

RAIN RFID Antenna Selection Quick Reference Guide

Transport, Logistics & Supply Chain Series

Dock doors

Loading bay verification

Delivery stations



Table of Contents

How to use this guide	3
How to select the right antenna	4
A5010 Circularly Polarised Antenna	5
A5020CP Circularly Polarised Antenna	6
A5531C Ground Antenna	6
A5060 Circularly Polarised High Gain Antenna	7
A3042 Robust SlimLine High Gain Antenna	7
Times-7 Portal	8
Custom Antenna Design & Manufacturing Services	9
General Configuration Examples	10



Times-7 designs and manufactures high-performance RAIN RFID antennas that deliver trusted accuracy, reliability, and RF excellence.

Headquartered in New Zealand and supported by a global distribution network, our products power mission-critical applications across retail, healthcare, logistics, manufacturing, and beyond.



Times-7 is a proud member of the RAIN RFID Alliance and an active participant in global industry events.

Fixed RAIN RFID Read Points in Transport, Logistics and Supply Chain



RAIN RFID readpoints underpin every stage of the modern supply chain: from the first tag read at a packing station to the final scan at a delivery bay. Our antennas are deployed across the full chain: at dock doors, on conveyors, inside tunnel readers, at yard gates, in cold stores, and on forklifts. Each installation type has a different combination of read zone requirements, environmental conditions, and mounting constraints. Our range is built to address all of them.

Whether you are tracking pallets at a distribution centre dock door, individual items on a sortation conveyor, or vehicles moving through a yard gate, the fundamental requirement is the same: a read that is reliable, repeatable, and defined, catching what it should catch and ignoring what it should not. We design our antennas from the ground up for these environments, with the gain, beam shape, environmental rating, and mounting flexibility to make every readpoint perform as intended.

Our range covers fixed and mobile installations (such as moving vehicles), item-level and pallet-level tracking, indoor and outdoor deployment, and environments from controlled ambient warehouses to freezer stores, outdoor yards, and food production wash-down areas. If you are specifying a readpoint or reviewing an existing installation that is not performing, the guidance below will help you identify the right antenna for the job.

How to use this guide

For dock door and loading bay verification, we recommend six antennas from our range: the A5010, A5020CP, A5531C, A5060, A3042, and Times-7 Portal. Each suits a different combination of mounting position, environmental exposure, and read zone control.

We have also included a general guidance section on page 10 for possible antenna configurations. If you have questions regarding antenna selection and antenna placement, our engineering team are available to provide technical support.

Recommended Dock Door Antennas

See pages 4 for guidance on selecting the right antenna for your application, then pages 5-8 for full specifications, key features, and customer benefits for each of our six recommended dock door antennas.

Note: The read point design will specify the number of antennas, mounting requirements and accessories.

Custom Designed Antennas

If a standard model does not meet your specific requirements, we'll build one that does.

We offer customised RF or mechanical specifications such as:

- Gain, beamwidth and polarisation options
- IP ratings
- Custom sizing
- Custom enclosures
- Different connector types

How to Select the Right Antenna

The right antenna for a supply chain application is determined by four factors working together.

01 Environment Rating

How exposed is the bay? Covered indoor bays need **IP54** as a minimum. Outdoor and exposed bays require **IP67** (temporary immersion up to 1 m, 30 min). Bays subject to high-pressure wash-downs, extreme humidity, or chemically aggressive environments, such as food production, cold stores, mining, require **IP68**, which covers prolonged immersion and sustained moisture.

02 Mounting Position

Mounting position determines beam direction and read-zone shape. **Overhead mounts** read downward into the bay opening, suited to consistent pallet heights and forklift paths. **Side mounts** read horizontally across the bay width. **Floor/embedded mounts** read upward through the pallet base, useful where overhead clearance is limited or where a discreet, in-floor read point is required.

