

5G IS THE TECHNOLOGY OF THE NEAR FUTURE

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ABSTRACT: In this article, we will talk about 5G and its importance, and the features of 5G at a time when technology is evolving. The 5G cellular network will not only connect people, but also increase the ability to connect and control machines, objects and devices. It enables new productivity and efficiency that enhances new user experiences and connects new industries. 5G offers multi-Gbps high speed, ultra-low latency, massive capacity and the same user experience.

KEY WORDS: 5G, mmWave, HSPA, multi-Gbps, wireless communication.

INTRODUCTION: 5G is a new type of network: an innovative platform that not only improves today's mobile broadband services, but also supports a diversity of devices and services and connects new networks with improved performance, efficiency and new production value. 5G will redefine everything from wholesale services to retail to education, transportation to entertainment, and everything in between. We see 5G as a technology that is a transformer in automotive and electric power. By examining the economics of 5G, we found that the full economic impact of 5G will be realized worldwide by 2035, supporting a variety of industries and potentially generating up to \$12 trillion in goods and services. The study also projects 3.5 trillion in total revenue by 2035 by the 5G value chain (OEMs, operators, content creators, application developers and consumers). It was found to generate up to USD 100,000 in income and support up to 22 million jobs, or several jobs per person. Beijing, China. Of course, there are many new and emerging applications that are not yet fully identified or even known. Therefore, only time will tell what the "5G effect" will be.

MATERIALS AND DISCUSSION: According to the requirements of IMT-2020, 5G is expected to transmit speeds of up to 20 Gbps. Qualcomm Technologies' first 5G NR modem, the Qualcomm® Snapdragon™ X50 5G modem, is designed to achieve low-speed data transfer rates of up to 5 Gbit/s. But 5G isn't about how

"fast" it is. In addition to higher data rates, 5G will also provide more network capacity by expanding into new spectrums such as millimeter wave (mmWave). 5G also provides much lower latency for fast response times and an overall uniform user experience, so that even when users are moving faster, data transfer speeds are consistently high. In addition, the new 5G NR (New Radio) mobile network is supported by the Gigabit LTE coverage fund, which provides full Gigabit-class connectivity. In general, 5G use cases can be broadly classified into three main types of connected services:

Enhanced mobile broadband: 5G will not only improve our smartphones, but also enable new immersive experiences such as VR and AR, with faster, more uniform data rates, lower latency and cost per bit. Mission-critical communications: 5G will enable new services that transform networks with highly reliable/available, low-latency communications, such as remote control of critical infrastructure, vehicles, and medical procedures. Internet of Things: 5G will seamlessly connect a huge number of embedded sensors in almost everything, which will reduce data transfer speed, power and mobility, and offer very cheap / low-cost solutions. A defining capability of 5G is also design for forward compatibility – the ability to flexibly support future services that are unknown today.

Like 4G LTE, 5G is OFDM-based and operates on the same cellular network principles. However, the new 5G NR (New Radio) air interface further enhances OFDM to provide a higher degree of flexibility and scalability. To learn more about the 5G waveform and multiple access methods, refer to this 5G waveform white paper. 5G will not only provide faster and better quality mobile broadband services compared to 4G LTE, but it will expand into service areas such as connecting critical communications and the massive IoT. This includes new 5G NR air interface design techniques, such as new TDD sub frame design; to learn more about 5G and understand specific 5G NR design components, refer to this 5G NR white paper. 5G should be available in 2019. 3GPP (3rd Generation Partnership Project, the standards office that will help define 5G) has decided to accelerate the initial phase of 5G NR (New Radio) - a new global 5G standard. 2019 year. It is important to note that the initial 5G NR deployment will be used to increase the availability of enhanced mobile broadband (eMBB) and provide a high-speed mobile broadband experience (faster speeds, lower latencies, etc.). As with previous generations of mobile networks, the new 5G network will take time to scale. 4G LTE will continue to grow and will serve as the forerunner of the 5G (multilink) mobile experience by providing Gigabit data rates beyond the reach of 5G cellular for many years to come. The main task of 5G is to lower the bit cost (cost of data) compared to 4G LTE, by using higher and higher bands in mmW wavebands. This may allow mobile operators to continue to offer unlimited data plans, or even increase data usage. It can also create new use cases and make more practical applications economical for wider adoption in 5G. For example, 5G will help augment immersive augmented and virtual reality, which is possible today with 4G LTE, but may be limited by network capacity and data costs. 5G is being managed by 3GPP, the standards body that oversees the development

of 3G UMTS (including HSPA) and 4G LTE standards. 3GPP is a group of companies across the mobile ecosystem working on 5G. These range from infrastructure vendors and component manufacturers to mobile operators and vertical service providers. Qualcomm Technologies is at the heart of 3GPP, leading many important innovations in all aspects of 5G design, from the air interface to the service layer. We expect the impact of 5G to be far greater than that of previous network generations. The development requirements of the new 5G network are expanding beyond traditional mobile operators to industries such as the automotive industry. Because of this, 3GPP is seeing an increase in new members that cross different industries. Close cooperation between 3GPP members is necessary to make 5G a reality. While 4G LTE aims to provide faster mobile Internet services than 3G, 5G is designed to be a unified and more capable platform that will not only enhance the mobile broadband experience, but also support critical communications and the massive IoT, also supports new services such as 5G also includes all types of spectrum (licensed, shared, unlicensed) and broadband (low, medium, high), wide deployment models (from traditional macro cells to hotspots), as well as new interconnection methods. (eg) supports. as a device-to-device and multi-hop network).

