



The Global Language of Business

# Gen2v3 Fact Sheet

## What's new in Gen2v3?

Release 1.0, Jan 2024



GS1's EPC "Gen2" air interface protocol, first published by EPCglobal in 2004, defines the physical and logical requirements for an RFID system of interrogators and passive tags, operating in the 860 MHz - 930 MHz UHF range. Over the past decades, EPC Gen2 has established itself as the standard for UHF passive RFID (aka RAIN RFID) implementations across multiple sectors and is at the heart of more and more RFID implementations.

### What

Gen2v3 represents the latest release of GS1's EPC air interface standard, which has been enhanced in response to the new challenges posed by the growing number of RFID applications.

### Where

Industry is deploying RAIN RFID item-level tagging on a large scale in the apparel sector for many years. Expansion into other sectors include rail industry, aerospace and defence, consumer electronics, pharmaceuticals, wine and spirits, high-end fashion, food services, oil and gas and automotive.

### How

Many of the changes in Gen2v3 address improving communications between RAIN RFID tags and readers. Here's a breakdown of four of the most impactful updates and their benefits.

- **Reducing tag clutter:** The prevalence of items connected with RAIN RFID tags is increasing every year. This can cause problems if a RAIN reader detects "unwanted" tags, or tag clutter. These are tags that are part of a different deployment or solution which shouldn't be acknowledged or read. Tag clutter interferes with a reader's ability to capture inventory data accurately and efficiently. Gen2v3 addresses tag clutter, ensuring that only the intended tags are read when commanded.

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"Gen2v3 supports faster, more accurate RAIN RFID deployments, reflecting the ongoing evolution of the industry. The need for advances that minimize tag clutter, improve read rates, and support multi-reader deployments has increased as more RAIN deployments incorporate autonomous reading with fixed readers tracking thousands of tagged items throughout their lifecycle."

**Megan Brewster**  
VP Advanced Technology, Impinj.

- **Improving read rates:** Gen2v3 is optimising read rates by enabling RAIN readers, which send power to a RAIN tag to generate a response, to ignore responses from tags that cannot complete their response before running out of power. This update should reduce the impact of degraded read rates caused by fringe tags on the outer edge of a read zone, helping enhance inventory accuracy.
- **Facilitating multi-reader deployment:** RAIN RFID solutions are becoming increasingly complex. Often, several readers are deployed in a single area with multiple applications running simultaneously. For example, one reader may be used in a retail store's back room for inventory, while another is used in a self-checkout kiosk, with another at the front for loss prevention. These overlapping applications can cause tags to be misread. Gen2v3 addresses this issue by streamlining tag data collection in multi-reader deployments.
- **Simplifying the access to data encoded** either in User or TID memory bank.

## Why

Gen2v3 is the result of several years of industry-wide collaboration with a diverse group of stakeholders. Gen2v3 will drive the next wave of RAIN RFID adoption in a wide range of sectors.

This new version of the air interface standard includes new features and additional functionality to help address increasingly complex supply chain challenges, including those that are posed by the growing number of RFID applications.

## When

- **2003:** GS1 launched EPCglobal as a subsidiary organisation to facilitate the technical development and adoption of EPC/RFID standards
- **2004:** GS1 published the first-ever version of the EPC Gen2 air interface standard
- **2005:** ISO/IEC incorporated the EPC Gen2 standard into ISO/IEC 18000-6C
- **2008:** GS1 released EPC Gen2 v1.2.0, featuring enhancements to improve RFID performance for item level tagging applications
- **2009:** GS1 published implementation guidelines for EPC-based Electronic Article Surveillance (EAS)

- **2010:** Industry working group launched to develop enhancements to the Gen2 standard based on EPC user community requests for additional functionality
- **2013:** Gen2v2 ratified - first major update since 2008
- **2014:** ISO incorporated Gen2v2 into the ISO/IEC 18000-63 standard
- **2021:** Industry working group launched to develop enhancements to the Gen2 standard based on RAIN Alliance requests to include new functionalities
- **2024:** Gen2v3 ratified - a major release since 2013

Now that Gen2v3 is published, manufacturers will begin implementing the specifications into their RAIN RFID products. To comply with Gen2v3, RAIN RFID tag chip and reader manufacturers will need to update their products. Solution providers may update their deployment implementation to take advantage of Gen2v3's new features, but it's not required.

There's no downside to switching to the Gen2v3 protocol. Gen2v3 is backward compatible, meaning deployments operating under the Gen2v2 protocol will still function.

## Who

GS1 is a neutral, not-for-profit, global organisation that develops and maintains the most widely-used supply chain standards system in the world. GS1 standards improve the efficiency, safety, and visibility of supply chains across multiple sectors.

Mission: to be the neutral leader enabling communities to develop and implement global standards providing the tools, trust and confidence needed to achieve our vision.

116 countries represented by our Member Organisations.

+2 million companies use GS1 standards.

+1 billion products carry GS1 barcodes.

6 billion transactions daily using GS1 Standards.

150 countries use GS1 standards.

GS1 facilitates the technical development and global adoption of Electronic Product Code (EPC) standards. Driven by industry and user requirements, they enable the identification of objects, data capture and sharing of information among partners throughout the supply chain.

EPCglobal Inc. is an affiliate of GS1 AISBL.

For more information on Gen2v3, please visit <https://www.gs1.org/standards/rfid/uhf-air-interface-protocol>

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