03 Installation Constraints

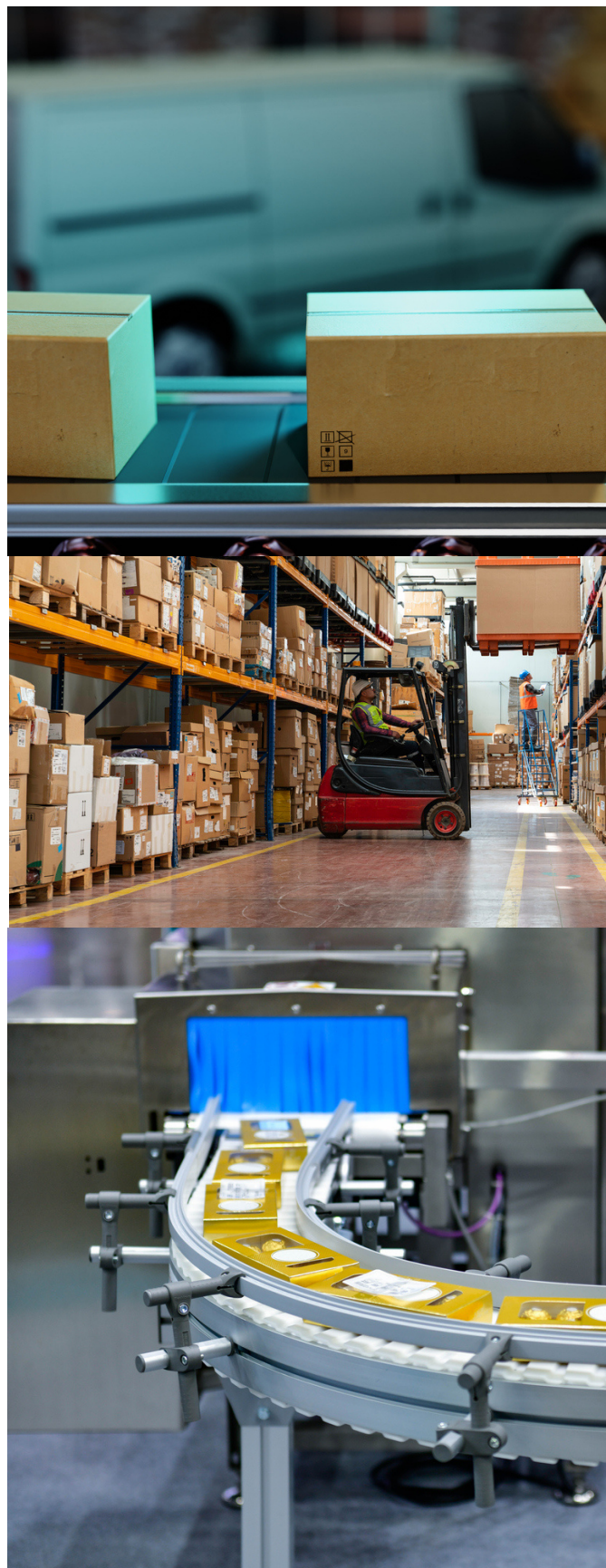
Customer-facing or aesthetic environments, retail distribution centres, food distribution all favour compact, unobtrusive form factors. **Cable routing**, **backplates** for easy mounting, and **connector type** all affect deployment time for large rollouts.

04 Read Zone Control

How tightly must the read zone be contained? Adjacent bays, nearby inventory, and crossing forklifts all create false-read risk. The tighter the physical environment, the more important it is to choose an antenna whose **beam pattern and gain** minimise reads outside the intended zone. **The read distance is another critical factor that controls the read zone**, with **far-field** for mid to long distance reads, and **near-field** for close range on surface reads.

05 Asset Types and Tag Orientation

Circular polarisation handles randomly oriented tags reliably, making it the standard choice for dock doors, conveyors, and portals. **Linear polarisation** is better suited to controlled-orientation applications where the tag is always presented at the same angle.



