iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 10 **Issue:** XII **Month of publication:** December 2022

DOI: https://doi.org/10.22214/ijraset.2022.48118

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 10 Issue XII Dec 2022- Available at www.ijraset.com

5G: Overview, Challenges and Benefits

Jadhav Akshay Arjun[1], Mali Kiran Kishor[2], Prof. Snehal Jadhav[3], Prof. Shweta Thorat[4]
[1, 2, 3,4]*Department of MCA Yashoda Technical Campus, Satara, Maharahtra, India*

Abstract: 5G Is a advances technology in world around us but also dynamic the wireless industry to develop the next generation of network technology. December 1, 2018, South Korea became the first country to offer 5G.5G is a high frequency band and different device support are 5G.5G main advantages is high speed and effective and efficiency technology.5G is wireless backhaul connection or high bandwidth optical fibber.
Keywords: 5G introduction, Challenges , Advantages, Services, Which Country Will Be the First to Adapt?, Overviews

I. INTRODUCTION

5G is the fifth generation network system. Advanced wireless technology introduced in 2019. 5G networks are also known as digital cellular networks, and this technology offers very low latency rates (the delay between sending and receiving information). From 200 milliseconds for 4G to 1 millisecond (1 millisecond) for 5G. His first 5G network was launched in South Korea in April 2019. When South Korea launched devices used by Samsung, Ericsson and Nokia base stations and all carriers, it also accepted Huawei devices for LGU Plus.

5G has different use cases. B. IoT communications, video, control and automation, fixed wireless access, high performance edge analytics, etc. 5G is the most dynamic and flexible generation of mobile connectivity ever. Remotely controlled heavy machinery with 5G technology. 5G technology will change services and communicate with and control other devices.

5G development work continues. This is done in his two phases. In the first phase, many universities and companies (mainly in Europe, Japan, South Korea, and the United States) will cooperate and concentrate on research activities. The second phase focused on defining ideals and implementing technology.

II. LITERATURE REVIEW

1) 5G Communication: An Overview of Vehicle-to-Everything, Drones, and Healthcare Use-Cases, (Published by HANIF ULLAH 1, NITHYA GOPALAKRISHNAN NAIR1, ADRIAN MOORE1, CHRIS NUGENT1, PAUL MUSCHAMP2) UND MARIA CUEVAS2) March 18, 2019 – His/her research study states that 5G information and different 5G use cases are highlighted in three major case studies. Next were V2X communications, drones, and healthcare. V2X communication, drones, healthcare, ultra-low latency, ultra-reliability.
2) Benefits and Challenges of Software-Defined Satellite 5G Communications in 2019 (Hamzeh Khalili, Pouria Sayyad Khodashenas, Carolina Fernandez, Daniel Guija, Joe Cahill, Robert King, Mark Kavanagh) – In his/her research study, 5G Technology based on the H2020 work project presents some challenges and solutions for integrated satellite systems for terrestrial 5G networks.
3) 5G-Key Capabilities & Applications (IN Division, TEC K.L. Bhawan, Janpath, New Delhi), March 2019 – In his / her research, he mentioned 5 G: overview, use cases, 5 G technology and spectral requirements, etc.
4) Setting the stage for 5G: Opportunities and Challenges (Martin Adolph, Denis Andreev, Cristina Bueti, Tatiana Kurakova, and Hiroshi Ohta) 2018 – In his / her research study, he co-cites 5G: Opportunities & Challenges. did. The ITU Standardization and Radiocommunications Bureau was created.
5) Survey on 5G Cellular Technology, 21 June 2018 (V. Samthira Pandey, J. Lakshmi Priya) – In her research, the main purpose of this paper is to conduct a comprehensive survey on 5G cellular technology. said to do. Future trending work will address 5G.

III. CHALLENGES

A. Frequency Bands

5G is the fifth generation wireless system. 5G is an enhanced network that will be rolled out in 2019 and beyond, and may use the existing His 4G or newly designated His 5G frequency bands for operations. 5G is a number of key technologies such as: The mm waVe band is 5G and offers up to 20 Gigabits per second of performance. There are three types of frequency bands: low frequency band, high frequency band, and millimeter wave.

