
Utilities and renewables

For ScottishPower Renewables, URWB provided critical long-range wireless connectivity for sea vessels during construction and the operational phases of offshore wind farms.



Ports and terminal operations

Several ports and terminal operators have successfully been using URWB to connect cranes, teleremote machinery, and autonomous or automated vehicles such as AGVs. A few examples include La Spezia Container Terminal, Malta Freeport Terminals Limited, and ThPA S.A. Port of Thessaloniki.



Manufacturing

URWB has been enabling manufacturers to connect not only their moving vehicles and mobile tooling, but also their product lines as wireless provides more flexibility and lower costs with no need for cabling. General Motors has been using URWB to capture data from vehicle sensors during performance testing in real time and adjusting the vehicle on the track, streamlining the process and saving time, thus accelerating time to market for commercially ready vehicles. Other manufacturers have successfully been using URWB to quickly deploy their growing numbers of AGVs. URWB provides the reliable, uninterrupted reliability that these applications need.

Rail

Because URWB delivers seamless handoffs even at high speeds, rail organizations have been using URWB to connect applications such as Communications-Based Train Control (CBTC), sensors, video data offload, onboard Wi-Fi, and real-time security video monitoring. And they are successfully maximizing passenger satisfaction, supporting safety and control applications, and maintaining situational awareness.

Mining

Mine automation boosts productivity, helps ensure consistent operations, and promotes worker safety. Mines have been using URWB to enable vehicle-to-ground communication for vehicle automation and real-time video monitoring with low latency and seamless handoff for even the most critical applications.

Smart cities, education, digital divide

Since URWB is cheaper and faster to deploy than fiber, it is an ideal technology to deliver consistent broadband connectivity in cities, schools, and universities. Canutillo Independent School District deployed the URWB technology to connect Wi-Fi hot spots in remote locations with poor internet coverage so thousands of students could learn from home during the COVID-19 pandemic. The City of Fort Worth used URWB to provide free Wi-Fi access for 40,000 residents in 10,000 lower-income households to help them access city services, telehealth, job market information, and educational opportunities.

Parks and entertainment

URWB has been used to successfully connect dark rides in entertainment parks. Rides need ultra-reliable wireless to provide safety and a good experience for passengers. Ride vehicles move, sometimes in high-speed, in closed areas with walls and obstacles. Any interruption in connectivity can jeopardize the guest's experience, as sound and visual effects synchronization can be affected.

Innovation to give you flexibility

The use of Wi-Fi and URWB together offers robust options to connect your applications, critical or not, indoors, outdoors, and in industrial settings. Wi-Fi supports a wide variety of use cases that require high throughput and low latency. URWB helps ensure that use cases that cannot tolerate any loss of communication and that have ultra-low-latency requirements are supported. Both technologies operate on unlicensed spectrum, saving you the costs and complexities associated with using a licensed spectrum.

URWB technology today is available in our Wi-Fi 6/6E industrial access points. By offering both Wi-Fi and URWB in the same access point we give you flexibility and the ability to support a wider range of applications that have different network requirements. URWB can be enabled in the field, allowing you to adapt the product to the specific use case streamlining deployment, simplifying operations and optimizing your investment.

Ultimately, our goal is to ensure that you have the right technology to seamlessly support your deployment scenarios and diverse applications. With our innovative solution—a single piece of hardware that supports both Wi-Fi and URWB, managed by Cisco Catalyst™ Center with a unified, simplified license—you gain flexibility without added complexity. This approach not only reduces costs but also enhances sustainability, empowering your operations like never before.

Cisco Industrial Wireless Portfolio supporting URWB

Table 1. Specifications summary for multi-radio Cisco Catalyst® Industrial Wireless products

	Catalyst IW9165E Rugged Access Point and Wireless Client	Catalyst IW9165D Heavy Duty Access Point	Catalyst IW9167I Heavy Duty Access Point	Catalyst IW9167E Heavy Duty Access Point	Catalyst IW9167E-HZ Heavy Duty Access Point
URWB mode	Standalone, Integrated with Wi-Fi technology	Standalone, Integrated with Wi-Fi technology	Integrated with Wi-Fi technology	Standalone, Integrated with Wi-Fi technology	Standalone, Integrated with Wi-Fi technology
Technology	2x2 dual radio up to 160 MHz	2x2 dual radio up to 160 MHz	4x4 tri-radio up to 160 MHz	4x4 tri-radio up to 160 MHz	4x4 tri-radio up to 160 MHz
Architecture	PTP, PTMP, mobility	PTP, PTMP, mobility	PTP, PTMP, mobility	PTP, PTMP, mobility	PTP, PTMP, mobility

	Catalyst IW9165E Rugged Access Point and Wireless Client	Catalyst IW9165D Heavy Duty Access Point	Catalyst IW9167I Heavy Duty Access Point	Catalyst IW9167E Heavy Duty Access Point	Catalyst IW9167E-HZ Heavy Duty Access Point
Frequency	4.9 GHz, 5.1 to 6.9 GHz*	4.9 GHz, 5.1 to 6.9 GHz*	2.4 GHz, 4.9 GHz, 5.1 to 6.9 GHz*	2.4 GHz, 4.9 GHz, 5.1 to 6.9 GHz*	2.4 GHz, 4.9 GHz, 5.1 to 6.9 GHz*
Theoretical data rate per radio	2.4 Gbps	2.4 Gbps	4.8 Gbps	4.8 Gbps	4.8 Gbps
Interface	1x 2.5 Gbps 1x 1 Gbps RJ-45 Optional M12	1x 2.5 Gbps 1x 1 Gbps RJ-45 Optional M12	1x 5 Gbps multigigabit RJ-45 1x 1G/10G multigigabit SFP+ Optional M12	1x 5 Gbps multigigabit RJ-45 1x 1G/10G multigigabit SFP+ Optional M12	1x 5 Gbps multigigabit RJ-45 1x 1G/10G multigigabit SFP+
Antenna	External 4x RP-SMA 1x SMA for GNSS	1x integrated plus 2x N-type 1x TNC for GNSS	External 8x N-type 1x TNC for GNSS	External 8x N-type 1x TNC for GNSS	External 8x N-type 1x TNC for GNSS
Certifications	IP30, EN50155 -40° to +70°C	IP66/67 -50° to +75°C	IP66/67 -50° to +65°C	IP66/67, EN50155, EN45545 -50° to +75°C	IP66/67, EN50155, EN45545 Class I Division 2, Zone 2/22, ATEX, IECEx -50° to +75°C

*** Support varies based on local regulations.**

Explore the possibilities with URWB

Reach out to our sales representatives or partners or request a one-on-one demo.
Learn more about our products and solutions by visiting cisco.com/go/urwb.

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