Antennas for dock doors, loading bays and delivery stations

Dock doors present a specific set of physical demands: moving vehicles, variable approach angles, outdoor exposure, and the need for controlled read zones that do not bleed into adjacent bays.

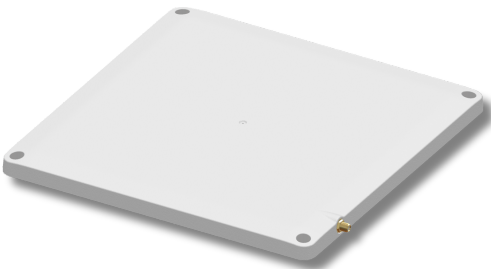
The right antenna depends on your mounting position, environment rating, beam pattern, and read-zone requirements.



A5010 Circularly Polarised Antenna

When to use this antenna:

Use when a covered outdoor or sheltered indoor bay requires full door-width coverage. IP67 protection supports exposure to dust and water, while the focused read zone supports high-throughput operations and separation between adjacent lanes.



Supporting Spec	Key Feature	Customer Benefit
8.5 dBiC gain	High gain sustains reads at forklift and truck handling speed.	No missed tags as loads move through the door at speed.
68° symmetrical beam (both planes)	Symmetrical beamwidth provides predictable and flexible read zone coverage	Full coverage is straightforward to achieve.
IP67	Sealed against dust and water ingress.	Survives covered outdoor bay conditions without a separate weatherproof housing.
-20 dB front-to-back ratio	High rear rejection keeps the read zone strictly in front of the antenna.	No false reads from vehicles or stock in the adjacent lane.
Flush or stud (VESA 100x100) mounting	Installs on any wall, column, or overhead surface without custom brackets.	Fast, clean installation on any surface , no custom steelwork.

A5020CP Circularly Polarised Antenna

When to use this antenna:

Use in the harshest dock environments: food production, wash-down yards, persistent moisture, chemical exposure, or freezing outdoor conditions. When IP68 and extreme temperature range are non-negotiable.

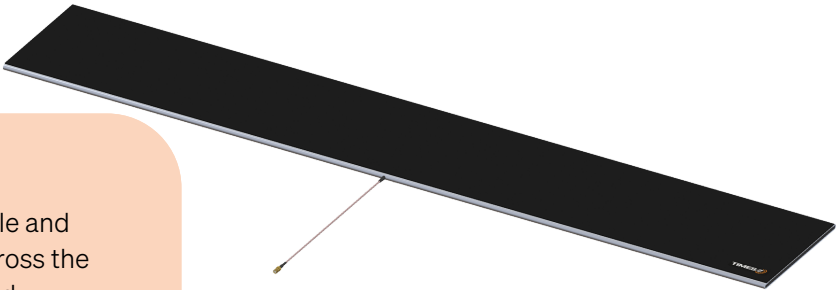


Supporting Spec	Key Feature	Customer Benefit
IP68 (fully sealed)	Rated for full immersion, wash-down, and chemical cleaning.	Survives food production cleaning, persistent moisture, and wet yards.
-30 °C to +65 °C operating range	Operates through extreme cold and heat without impacting performance.	Reliable reads in freezer yards and cold DCs, no warm-up period, no drop-out in winter.
105° beam (both planes)	Widest beam in the dock door range.	Catches tags that approach at steep or variable angles.
5 dBiC gain	Optimised for mid to close-range reads in compact installations.	Consistent read performance where mounting distance to the tag is short.
150x150x14.5 mm compact form factor	Smallest footprint of any dock door antenna in the range.	Installs where a full-size dock door antenna cannot fit.

A5531C Ground Antenna

When to use this antenna:

Use when overhead portal infrastructure is not feasible and pallet-level tags must be read at floor level as loads cross the threshold. Best for high-traffic bays where forklifts and pedestrians cannot be interrupted.