©IJRASET: All Rights are Reserved

B. Device Support

5G smartphones and other devices are used. South Korea and Japan have already rolled out his 5G in some cities, and the manufacturer has confirmed that compatible phones will launch in his 2019. Various devices are used: 5G Samsung Galaxy S10, Samsung Galaxy Note 10+, Oppo Reno, OnePlus 7 Pro, etc.

C. Security and Privacy

5G is a large amount of data stored, and this data security is an important part of 5G. Questions still remain about the network power of 5G's advanced computing and technology, and how it will address critical security and privacy issues. To make 5G a viable and "secure" technology, the security of this technology is critical. 5G will have to define the ambiguity surrounding security threats spreading around the world, including trust, privacy and cybersecurity.

D. Shorter Range

5G is not 100% perfect. As with all wireless networks, ranges vary greatly from city to city. 5G will face different challenges in areas with high buildings and trees, and will be connected to other devices. With 5G technology, carriers plan to use "small cells". H. A mobile phone antenna or radio the size of a backpack. Citizens of Oakland, California are concerned about the medical benefits of small cell antennas and the artistic look they bring to the community.

E. Multiple Services

5G will provide multiple services such as radio signal services. 5G presents significant challenges in serving heterogeneous networks, technologies, and devices operating in different geographic regions. Therefore, the challenge of 5G is to deliver dynamic, universal, user-centric, data-rich wireless services to meet people's high expectations.

IV. ADVANTAGES

5G is primarily aimed at enabling many new use cases that are faster, more efficient and effective.

A. Higher Speeds

5G devices can reach over 10 Gbps, almost 1,000 times faster than 4G devices. Ultra-fast mobile communications will continue to make media usage more personal, flexible and versatile. For example, multiple people can access the Internet on her mobile at the same time. You can download an average HD movie in about 25 hours on 3G, less than 10 minutes on 4G, and less than 4 seconds on 5G. This is a key advantage of his 5G.

B. Efficient & Effective

5G will work more effectively and efficiently than other networks. 5G will offer higher speeds, lower latency, better quality, and wide bi-directional bandwidth shaping. 5G will bring a variety of new technologies such as wireless virtual headsets and remotely controlled cars. 5G delivery is much more accessible and easier.

C. Many New Use Cases

5G has many applications and many use cases such as IoT communication. 5G's aggressive capacity expansion will allow more devices to be connected. Videoconferencing is already working on his current 4G network, but much is often desired, but the 5G network offers the clearest and most effective video communication. The main case for 5G is control and automation. Improved speed, latency and capacity means improved robotics, manufacturing control and warehouse automation through shorter cables and greater flexibility, leading to increased competitiveness and shorter lead times.

V. 5G SERVICES

A. 5g Home Service

First, 5G home service will begin in the United States on October 1, 2018. Verizon's 5G Home service is a fixed 5G wireless access service with an average speed of 300 Mbps and a maximum speed of 1 Gbps, with unlimited data usage and no data cap. There are no annual contract offers. No 5G home internet, no long term contracts, equipment or installation fees, all taxes and fees are included. Various perks include 5G home service home with ultra-fast Wi-Fi, favorite prices, free TV and more.

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

5G home internet service with normal speed around 300 Mbps and maximum speed up to 940 Mbps depending on location. 5G will use multiple streaming devices. 5G Home Internet can be selected from any of the following devices:

1) Apple TV
2) Verizon Stream TV
3) Amazon Fire Stick
4) Amazon Fire Cube

B. AT&T 5g Service

AT&T stands for "American Telephone & Telegraph" AT&T 5G Service, which means 5G cellular service will launch in 12 US cities on December 21, 2018. 5G service was rolled out in 12 cities in April 2019, with 7 more cities turning on lights (the first 12 cities include Atlanta, Charlotte, Dallas, Houston, Indianapolis, Jacksonville, Louisville, Oklahoma City, , New Orleans, Raleigh, San Antonio and Waco)). The seven additional cities include Austin, Los Angeles, Nashville, Orlando, San Diego, San Francisco and San Jose). AT&T plans to offer at least three 5G handsets by 2019.

C. 5G Mobile Service

5G is the largest mobile service being deployed. 5G cellular systems will offer a much higher level of performance than previous generation cellular systems. 5G cellular will offer three main services. These are in addition to mobile broadband, ultra-reliable low-latency communications, and large-scale machine-type communications.

