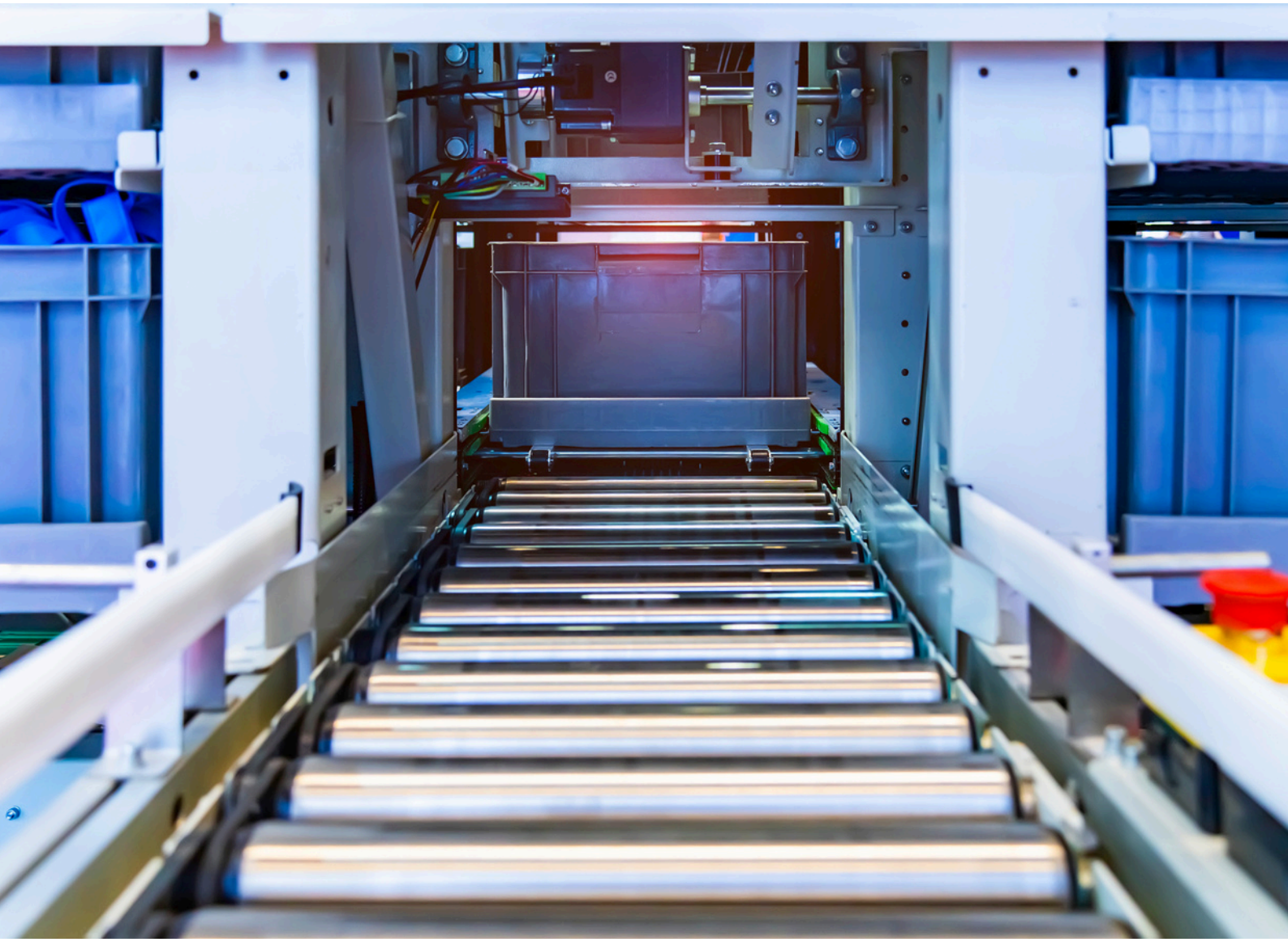
TIMES-7™
INTELLIGENT TRACKING | SMART TECHNOLOGY

RAIN RFID Antenna Selection Quick Reference Guide

Transport, Logistics & Supply Chain Series

RFID enabled tunnel tracking



RAIN ALLIANCE

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SCL / QG / Tunnel tracking/ V1 10/26

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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 tunnel tracking



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 RFID enabled tunnel tracking we recommend these antennas: the **A5060, A5010, A5020CP** and the **A1163**. Each suits a different combination of mounting position, environmental exposure, and read zone control.