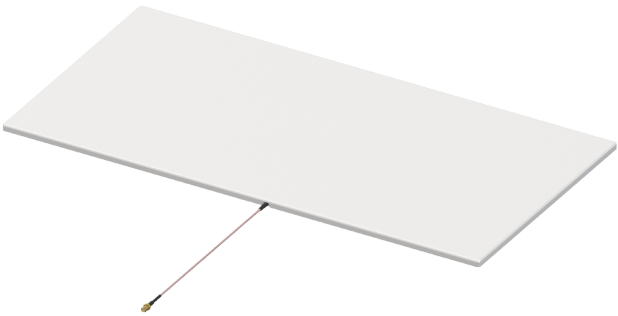


Supporting Spec	Key Feature	Customer Benefit
9.5 dBiC gain	High gain concentrated upward through the pallet load at the threshold.	Reads pallet-level tags reliably without portals or overhead infrastructure.
13° beam (XZ, focused upward) x 85° (YZ)	Tightly collimated beam reads only what passes directly above.	No spurious reads from adjacent lanes or passing pedestrians.
1,200x195x10 mm (10 mm profile)	Slim enough to lie flush in a recessed floor channel.	Forklifts and foot traffic pass over without interruption or trip hazard.
Up to 500 kg distributed / 100 psi point load	Rated for fully loaded pallet jack and forklift traffic.	No antenna damage from normal warehouse vehicle operations.
IP53	Protected against dust and light water spray at floor level.	Survives floor-level installation without a sealed housing.

A5060 Circularly Polarised High Gain Antenna

When to use this antenna:

Use in high-density loading bays with multiple adjacent doors where cross-read elimination is critical and a flush, thin-profile install is required. Preferred where bracket depth is a constraint.

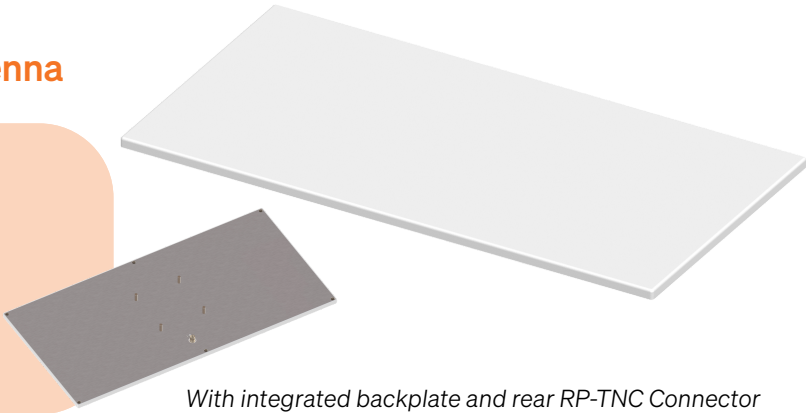


Supporting Spec	Key Feature	Customer Benefit
10.5 dBiC gain	Highest gain flat-panel dock door antenna with extended read range.	Reads large, densely packed or RF-challenging pallet loads reliably at distance.
25x60° asymmetrical beam	Narrow beam confines the read zone to a single door opening.	No cross-reads between adjacent bays, even in high-density loading dock layouts.
-25 dB front-to-back ratio	Highest rear rejection in the dock door range.	Zero false reads from vehicles or stock in the lane behind the antenna.
608x308x9.7 mm (sub-10 mm profile)	Flush or surface mount with no bracket depth required.	Installs flat against any wall or door frame.
IP54	Suited to covered environments rather than full outdoor exposure.	Works at bays with a roof or canopy without needing a fully sealed housing.

A3042 Robust SlimLine High Gain Antenna

When to use this antenna:

Use in the same multi-door, lane-isolation scenarios as the A5060, but where rear-exit cabling and an integrated rigid backplate simplify installation in tight or cable-constrained bays.



