Global RFID Technology Market - Readers, Tags and Software

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Report description:

Global Radio Frequency Identification (RFID) Technology Market Trends and Outlook
Radio Frequency Identification (RFID) Technology is a method that allows the wireless transfer of data using electromagnetic fields for the automatic identification and tracking of tags affixed to objects. On the whole, an RFID system comprises Tags, Readers and Software & Middleware. Tags are equipped with an antenna and a microchip for storing data concerning the items they are attached to. Readers then transmit radio waves to communicate with these tags and retrieve the stored information that the software then processes to provide necessary insights. The versatility and adaptability of RFID technology have facilitated its adoption across a spectrum of industries, including Agriculture, Automotive, Healthcare & Medical, Logistics & Transportation, Manufacturing and Retail, among others. Major applications comprise Quality Assurance & Quality Control (QAQC) and Tracking & Management, among which supply chain management, asset tracking, inventory control and personal identification applications, such as passports & access cards are prominent. RFID can offer real-time data without the need for line-of-sight, which makes it quite different to traditional barcoding systems.

RAIN (UHF RFID) is an emerging wireless technology via which trillions of day-to-day items are connected to the Internet that helps businesses and consumers in identifying, locating, authenticating and engaging every item. RAIN is an acronym derived from RAdio frequency IdentificatioN, similar to other wireless technology organizations, including NFC Forum, WiFi Alliance and Bluetooth SIG. RAIN uses the GS1 UHF Gen2 protocol which ISO/IEC has standardized as 18000-63. This technology intends to create a link between UHF RFID and the cloud to enable storage, management and sharing of RFID-based data via the Internet.

The global Radio Frequency Identification (RFID) Technology market size is estimated at US$18.6 billion in 2024 and is projected to reach US$40.6 billion by 2030 at a CAGR of 13.9% between the two years. Some of the key factors driving the market for RFID Technology include integration of this technology with the Internet of Things (IoT) and Industry 4.0 initiatives and the wide deployment of RFID-enabled tags and devices across a range of industries to collect real-time data and create a smart, connected ecosystem, offering enhanced visibility, automation and decision-making. Another crucial reason for wider adoption of RFID includes an increase in regulatory requirements for product traceability, safety and security in sectors, such as healthcare, pharmaceuticals, food & beverage and aerospace. This technology allows organizational compliance with procedures through offering accurate and auditable data as to the origin, handling and distribution of products. Use of RFID optimizes supply chain operations by providing real-time visibility and traceability of goods throughout the supply chain. A few major benefits for

businesses include improved inventory accuracy, reduced stock-outs, minimization of excess inventory and enhancement of efficiency in supply chains.

RFID Technology Regional Market Analysis

North America is the largest global market for RFID Technology, the significant factors for which include early recognition and adoption of the same in various industries. The region's advanced technological infrastructure that comprises strong communication networks and IT systems enable in the seamless incorporation of RFID technology into a number of sectors, allowing businesses to easily deploy and leverage RFID solutions in an effective manner. As far as growth is concerned, the demand for RFID Technology in Asia-Pacific is slated to outpace other global regions, a major factor for which is an increase in trade connections among a number of countries in the region. This has prompted several regional organizations to make use of RFID solutions in enhancing supply chain visibility and operational efficiency. The results of this proactive approach have been evident in several countries, including China, India, Japan, South Korea, Australia and New Zealand, as also in ASEAN nations. China has a very strong manufacturing sector, which has adopted RFID technology to tide over several limitations witnessed previously, such as optimization of operations, minimization of costs and improvement in monitoring equipment, materials and safety protocols. Overall, Asia-Pacific's growing industrialization and strong economic growth will be major contributory factors propelling the market for RFID in the region.

RFID Technology Market Analysis by Component

Tags, Readers and Software, Middleware & Services are the most important components of RFID technology, of which Tags account for the largest share. RFID Tags find application in storing and transmitting data wirelessly via radio waves, which are then read by RFID Readers. The conventional applications of Tags include inventory management, asset tracking, equipment tracking, vehicle tracking, access control in security, contactless payment and enhancing customer service. RFID Tags have been witnessing reduction in size, owing to technological advancements, thereby allowing for ease of installation/attachment in their intended application areas and contributing to decrease in production costs. On the other hand, the global market for RFID Readers is likely to clock the fastest growth during the 2024-2030 analysis period. These components can concurrently capture data from multiple tags in a rapid and precise manner, which facilitates high-speed data collection and processing. These features are of particular significance in the areas of inventory management, asset tracking and access control that need fast data capture.