We have also included a general guidance section on page **8** for possible antenna configurations. If you have questions regarding antenna selection and antenna placement, our engineering team are available to provide technical support.

Recommended antennas for RFID enabled tunnels

See pages **4** for guidance on selecting the right antenna for your application, then **pages 5-7** for full specifications, key features, and customer benefits for each of our recommended antennas.

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

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 readpoint? Covered indoor readpoints need **IP54** as a minimum. Outdoor and exposed readpoints require **IP67** (temporary immersion up to 1 m, 30 min). Readpoints 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.

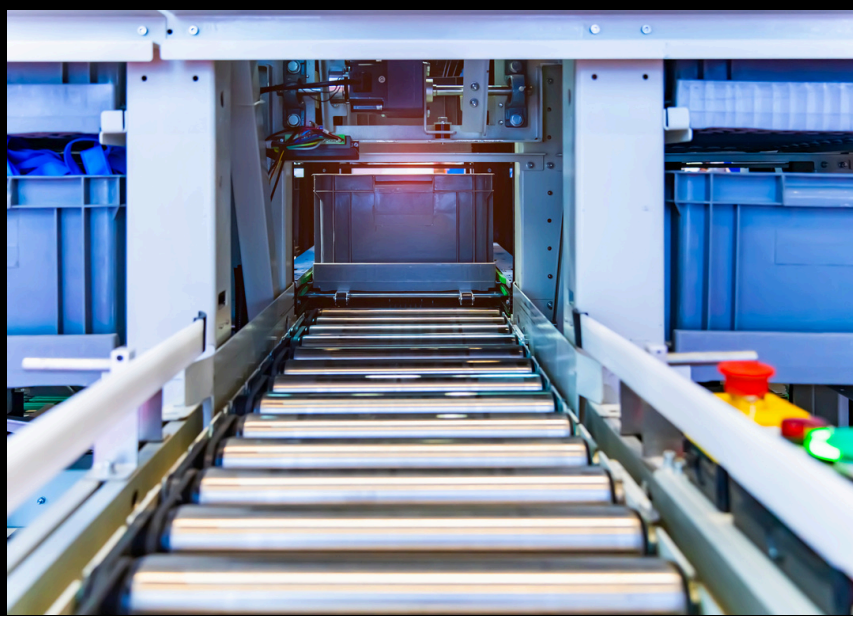


05 Asset Types and Tag Orientation

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.

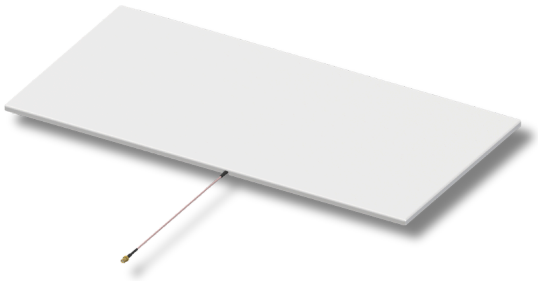
Antennas for RFID enabled tunnel tracking

RFID tunnels automate the identification of tagged items as they move through conveyor systems, supporting applications such as sortation, returns processing and item verification.
Selecting the right antenna depends on tunnel dimensions, tag density, item orientation, required read-zone coverage and operating conditions. The appropriate antenna configuration helps achieve reliable tag detection while reducing unintended reads from surrounding areas.



