

# Discussion on the characteristics and applications of 5G mobile communication technology

李庆明

(沃易升科技(北京)有限公司 北京 100080)

**Abstract:** Amidst the rapid growth of Internet technology, the extensive adoption of mobile and intelligent terminals plays a crucial role in modern communication, propelling wireless communication technology to new heights. This progress is unfolding against the backdrop of the global development of fifth-generation mobile communication technology. The 5G mobile communication network represents a complex innovation with a range of inherent advantages, which effectively addresses issues including low security and slow communication rates, transforming into a high-speed transmission solution over time. Additionally, it introduces clear imaging technology and boasts unique characteristics, surpassing the efficiency of traditional communication methods. These attributes find their place within the distinct application trends.

**Key words:** 5G mobile; communication technology; uniqueness; exploration

中图分类号: TN929.5 文献标识码: A 文章编号: 2832-9317 (2023) 03-0121-03

**DOI:** 10.12424/HA.2023.056 本文链接: <https://www.oc-press.com/HA-202303-121.html>

## Introduction

China's communication evolution has undergone distinct phases—sequentially encompassing "2G tracking," "3G breakthrough," and "4G synchronization." The emergence of 5G signifies the culmination of fifth-generation mobile communication technology. It derives impetus from the widespread adoption of intelligent devices and the swift growth of Internet technology, representing a comprehensive application that revolutionizes the landscape of traditional communication under the context of new dual-entry advancements.

## 1. Analysis of 5G Mobile Communication Technology

5G mobile communication technology has forged ahead since its inception. It maximizes the use of diverse resources, swiftly delivering information to users with its singularly fast transmission speed and efficient

resource utilization. In every aspect, it surpasses the capabilities of 4G, providing users with a distinct experience that ensures data security and efficiency. Moreover, it enhances user convenience across various domains and satisfies basic needs. Notably, 5G boasts unique advantages, excelling in both resource utilization efficiency and rapid data transmission. Indeed, an increasing number of users have extolled the dependability of 5G technology, leaving it ample room for growth and development across various sectors.

### 1.1 Enhanced Resource Utilization

While 4G technology has reached a relative maturity, its ability to efficiently utilize the array of resources it provides remains below 50%. The advancement of 5G technology opens avenues to delve deeply into high-frequency band resources, a pivotal aspect of mobile communication technology. This exploration aims to optimize the capacity of

high-frequency radio waves to penetrate, thereby significantly enhancing the quality and speed of mobile communication transmission. Meanwhile, 5G serves to improve communication technology security while preserving the capacity for penetration, which, in turn, fosters the integration of mobile communication technology with wireless broadband and optical cable technology.

### 1.2 Robust Systemization

Since the invention of mobile communication technology, the architecture of communication systems remains an indispensable part. As mobile communication technology advances rapidly, there is a mounting demand for sophisticated mobile communication systems. In the realm of 5G technology research, a focal point lies in the systematic transmission of communication data. The evolution of 5G technology transcends the confines of point-to-point transmission, adopting a more comprehensive approach that caters to users' information and data requirements. This involves proactive exploration of multi-plane, multi-faceted, and multi-point network transmission modes, thereby optimizing the entire mobile communication system under specific conditions.

### 1.3 Cost Efficiency

Distinct from the traditional long-distance transmission in mobile communication, 5G technology centers on indoor communication technology. It introduces a cost-efficient method for transmitting short-range information. This method ensures that the rate of short-range information transmission consistently approaches its peak, thereby achieving optimal short-range transmission effects. Additionally, to enhance the user experience of the mobile communication system, it facilitates seamless indoor network coverage, eradicating blind spots and limitations. The design concept of 5G builds upon the foundation of 4G, selectively inheriting and innovating upon its principles

to meet the soaring demands of modern mobile communication technology.

## 2. 5G Mobile Communication Technology Applications

### 2.1 Embracing Cloud Integration

The utilization of 5G technology has brought a profound impact, steering our lives into the realm of "cloud" which promises substantial enhancements in video playback rates. The concept of "cloud" will play an increasingly pivotal role in our daily existence. This transformative shift is poised to render the conventional hard disk storage model obsolete, making room for a massive influx of data into the cloud. The progression of 5G-powered cloud-based mobile content falls into two distinct stages: an evolution from central cloud architecture to edge cloud solutions, culminating in terminal cloud integration. In recent years, the proliferation of mobile terminals, particularly smartphones, has catalyzed a prominent surge in data volume within mobile networks, engendering diverse forms of data representation. Given the efficiency of 5G technology, the sheer amount of information generated by users can be systematically analyzed and processed, paving the way for tailored information services that enhance user experience. This, in turn, prompts mobile devices to evolve from being an extra resource into integral components of cloud infrastructure., ultimately shaping a more advanced, mobility-centric cloud computing paradigm.

### 2.2 Advancing Interaction Intelligence

The 5G technology, emphasizing efficiency, high throughput, and large-capacity data handling, significantly influence interactions across domains from artificial intelligence to unmanned vehicles. With a mere 1 millisecond latency, the technology's rapid responsiveness underpins applications such as augmented reality, virtual reality, telemedicine, and autonomous driving. The interconnectedness facilitated

by 5G network technology serves as the backbone for endeavors like smart cities, virtual reality gaming, and VR live broadcasts, all poised to revolutionize everyday lives. This interconnectedness transcends conventional devices like computers and mobile phones, extending to encompass pet collars, wearables, vehicles, surveillance cameras, locks, and home appliances. Furthermore, governmental and commercial institutions can leverage 5G to monitor pollution levels and traffic patterns in real-time, enabling timely parking solutions and immediate dissemination of pertinent information to the public. Integrating patients' vital signs with the Internet empowers doctors with real-time insights into their condition and lifestyle, fostering more proactive healthcare interventions.

### Conclusion

In summary, the mounting demands for advanced communication technology underscore the indispensable role that mobile communication technology holds in contemporary society's production and people's daily life. Presently, 5G technology remains in the research, development, and testing phase. For effective integration of 5G technology into production and daily life, it is

imperative for scientific researchers to consistently refine the technology's functionality and stability, ensuring its seamless alignment with the ongoing evolution of communication networks and optimizing the entirety of the communication network within the power grid. Given that the smooth operation of each communication network component is of paramount important, 5G technology will surely promote the holistic development of China's communication technology.

### References

- [1] Li Ge. Key technologies and development trends of 5G mobile communication in China[J]. *Science and Technology Communication*, 2016, 01: 157~158.)
- [2] Tang Zansong. 5G mobile communication technology application and exploration of its development prospect[J]. *China New Communications*, 2017, 01: 36.)
- [3] Wu Qiang. 5G mobile communication development trend and some key technology analysis[J]. *Education and Teaching Forum*, 2016, 22: 82~83.)
- [4] You Xiaohu, Pan Zhiwen, Gao Xiqi, Cao Shumin, Wu Hequan. Development trend and some key technologies of 5G mobile communication[J]. *Science China Information Science*, 2014, 44(05): 551-563.)