RFID Tags by type are further sub-categorized as Active and Passive, with the latter dominating the market. These cost-effective tags are widely utilized as labels and cards to fulfil a variety of purposes, including identification, access control, asset labelling, goods tracking and payment management. Passive RFID Tags do not need an external power source, such as a battery, and their functionality relies on electromagnetic waves transmitted by RFID readers that power them. Major areas where these tags are used include pharmaceuticals, retail and supply chain, among others.

Further segmentation of Passive RFID Tags is based on their frequencies, comprising Low Frequency, High Frequency and Ultra-High Frequency. High Frequency Passive RFID Tags are the most extensively employed because of their capacity to support higher data transfer rates that enables faster communication between readers and tags. Such high-speed data transfer capability can be highly advantageous for applications requiring rapid data exchange, such as contactless payment transactions, asset tracking and inventory management in retail and healthcare settings.

RFID Technology Market Analysis by Application

Based on application, the global market for RFID as covered by this report includes Quality Assurance & Quality Control (QAQC) and Tracking & Management, with the latter being further classified into Crops, Forest Produce & Livestock, Financial & Physical Assets, Inventory, Production and Supply Chain. Of the two major applications, the global market for RFID as used in Tracking & Management is larger, as also faster growing. Tracking and managing various assets using RFID is a proven approach to overcome any issues related to mishandling and pilfering. This secure and accurate method is employed in a range of sectors for improving inventory management. Studies have shown that organizations implementing RFID technology have seen their inventory tracking

and management capabilities increase from about 60% to more than 90%. Some key advantages offered by RFID in this area include ability to track multiple assets at one go, real-time data collection, enhancement of asset visibility, locating lost or misplaced assets, maximization of inventory accuracy and eliminating human intervention. Internet of Things (IoT) has also been a contributory factor in the wider utilization of RFID technology, especially for asset-heavy industries, such as aerospace, automotive, construction, chemical, mining and oil & gas. In the area of QAQC, the benefits offered by RFID include real-time tracking, automated data collection, enhanced inventory management, improved production line monitoring, supply chain security and identification of issues related to quality.

RFID Technology Market Analysis by End-Use Sector

Worldwide, the Retail sector is the leading end-user of RFID technology, since this technology has proved invaluable in allowing retailers to gain enhanced visibility into their supply chain, starting from manufacturing to distribution and the final product reaching stores. The use of RFID helps retailers in tracking shipments, monitoring delivery schedules and identifying possible bottlenecks or obstacles in the supply chain. The retail industry has also been benefitted by being able to prevent thefts from stores and manage inventory better. Owing to these factors, the demand for RFID in this sector has been and will continue to post impressive growth. The demand for RFID in Healthcare & Medical and Manufacturing is also poised to post promising growth over the coming period.

RFID Technology Market Report Scope

This global report on RFID Technology analyzes the market based on component, application and end-use sector for the period 2021-2030 with projections from 2024 to 2030 in terms of value in US$. In addition to providing profiles of major companies operating in this space, the latest corporate and industrial developments have been covered to offer a clear panorama of how and where the market is progressing.

Key Metrics

Historical Period: 2021-2023
Base Year: 2024
Forecast Period: 2024-2030
Units: Value market in US$
Companies Mentioned: 60+

RFID Market by Geographic Region

- North America (The United States, Canada and Mexico)
- Europe (France, Germany, Italy, Russia, Spain, The United Kingdom and Rest of Europe)
- Asia-Pacific (China, Japan, India, South Korea and Rest of Asia-Pacific)
- South America (Argentina, Brazil and Rest of South America)
- Middle East & Africa

RFID Market by Component

- Readers
- Tags
  - Active Tags
  - Passive Tags
- Software, Middleware & Services

RIFD Passive Tags by Frequency

- Low Frequency
- High Frequency
- Ultra-High Frequency

RFID Market by Application
□□Quality Assurance & Quality Control (QAQC)
□□Tracking & Management
o□Crops, Forest Produce & Livestock
o□Financial & Physical Assets
o□Inventory
o□Production
o□Supply Chain

RFID Market by End-Use Sector
□□Agriculture
□□Automotive
□□Healthcare & Medical
□□Logistics & Transportation
□□Manufacturing
□□Retail
□□Other End-Use Sectors (Primarily including Aerospace & Defense, Apparel, Commercial, Financial Services, Food & Beverages, Government, Hospitality and Security Access & Control)

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