A5060 Circularly Polarised Antenna

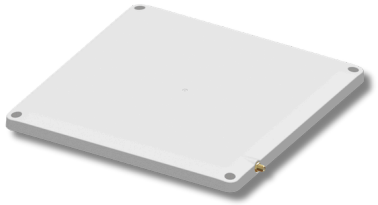
When to use:
Mounted in conveyor tunnels requiring a focused read zone, particularly for densely packed tagged items.



Supporting Spec	Key Feature	Customer Benefit
25° × 60° asymmetrical beam	Narrow, directional beam concentrates coverage within a defined read zone.	Helps contain reads within the tunnel and reduces unwanted detection of nearby tagged items.
9.7mm formed / 8.6 mm flat profile	Ultra-slim design for discreet mounting on tunnel walls.	Minimises intrusion into the tunnel opening, preserving clearance for moving items.
10.5 dBiC gain	High-gain, multi-element antenna designed for demanding, densely populated tag environments.	Supports reliable identification of tagged items in densely packed cartons as they pass through the tunnel.
-25 dB front-to-back ratio	Strong rejection of RF energy behind the antenna.	Helps reduce unwanted reads from tagged items behind the tunnel wall or mounting panel.

A5010 Circularly Polarised Antenna

When to use:
Mounted tunnel installations requiring symmetrical RF coverage across the conveyor width, particularly where tagged items vary in position or orientation



Supporting Spec	Key Feature	Customer Benefit
68° symmetrical beam	Even coverage across the full tunnel width.	Supports consistent coverage across the intended conveyor area, accommodating items travelling at different lateral positions.
8.5 dBiC gain	High-gain far-field antenna with a symmetrical beam.	Provides RF coverage for tunnel configurations where tags must be detected from a distance.
250 x 250 x 14mm	Square, slim panel suitable for flush mounting or VESA mounting	Fits into tunnel structures without significantly reducing the available conveyor clearance.
IP67	Sealed against dust and temporary immersion.	Supports use in tunnels where dust, moisture or occasional cleaning exposure may occur.

A5020CP Circularly Polarised Antenna

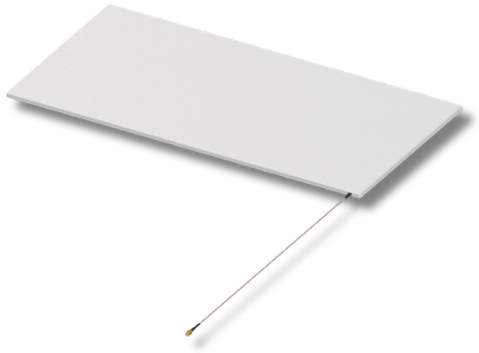
When to use:
Compact tunnels requiring broad RF coverage, particularly where moisture, frequent cleaning or limited mounting space are important considerations.



Supporting Spec	Key Feature	Customer Benefit
IP68	Sealed housing designed to resist dust and water ingress.	Suitable for tunnel installations exposed to moisture or cleaning, reducing the risk of environmental damage to the antenna.
105° symmetrical beamwidth	Broad, even far-field coverage	Helps cover a wider section of the tunnel from a compact mounting position, accommodating variation in item placement.
5 dBiC gain, 4m typical read range	Moderate gain, wide coverage	Covers the belt without over-reaching into the neighbouring line.
Flush or 100 x 100mm VESA mounting	Recessed mounting holes provide flexible installation options.	Allows the antenna to be mounted directly to tunnel panels or brackets to suit available space.

A1163 True NearField™ Antenna

When to use:
Low-clearance tunnel installations where items pass close to the antenna and precise detection within a localised read area is required.