5G Wi-Fi is not that thing. 5G is a new generation of mobile technology defined by 3GPP (3rd Generation Partnership Project) - a standard organization that has neglected the development of 3G UMTS (including HSPA) and 4G LTE standards. Wi-Fi is defined/standardized by IEEE and promoted/validated by Wi-Fi Alliance, not 3GPP. A 5G user can use 5G, 4G and Wi-Fi seamlessly because 5G is interoperable with 4G and Wi-Fi, allowing the user to use 5G New Radio (NR), LTE or Wi-Fi at the same time, allows you to connect. Like Wi-Fi, 5G NR is designed for unlicensed spectrum without requiring access to licensed spectrum, allowing more enterprises to deploy 5G and enjoy the benefits of 5G technology.

In this age of technology, we are seeing a new variation of new development every day. The impressive momentum we're seeing, especially in communications technology, is amazing. And that's where 5G comes into play. But before we dive into the topic, we first need to understand what 5G is. So, without any further delay, let us better understand 5G, 5g network and 5G technology with this 5G guide. 5G is basically the 5th generation of Cellular Network. A cellular network is a global wireless communication standard by which we communicate around the world. And this is a next-generation network that allows you to connect with almost everything in the world, as well as various devices, objects and more. The 5G array plans to use a technology called MIMO. It uses something called radiation, although it usually produces noise. With beamforming, you can direct the signal in the direction of the receiver instead of spreading the signal. And when combined with the high-frequency waves that 5G uses, this technology means that no one can achieve speeds that anyone ever thought possible for a wireless network. 5G is undoubtedly one of the biggest investments for the coming years. This technology began its progress in the next phase of 2018. Not only does it improve the speed department, but it connects billions of devices worldwide with the perfect balance of speed, cost and latency. Now that we know what 5G

technology is in our 5G guide, let's see how it works. First, let's talk about its spectrum. Just like 4G LTE, 5G technology uses a wide range of radio spectrum allocations, but is capable of operating in a wider range than current networks. The most common form of 5G is Sub-6 and mmWave.

U-6 refers to 5G operating at frequencies below 6 GHz. All carriers have some form of Sub-6 network, as previously 4G LTE operated at these lower frequencies. For example, T-Mobile has 600 MHz of low-band spectrum and 2.5 GHz, formerly owned by Sprint, are both used for 5G. The sub-6 spectrum is critical to the rollout of 5G, as these lower-frequency radio waves can travel long distances and penetrate walls and obstacles. This means that carriers can deploy much larger networks without having to build hundreds of cells in each city. mmWave (millimeter wave), which refers to ultra-high frequency radio waves 30Hz and 300Hz, used to charge 5G connections and provide download speeds of several gigabits per second. Initially, Verizon relied solely on mmWave for its 5G network, but the carrier has now started rolling out Sub-6 networks as well. Although mmWave connections provide fast download speeds, high-frequency radio waves cannot travel long distances and cannot pass through obstacles - in most cases, even a window or a leaf on a tree can block the connection. This means that to build a robust mmWave network, carriers need hundreds or thousands of small network cells in each city. In fact, mmWave network deployment often requires the construction of small networks in every corner of the building. So why bother? MmWave can handle large amounts of data and large numbers of users at the same time. This makes it better for densely populated cities, as well as places like stadiums and arenas.

CONCLUSION: All major carriers are deploying mmWave networks, but so far these high-speed connections have been limited to a few urban centers in major cities. MmWave networks are expected to become more powerful, but only time will tell. With 5G, base stations must support speeds of 0 to 310 mph. This means that the base station has to work on the development of the antenna, even on a high-speed train. While effective in LTE organizations, such mobility may be a challenge in newer mmWave organizations.

REFERENCES:

1. ETSI — GTS 08.08-EXT GSM 08.08 European digital cellular telecommunications system (Phase 1) BSS-MSC — Layer 3 specification 1996–1998
2. Андреев, В.А. Направляющие системы электросвязи. В 2 т. Т. 2.
3. Чекалин А.А. и др. Защита информации в системах мобильной связи. Учебное пособие, -2-е издание. М.: Горячая линия, 2005, 171с.
4. Sadullaeva S. A. et al. Analysis of Detection and segmentation of Uterine fibroids between uzbek women //NeuroQuantology. – 2022. – Т. 20. – №. 10. – С. 83.
5. Muazzam A. Image squeezing by the wavelet squeezing //International Journal of Innovative Technology and Exploring Engineering. – 2019. – Т. 8. – №. 11. – С. 3705-3707.