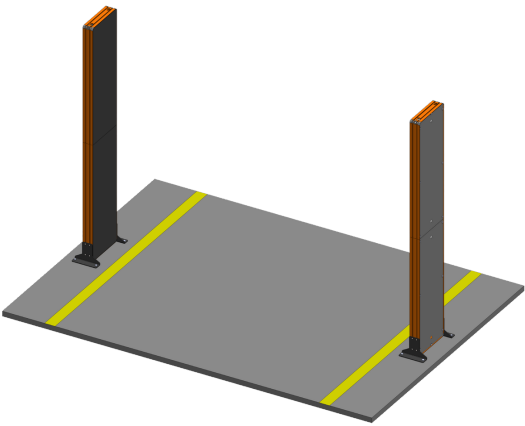
With integrated backplate and rear RP-TNC Connector

Supporting Spec	Key Feature	Customer Benefit
10.5 dBiC gain	Same gain as A5060.	Reads densely packed or RF-challenging pallet loads reliably.
25x60° asymmetrical beam	Same lane-isolating beam as A5060.	One-door read zone in high-density dock configurations.
-25 dB front-to-back ratio	Same high rear rejection as A5060.	Zero false reads from the adjacent lane.
Rear RP-TNC connector + riveted metal backplate	Rear-exit cable routing on an integrated rigid backplate with VESA studs.	Cleaner installation in tight bays where surface wiring is not possible.
IP54, white radome	Solar-resistant white formed radome for covered environments.	Maintains appearance and performance in exposed covered dock locations.
604x304x11 mm	Same footprint as the A5060, with the added rear-cabled backplate.	Drops into the same mounting space planned for an A5060 install.

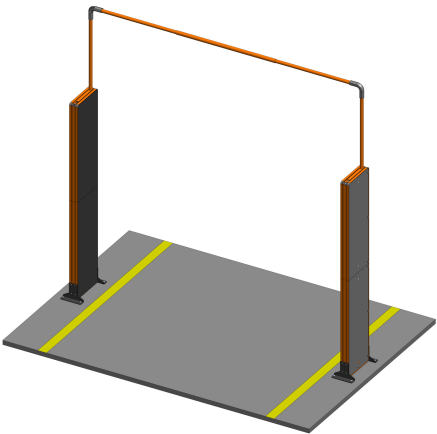
Times-7 Portals

When to use this antenna system:

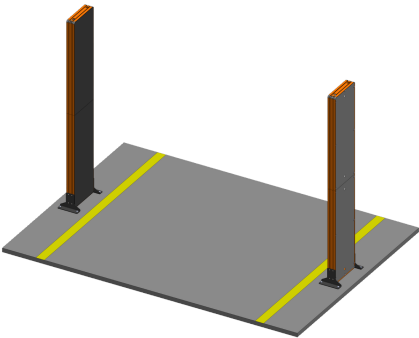
Use for high-throughput dock operations with RF-challenging loads (liquid, metal, glass, mixed apparel). Purpose-built platform requiring framing, reader placement and cabling management.



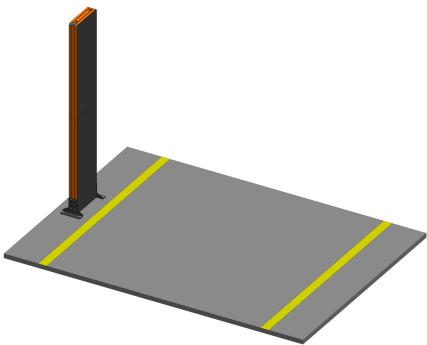
Supporting Spec	Key Feature	Customer Benefit
10 dBiC gain	High gain validated across all tag substrates including RF-challenging materials.	Reads liquid-filled containers, glass, cans, metal, and mixed apparel without substrate-specific tuning.
50° horizontal beam	Focused beam per door defines a precise per-portal read zone.	No cross-reads between adjacent portals at any throughput.
-20 dB front-to-back ratio	High rear rejection limits reads to in-bound loads only.	Ignores stock and vehicles behind the portal.
Covers door widths 2.4 to 3.2 m (Cable Bridge)	Spans any standard dock door width without custom engineering.	Covers every standard dock door size out of the box.
Portal System / Portal Tower / Portal Mini Towers	Two-tower, single-tower, or base-only configuration.	Deploys at any dock door regardless of existing infrastructure.