Supporting Spec	Key Feature	Customer Benefit
True NearField™ technology	Minimises far-field components to concentrate detection close to the antenna surface.	Helps distinguish items at the intended verification point from tagged products elsewhere along the conveyor.
604 x 304mm near-field zone	Large near-field antenna surface designed to minimise dead spots across the panel.	Provides a broad physical detection surface for close-range verification, reducing the need for multiple smaller antennas where the application permits.
Near-field coupling	Designed for applications involving difficult-to-read materials, including liquids and metals.	Provides an option for verifying appropriately tagged products containing liquids or metals, where conventional antennas would struggle.
8.5mm flat radome thickness	Slim design with integrated rear mounting holes	Ease of installation in low-clearance tunnel structures without significantly reducing available space for passing items.

How a RFID enabled tunnel readpoint is configured

An RFID tunnel uses antennas positioned around an enclosed conveyor section to identify tagged items as they pass through. Depending on the tunnel dimensions, product characteristics and required read coverage, antennas can be mounted on the sides, overhead or in a combination of positions.

The aim is to provide sufficient RF coverage within the tunnel while minimising unintended reads from tagged items outside the intended read zone.

What determines the number and position of antennas

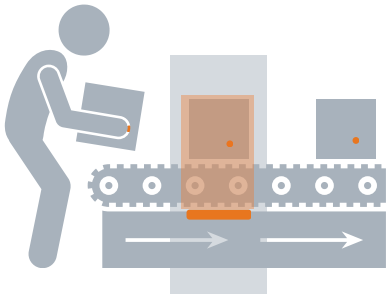
Tunnel dimensions and conveyor layout
The tunnel's width, height and available mounting positions determine antenna placement and the coverage required.

Tag orientation and product materials
Tag position, orientation and materials such as liquids or metals influence RF performance and whether coverage from multiple directions is needed.

Read-zone requirements
Focused antennas help limit unintended reads outside the tunnel, while broader beam patterns may be suitable where wider coverage is required.

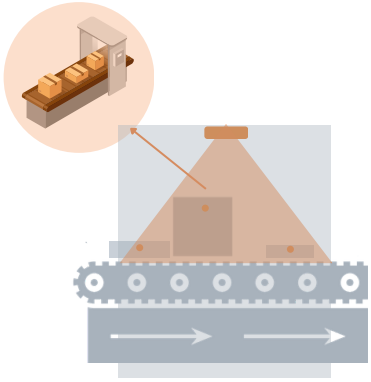
Item density and movement
The number of tagged items passing through together, their spacing and conveyor speed influence the coverage and read time required for reliable identification.

Schematic side and front elevations, with orange rectangles showing antenna position, orange dots representing RFID tags and orange shading indicative antenna coverage.
(Schematics are illustrative only)



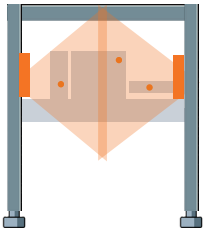
Under-belt mounted

A near-field antenna positioned beneath or adjacent to the conveyor, with tagged items passing close to its surface.
Suitable for item-level verification where a localised read zone is required and unintended reads need to be minimised.



Overhead mounted

An antenna mounted inside the tunnel structure above the conveyor, directed downwards towards passing items.
Suitable for where a lower density of tagged items travel in predictable positions and a single overhead antenna provides sufficient coverage.



Side-mounted

Antennas positioned along one or both tunnel walls, directed towards items travelling on the conveyor.
Suitable for densely packed items or varying tag orientations.

Depending on the application and required read coverage, a combination of antenna configurations may be needed to achieve reliable tag detection.



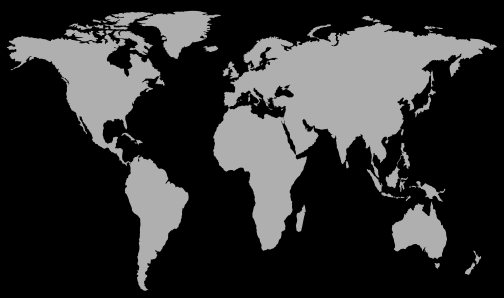
Global Partner Network

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



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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

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