VI. 5G TECHNOLOGY: WHICH COUNTRY WILL BE THE FIRST TO ADAPT?

A. South Korea

The first 5G network launched by South Korea. 5G Cellular Network Hyperwired South Korea has long been known for its technological prowess, and Seoul has made her 5G deployment a priority to spur sluggish economic growth. Along with the United States, China and Japan, South Korea was vying for the title of becoming the first company to deploy a nationwide ultra-high-speed network. As of mid-June 2019, his 5G subscribers in South Korea surpassed his 1 million. Samsung, Ericsson and Nokia base stations and devices used by all carriers are also compatible with his Huawii devices in LGU Plus.

B. Japan

Japan's goal is to roll out 5G cellular service in 2020.

C. China

China's largest 5G network will have lunch on October 31st. China Mobile, China Unicom and China Telecom all activated their networks within five months of getting their 5G licenses. He is projected to use 5G by 2025, with 36% of China's mobile phone users. This equates to around 600 million subscribers, which will represent 40% of the total 5G market inclusive by this year.

D. Germany

According to federal government plans, 99% of German customers should have access to 5G by 2025. In 2019, Vodafone Germany and Deutsche Telekom Germany launched their 5 G service in multiple cities. Germany is one of the world's pioneers in the civil use of 5G. This is where you lay the groundwork for disruptive change. Local frequencies have allowed businesses to set up their own networks from day one. Traditionally, businesses have relied on carriers. That's a big step forward ...

VII. OVERVIEW

5G networks are also known as digital cellular networks, where the coverage area covered by a provider is divided into smaller geographical areas called cells. 5G is a wireless device that operates on radio waves using local antenna arrays and low-power automated transceivers.

When communicating within a cell, the local antenna is connected to the telephone network and also to the Internet via a high-bandwidth fiber optic or wireless backhaul connection.

In December 2019, 5g T-Mobile USA and AT&T will launch low band. Once the 5G system is fully developed and has access to more shipper frequencies, the performance, capabilities and costs will be similar to his 4G in the same band. 5G can support millions of devices per square kilometer, while 4G can only support up to 100,000 devices per square kilometer.

