Volume 2, Issue 6, June 2024 **ISSN (E):** 2938-3757

THE IMPORTANCE OF RFID TECHNOLOGICAL SYSTEM

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Abstract
In this article, we have collected the main trends in the field of wireless communication, both current and upcoming years. The latest innovations in the field of wireless communication, RFID (Radio Frequency Identification) technological system components, types, operating ranges, areas of application, as well as existing problems and its role in society are covered in detail.

Keywords: digitized society, wireless communication, technology, system, RFID.

Introduction

The role of “Information Communication Technologies”in the life of society is also increasing as times change and develop, that is, “information communication technologies” (ICT), which are developing, are bringing significant changes in all aspects of our daily life.

At the same time, it is worth noting the positive aspects of the digitalization of society, the automation of various spheres of public life, electronic payments, an electronic database, an electronic digital signature, as well as the use of forms of wireless communication. The emergence of Distributed Data Processing Systems has led to the formation of a new approach to the security issue. As you know, the role of wireless forms of communication in such systems is incomparable. For this reason, the creation of systems such as remote scanning, reading, as well as transmission of information serves as an important factor in the development of society. One such technological system is RFID (radio frequency identification), a form of wireless communication that involves the use of an electromagnetic or electrostatic connection in the radio frequency part of the electromagnetic spectrum to uniquely identify an object, animal or person.

The RFID technological system is used in various fields: in the contactless identification of products in trade complexes, in the identification of automatic permits when entering buildings, in the management of production processes, in the management of transport techniques and many other areas. One of the main elements of the system is chips. Chips are used to transfer data.

Unlike the GPS system, employees can only be monitored during working hours. Students record the time of the employee's appearance, departure and overwork load. All information is automatically transferred to the accounting department. Participation in public events with tags, you can automate movement control and calculate the number of participants in meetings and demonstrations. The technology involves the use of bracelets or badges, software and tags in the form of readers. The coordinates of the visitors are determined online and transmitted to the server for analysis. Organizers receive information about visiting stands and sites and can

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highlight the most interesting segments. For product storage, RFID transponders can be used to control and account for Biological Products, weapons, valuables, and hazardous substances. The software and hardware solution was introduced for industrial refrigerators and vending machines. Tags applied to goods are read, which makes it possible to record the presence of a thing, the shelf life, the time taken, as well as the time that is outside the storage system. The technology also provides user access control.

Each RFID system consists of three components: a scanning antenna, a receiver, and a transponder. When a scanner antenna and receiver-transmitter are combined, they are called an RFID Reader or tag. There are two types of RFID readers - stationary Reader and mobile Reader. RFID Reader is a network-connected device that can be portable or permanently connected. This uses radio waves to transmit signals that activate the tag. Once activated, the tag sends a wave to the antenna, where it is translated into data (Figure 1).

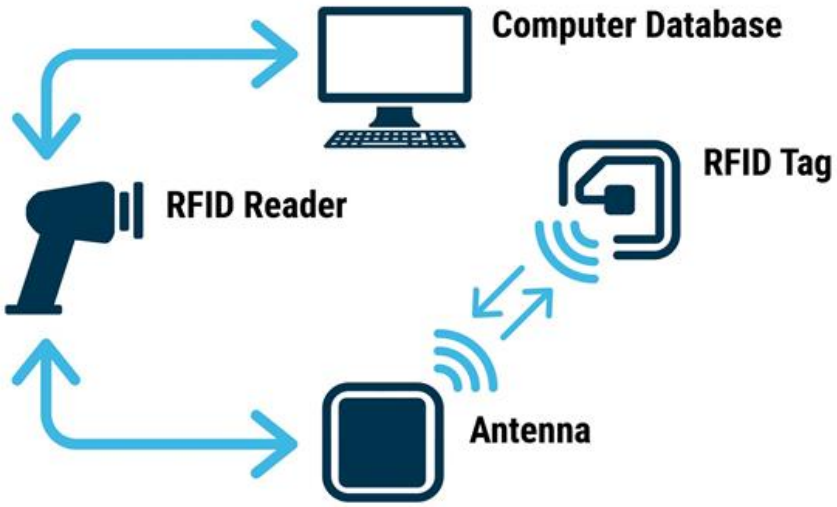

Figure 1. RFID system components

The Transponder is located on the RFID tag itself. The reading range for RFID tags varies depending on factors such as tag type, Reader type, RFID frequency, and ambient or noise of other RFID tags and readers. Tags with a powerful power supply also have a longer range of readings. Let's see what types of RFID tags exist and what are distinguished.

