RAIN Item Numbering to Avoid Tag Interference

RAIN RFID Advisory Note: RAIN Item Numbering to Avoid Tag Interference

RAIN RFID enables highly efficient, long-range, multi-read features, making RAIN RFID the ideal technology to identify real world items in the digital world. However, the benefits of long range and multi tag reading can also cause interference between RAIN enabled applications and services, reducing the effectiveness of the RAIN solution. This advisory note informs business leaders, integrators and users of the importance and advantages of proper usage of RAIN item numbering and information to reduce RAIN tag interference.

> As RAIN deployments grow, RAIN tag interference between applications may become a real long-term issue. Proactively follow these RAIN item numbering suggestions, rather than retroactively correcting errors in the field, which can be an expensive operation.

Tag interference may occur when there are many tags in the read-zone and when tags are poorly programmed. Colloquially, these have sometimes been referred to as:

- **Acid RAIN**: when tags intended for use in one application impact the performance of another system or application.
- **RAIN Flooding**: when too many tags are present at the same time in the read-zone, resulting in some tags not being read.

To overcome tag interference, an application-specific reader must be able to quickly communicate with the tags corresponding to its application, while all other tags in the read-zone remain silent. One way to achieve this is by following the item numbering standards described below.

Object identifier specification

The object identifier is the *unique name* of the item the tag represents. The item number should be specified with the following methods:

1. **Standard-managed (recommended)**: Using a standard-managed item numbering method ensures that interference with other systems that also use standardized data schemes will not occur.

   - ISO item number methods (unique item identifier - **UII**) are specified by the ISO/IEC 1736x series of standards or ISO/IEC 15961 registered global organisations, like IATA, specify, manage and administer their own numbering system and data. (ISO standards can be obtained from AIM – https://web.aimglobal.org/ecommerce or from your local ISO standards body – https://www.iso.org/members.html)

   - GS1 item number methods (Electronic Product Code - **EPC**) are specified by the EPC Tag Data Standard (TDS).

2. **Proprietary (not recommended)**: If you do wish to use your own numbering method, consider using the ISO/IEC 15961 method with the Application Family Identifier set to a value that indicates a proprietary numbering system, namely set the AFI value equal to 0x01, 0x02 or 0x03.

Further, standardized methods like ISO/IEC 20248 allow ISO/IEC 15459 registered companies and organisations to develop, manage and administer their own item numbers and verifiable tag data structures. This advisory note is aligned with the methods of the RAIN Reader Communication Interface (RCI) guide and the GS1 Low Level Reader Protocol (LLRP).

Item information specification

To specify additional RAIN tag data (item information), use the following methods:

1. **Standardized**: The ISO Data Storage Format Identifier (DSFID), whose formats are administered by the ISO Registrar AIMglobal (ISO/IEC 15961).

2. **Proprietary**: unilaterally designed and implemented by the system owner.

ISO/IEC 20248 has an assigned DSFID (0x11) allowing ISO/IEC 15459 registered companies and organisations to develop, manage and administer their own verifiable data structures in a way that is compatible with all numbering methods.

ABOUT RAIN RFID ALLIANCE

The RAIN RFID Alliance is an organization supporting the universal adoption of RAIN UHF RFID technology. A wireless technology that connects billions of everyday items to the internet, enabling businesses and consumers to identify, locate, authenticate, and engage each item. The technology is based on the EPC Gen2 UHF RFID specification, incorporated into the ISO/IEC 18000-63 standard. For more information, visit www.RAINRFID.org. The RAIN Alliance is part of AIM, Inc. AIM is the trusted worldwide industry association for the automatic identification industry, providing unbiased information, educational resources, and standards for nearly half a century.

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