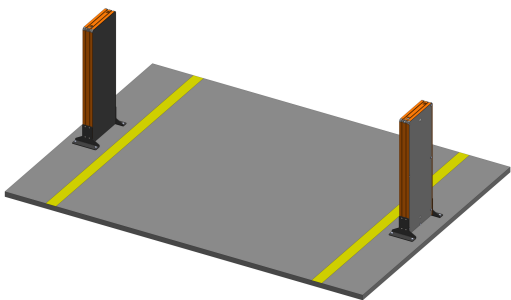
Portal System Combo



Portal System



Portal Tower



Mini Towers

Custom Antenna Design & Manufacturing Services

While our standard portfolio of high-performance RAIN RFID antennas suits many applications, some projects demand more. We offer custom antenna development to meet unique size, shape, and RF performance requirements.

Whether you need embedded, near-field, rugged ground antennas, prototypes or high-volume production, we deliver tailored solutions on time and to specification. We offer a broad range of high-performance standard antennas, ready to deploy, as well as the capability to design fully custom solutions tailored to your exact specifications.



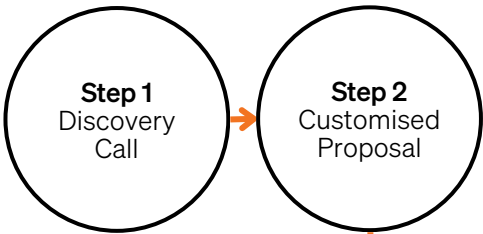
Why opt for a custom antenna design?

- Unique installation environments (metal surfaces, extreme temperatures, or high-moisture conditions).
- Specific read zone requirements for accuracy and control.
- Aesthetic or space constraints in new product designs.
- Regulatory compliance or certification needs.
- Performance thresholds that meet or exceed industry standards.

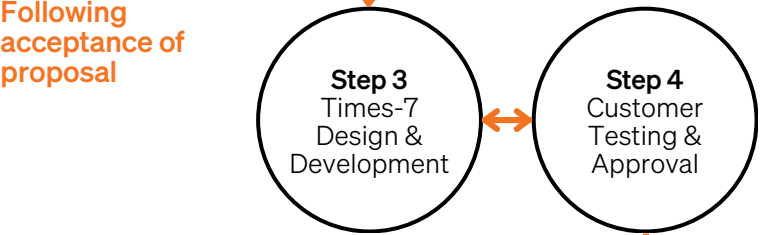
Have a challenging application that requires a unique antenna? Talk to us today!

The Custom Antenna Design Process

Discovery



Following acceptance of proposal



Delivery



How a dock door readpoint is configured

A readpoint is a configuration, not a component.

The antennas in this guide are the building blocks. How many you need, where they mount and which accessories go with them are outputs of the readpoint design, not properties of the antenna model.

Most dock doors use two or more. A single antenna is enough only where the opening is narrow, load heights are consistent and the tag sits on a known face.

What determines the number of antennas

Door width and geometry

A 2.4 m opening and a 3.2 m opening are different coverage problems. Beam width per antenna sets how many positions you need.

Tag placement consistency

One known face on every pallet is a one-sided problem. Tags applied anywhere need both sides covered.

Cross-read tolerance

Adjacent bays working at once change the antenna choice and the count together.

Load height and tag position

A tag at the pallet base, mid-load or on top of a stack sits in a different part of the read zone.