RFID tags consist of an integrated circuit (IC), antenna and chip. The part of the RFID tag that encodes the identification data is called RFID Inley.

There are two main types of RFID tags:

- Active RFID. An active RFID tag has its own power supply, often a battery.
- Passive RFID. A passive RFID tag derives its power from a reading antenna whose electromagnetic wave generates current in the RFID tag's antenna.

There are also semi-passive RFID tags, which means that the battery will cause the contacts to rust when the connection is powered by RFID Reader.

Low-power, built-in non-volatile memory plays an important role in every RFID system. RFID tags typically contain less than 2,000 KB of information, including a unique identifier/serial

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number. Tags can be read-only or read-write-only, where data can be added by Reader or overwritten over existing data.

The reading range for RFID tags varies depending on factors such as tag type, Reader type, RFID frequency, and noise of surrounding or other RFID tags and readers. Due to the strong power supply, Active RFID tags have a longer reading range than passive RFID tags.

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Smart tags are simple RFID tags. These tags have an RFID tag built into the adhesive tag and have a barcode. They can also be used by RFID and barcode readers. Smart tags RFID tags can be printed on demand using desktop printers that require more advanced equipment.

Types of RFID systems. There are three main types of RFID systems: low frequency (LF), high frequency (HF), and ultra high frequency (UHF) (Table 1). Microwave RFID is also available. Frequencies vary greatly depending on the country and region.

Low frequency RFID systems: they range from 30 KHz to 500 KHz, although the typical frequency is 125 KHz. LF RFID has a short transmission range, usually from a few inches to six feet anywhere.

High frequency RFID system: they range from 3 MHz to 30 MHz, usually the HF frequency is 13.56 MHz. The standard range is anywhere from a few inches to a few feet.

UHF RFID systems: they can be read from 300 MHz to 960 MHz, usually with a frequency of 433 Mhz, and usually from a distance of 25 feet.

Microwave RFID systems: they work at 2.45 GHz, can be read from a distance of more than 30 feet.

Table 1. Frequency and range of operation of the RFID technological system.

Band type	Frequency Range (in Hz)	Read Range (in m)
Microwave band	2.45 GHz	Minimum of 3 2m
UHF band	300 MHz – 3 GHz	Minimum of 3m and up to 50 m or 100 m
HF band (Smart cards)	3-30 MHz	1.5 m; high end readers
LF band	30 kHz –300 kHz	At best around 1 m
UHF – Ultra High Frequency; **HF –** High Frequency; **LF –** Low Frequency		

The frequency used will depend on the RFID application, with the actual distances taken sometimes different than expected. For example, when the US State Department announced that it would issue electronic passports equipped with an RFID chip, it said that the chips could only be read from a distance of about 4 inches. However, the State Department soon received

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evidence that RFID readers could pass data on RFID tags far beyond 4 inches – sometimes from distances above 33 feet.

If longer reading ranges are needed, using tags with additional power can increase the reading range to 300 feet.

In place of the conclusion, it is worth noting that RFID technologies allow you to automate modern business processes, which reduces the likelihood of human error and increases the speed of data processing. And the use of tags opens the door to wide possibilities.

One of the main disadvantages of the RFID technological system is the limitation of its scope of exploitation.

References

1. https://www.techtarget.com/iotagenda/definition/RFID-radio-frequency-identification
2. https://tashkent.1cbit.ru/blog/rfid-metki-chto-eto-takoe-kak-rabotaet-vidy-i-tipy-identifikatsii/?utm_referrer=https%3A%2F%2Fwww.google.com%2F

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