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

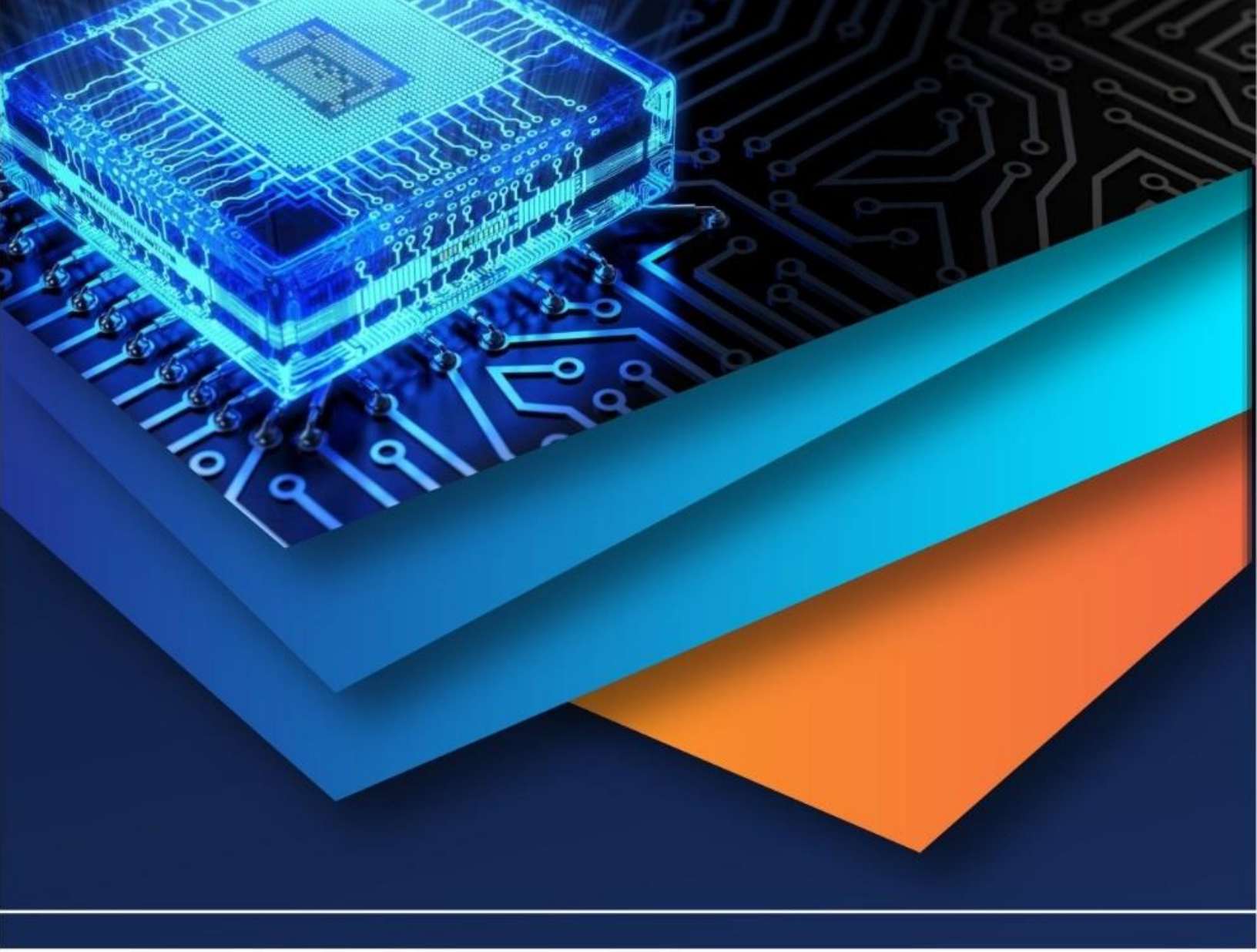
VIII. CONCLUSION

This document provided 5G information and various 5G challenges such as frequency bands, device support, security and privacy, reduced range, and multiple services. The main objectives of 5G are to enable higher speeds, efficiency, effectiveness and many new use cases. 5G is being deployed in various services. B. Home Service, AT&T 5G Service, 5G Cellular Service. The first four countries to deploy 5G on a large scale were South Korea, Japan, China and Germany. Also, all his 5G networks are digital cellular networks. 5G is the most dynamic and flexible generation of mobile connectivity ever, powered by Steam native apps and Core.

REFERENCES

[1] HANIF ULLAH 1, NITHYA GOPALAKRISHNAN NAIR1, ADRIAN MOORE1, CHRIS NUGENT1, PAUL MUSCHAMP2 UND MARIA CUEVAS2, "5G Communications: An Overview of Use Cases for Everything from Vehicles, Drones, and Healthcare, " March 18, 2019.
[2] Hamzeh Hariri, Apulia Sayyad Kodashenas, Carolina Fernandez, Daniel Guija, Joe Cahill, Robert King, Mark Cabana
[3] FN-Abteilung, TEC K.L. Bhawan, Janpath, New Delhi „5G-Key Capabilities & Applications " I'm Marz 2019.
[4] Martin Adolph, Denis Andreev, Cristina Bueti, Tatiana Kurakova und Hiroshi Ota „Setting the Scene for 5G: Opportunities & Challenges" im Jahr 2018
[5] V. Samthira Pandey. J. Lakshmi Priya, 5G Mobile Technology Research, 21 Jun 2018,
[6] Toni Janevski, 5G Cellular Concepts.
[7] Monica Daga" https://dzone.com/articles/5g-is-coming-an-overview-of-the-advantages-amp-cha" in 24 march 2018. ·
[8] https://en.wikipedia.org/wiki/5G
[9] https://www.brainbridge.be/news/from-1g-to-5g-a-brief-history-of-the-evolution-of-mobile-standards
[10] https://5gobservatory.eu/market-developments/5g-services/ in July 2019.
[11] https://www.qualcomm.com/invention/5g/what-is-5g
[12] Hussain Kanchwala"https://www.scienceabc.com/innovation/what-is-5g-wifi-technology-wireless-network-internet.html"in 27 Oct 2018
[13] https://5g-ppp.eu/history/
[14] https://communityphone.org/blogs/news/the-history-and-future-of-5g-networks
[15] https://www.investopedia.com/articles/markets-economy/090916/5g-technology-which-country-will-be-first-adapt.asp

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)