Chapter 20
Software Principles of 5G Coverage:
Simulator Analysis of Various Parameters

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ABSTRACT

5G NR (new radio) coverage tool is a software-based solution that helps network planners and engineers to analyze and optimize the coverage of 5G networks. The tool uses advanced algorithms and models to predict the 5G signal propagation and coverage performance in different environments and scenarios. It takes into account various factors such as the frequency band, the antenna configuration, the terrain, the building materials, and the interference from other sources. It provides a detailed analysis of the signal strength, quality, and throughput in different locations, enabling network operators to identify areas with poor coverage and take appropriate measures to improve it. It also allows network planners to simulate different deployment scenarios and optimize the network design for maximum coverage and capacity. The tool provides real-time feedback and visualization of the coverage performance, allowing engineers to adjust the network parameters and antenna configurations on the fly.

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INTRODUCTION

As wireless technology continues to advance, it's important for consumers to have access to tools that can help them determine the extent of wireless coverage in their area. 5G and 4G are two of the most popular wireless technologies, and there are a number of coverage tools available that can help consumers identify areas with 5G and 4G coverage. The fifth generation of wireless technology, or 5G, offers increased connectivity, faster upload and download speeds, and lower latency for a variety of applications. 4G, on the other hand, is the fourth generation of wireless technology and provides faster download and upload speeds than 3G. 4G is extensively available over the majority of the world, although 5G is still being deployed in many locations (Bhargava, M. et. al.,2018). To help consumers determine the extent of 5G and 4G coverage in their area, there are a number of tools available. Some tools are mobile apps that use crowd sourced data to create a map of wireless coverage, while others are web-based tools that rely on data provided by carriers (Chen, J. et. al.,2019). By using these tools, consumers can get a better understanding of 5G and 4G coverage in their area and make more informed decisions about their wireless service. It's important to note that while these tools can be helpful in identifying areas with 5G and 4G coverage, they may not provide a complete picture of coverage in all areas. Additionally, coverage can vary based on carrier, location, and other factors. It's always a good idea to check with your carrier directly to confirm 5G and 4G coverage in your area.

LITERATURE SURVEY

The literature survey have been showcase in the Table1.

5G AT A GLANCE

The newest mobile communication technology, 5G, has the potential to completely change how we use the internet. It is intended to provide enhanced network capacity, network slicing, lower latency, quicker internet speeds, improved network dependability, expanded network capacity, and support for extensive IoT installations. Users may anticipate download rates of up to 10 Gbps with 5G, which is much faster than the top 4G LTE speeds. Additionally, it is anticipated that this technology would offer lower latency, which translates into quicker reaction times and is appropriate for real-time applications like gaming and autonomous cars. Additionally, 5G technology is intended to have enhanced network capacity, which allows for simultaneous connections from more devices without degrading performance (Huang, Y. et. al.,2020)(Khan, I. et. al.,2019).

The more linked devices there are, the more crucial this enhanced capacity is anticipated to be. Better coverage and fewer lost calls are two other improvements that 5G dependability is anticipated to make. Network slicing allows for the network to be split up into various virtual networks in order to offer specialised services to various user types (Lee, J. et. al.,2022). The enormous IoT installations that 5G is intended to serve will allow millions of devices to connect to the network. Overall, 5G technology is anticipated to enable new applications and services that were previously not feasible with 4G LTE technology, leading to substantial changes in the way we use the internet (Liu, Y. et. al.,2020). Table 2 shows difference Between 4G and 5G.