

Chapter 2

Development of 5G and Smartphones

ABSTRACT

The global rollout of 5G in 2019 marked a turning point in mobile connectivity, offering enhanced bandwidth and ultra-low latency. This fueled rapid adoption of 5G-enabled devices, with 56 manufacturers introducing 129 models by year's end. These included smartphones, hotspots, and other equipment, showcasing 5G's wide-ranging impact. The launch of 5G-compatible chipsets played a key role, enabling high-speed, high-performance devices and paving the way for models like the Samsung Galaxy S20. 5G has since redefined mobile technology and expanded its role in consumer and industrial applications.

INTRODUCTION

The development of 5G technology has revolutionized telecommunications and redefined the role of smartphones in modern connectivity. Enhanced Mobile Broadband (eMBB) capabilities in 5G networks enable 10 times faster download speeds compared to 4G technologies.

As 5G networks began rolling out globally in 2019, the Global Mobile Suppliers Association (GSA) tracked the launch of 5 G-enabled devices, marking a critical milestone in the industry's transition. By the end of 2019, the number of announced 5G devices rose to 129 across 56 vendors, showcasing the rapid adoption and diversification of 5G applications. These devices spanned a variety of form factors, including smartphones, hotspots, customer-premises equipment, and dongles, underscoring the extensive possibilities offered by 5G technology.

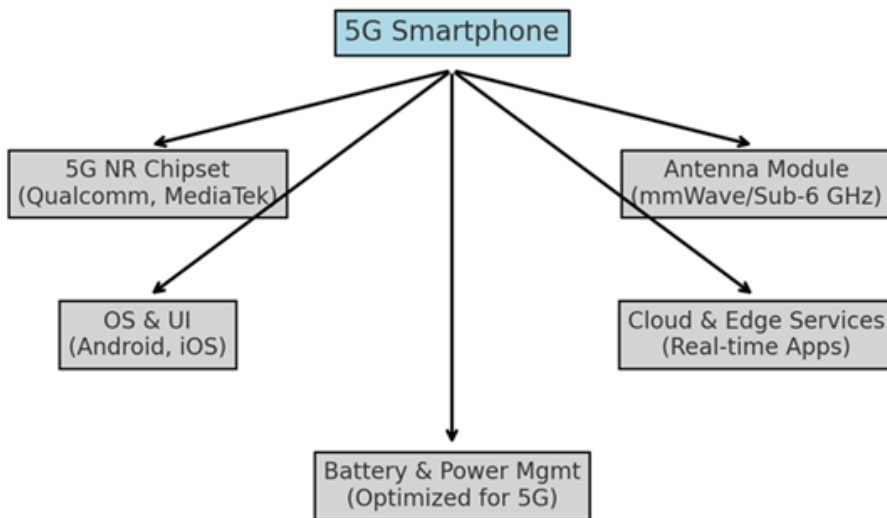
The introduction of 5 G-compatible chipsets also played a vital role in accelerating this evolution. At the start of 2019, four certified 5G modem chipsets were available, with more anticipated shortly. It enabled manufacturers to develop devices

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with unprecedented speed and capability. It laid the groundwork for flagship 5G smartphones, such as the Samsung Galaxy S20, which debuted in March 2020. Despite its premium price compared to its 4G predecessors, the device demonstrated the transformative potential of 5G for enhanced data speeds and low latency.

The development of 5 G-enabled smartphones has necessitated a redesign of hardware and software architectures to meet the performance and connectivity demands of next-generation networks. These devices integrate advanced chipsets, multi-band antennas, optimized battery systems, and seamless cloud interaction to enable real-time applications. Figure 1 provides an overview of the key functional components within a 5G smartphone ecosystem.

Figure 1. Architecture of a 5G smartphone and its supporting components



HMD Global further expanded the accessibility of 5G with the Nokia 8.3, which boasted broad compatibility with 5G bands from 600 MHz to 3.8 GHz. This midrange model highlighted how 5G technology became increasingly accessible to consumers, catering to diverse price points and geographic markets. As smartphones evolve alongside 5G networks, their role in driving innovation and connectivity across industries becomes ever more critical, paving the way for new applications and unparalleled user experiences. The authors argue that 5G technology can significantly enhance logistics operations by improving real-time data exchange, automating processes, and increasing overall system connectivity —essential components of modern supply chain efficiency (Lagorio et al., 2023).

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