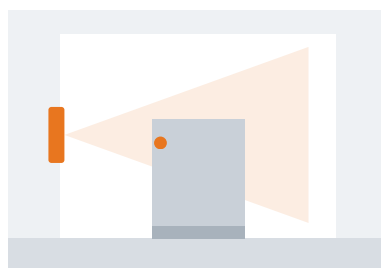
Throughput and dwell time

The faster a load crosses the threshold, the less time the reader has. More antennas mean more chances to read.

Mounting and reader ports

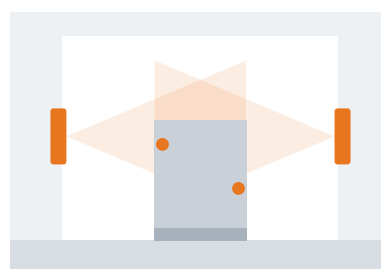
Overhead clearance, frame depth and floor recess options decide what can be mounted. Reader port count bounds the design.

Schematic front elevation, looking into the bay. Orange marks antenna positions; shaded areas indicate coverage direction, not measured read zones.



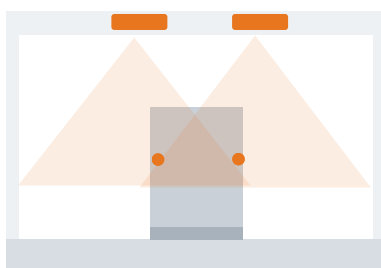
Single side-mounted

Use where the opening is narrow, throughput is moderate and the tag is on one known face at a consistent height.



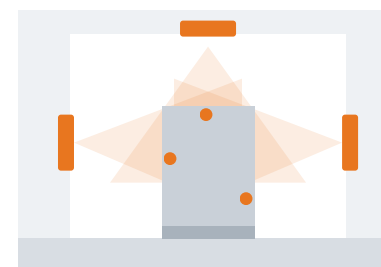
Two-sided, one per dock door

The most common starting point. Covers both faces of the load, so tag placement does not have to be controlled.



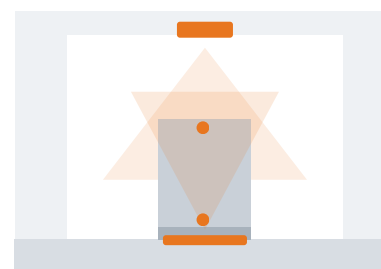
Two overhead

The overhead position reads down onto the top of the load. Use to cover wider chokepoints.



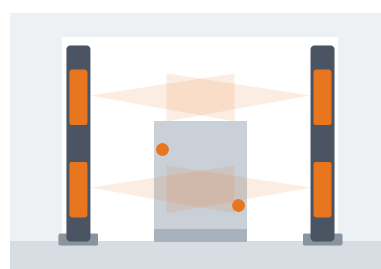
Two-sided plus overhead

Use where load heights vary and tags sit anywhere on the pallet. The overhead position reads down onto the top of the load.



In-floor plus overhead

Use where side mounting is not available or forklift traffic cannot be obstructed. The unit reads up through the pallet base.



Two-tower portal

Use for RF-challenging loads and where cross-reads between adjacent portals cannot be tolerated. Upper and lower units cover the full load height.

Load contents matter as much as geometry. Liquids, metals and glass absorb and reflect RF, so an RF-challenging load needs more angles at the tag than dry goods at the same throughput.



Global Partner Network

Times-7 works with a worldwide network of authorised distributors and integration partners to deliver local expertise, fast product availability, and trusted support.

Many popular models are stocked regionally, with rapid-ship options and clear lead times for build-to-order antennas.

Find your local Times-7 antenna partner:

<https://www.times-7.com/partners/distributors>



Times-7 Research Ltd
10 Te Puni Street
Petone
Lower Hutt 5012
New Zealand
Phone: +64 4 974 6566
Email: sales@times-7.com

For more information, visit
www.times-7.com