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A Comprehensive Review of 5G Wireless Network Evolution

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Abstract. Due to the demand for faster connections, the world's telecommunications companies are working together to improve fast connectivity. Thanks to fifth-generation (5G) wireless technology, devices such as smartphones, smart watches, smart homes and connected cars are increasingly connected to the internet. This is an exploration of a rapidly changing world. The cellular architecture of the industry must adapt to accommodate these changes. This study focuses on the design of 5G mobile networks and explores potential strategies that can improve infrastructure and meet customer needs. More importantly, this article highlights the importance of two key concepts in 5G: device-to-data (D2D) communications and multiple input multiplexing (MIMO) technology. Thanks to extensive research and the use of reliable online sources, the use of 5G e9 mobile networks is well established and developed.

Keywords: 5G Wireless Technology, Cellular Architecture, Connectivity Demand.


1 Introduction

The latest news in January 2022 says that 5G technology is a major breakthrough in wireless communications, providing faster speeds, lower latency and better connectivity than the pre-4G/LTE era. The emergence of new technology is not only interesting, but also important for understanding what will happen in the future. This research is part of the early development of the fifth generation of wireless communications equipment and technology known as 5G. 5G technology is gaining prominence in new applications and industries due to better, deeper and more powerful access. The main purpose of this article is to trace the development of this technology over the years and provide good and consistent evidence of its progress. We are exploring the field of technology development to update data analysis and mining techniques. This approach has proven useful in analyzing numerous published international reviews focusing on 5G.

5G-based telecommunication systems are designed to address challenges more effectively by leveraging the foundations laid by widespread use of 4G prototypes. While no single organization owns 5G, various companies within the mobile phone industry have made significant contributions to its development. Qualcomm, in particular, has played a pivotal role in introducing the foundational technologies that have propelled the industry forward, setting the stage for 5G as the next wireless standard.

South Korea is anticipated to lead the global deployment of 5G networks, positioning itself at the forefront of this technological advancement. Projections suggest that by 2025, 60% of mobile phone users in South Korea will be utilizing 5G networks. Notably, Huawei Technologies Co. has been identified in a recent study as holding essential rights to core aspects of next-generation 5G technology. Despite efforts by the Trump administration to exclude the technology from its supply chain, Huawei continues to provide financial support for the development of 5G.

Wireless systems employing broadband Orthogonal Frequency Division Multiplexing (OFDM) in the millimeter-wave spectrum (10mm to 1mm) ranging from 30 GHz to 300 GHz have the potential to deliver speeds of up to 20 Mbit/s at a distance of 2 km from the data source. The millimeter-wave band emerges as a promising solution that could support global network usage for wireless internet. Fig.1. below represents an introduction to 5G technology.


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