Industrial Engineering Journal
ISSN: 0970-2555
Volume : 53, Issue 4, No. 3, April : 2024

AN OVERVIEW OF WIRELESS COMMUNICATION NETWORK

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Abstract: Communication systems can be either wired or wireless, and guided or unguided mediums are available for use. Coaxial cables, twisted pair cables, optical fiber links, and other physical paths are examples of the medium used in wired communication which directs the signal's propagation from one point to another. We refer to this kind of media as guided Medium. The term "wireless" describes information transfer or communication that occurs over a distance without the use of cables, wires, or other electrical conductors. One of the key means of sending data or information to other devices is wireless communication. Without the need for cables, the communication has been established and the data is sent by electromagnetic waves such as satellite, infrared, radiofrequencies, etc. Inelectromagnetic waves, suchas satellite, infrared, radiofrequencies, etc., are used to establish communication and transfer data via the air without the need for wires.

Keywords:
Wireless communication, WPAN, WLAN, WMAN,WWAN

I. Introduction

Now-a-days, wireless connectivity is crucial. Apart from that, wireless technology has become an essential component of our everyday lives. Wireless communication is the term used to describe the transfer of information or data wirelessly from one location to another. This uses radio waves and RF to transfer data without the need for a conductor. Through clearly defined channels, the data is transferred between the devices over distances ranging from a few meters to hundreds of kilometers. Theabsence of wires in communication is referred to as wireless. Antennas are required for wireless communication in order to send data or voice. The apparatus that connects audio frequency energy from one medium such as a wave guide, transmission line, etc. to another such as air is known as an antenna. Two systems are needed, viz. To finish an end-to-end wireless link, send and receivesignals. Electromagnetic waves arethe mediumtofinished in wireless communication to transport the data transferred between the transmitter and the receiver over the channel. The revolution in cellular communication is delivering significant advancements in data networking, telecommunication, and the realization of integrated networks. Personal communications networks, by releasing the user from the cable. Fully distributed mobile computing and communications are promised by wireless LANs, mobile radio networks, and cellular systems, anytime, anyplace. Wireless Networks, which focuses on the networking and user components of the discipline, offers a global venue for archival value contributions that document these rapidly expanding fields of interest. The journal provides peer-reviewed articles on research, practice, and management concerns related to wireless networks. Its goal is to make the reader's experience, issues, and solutions understandable. The mainadvantage of mobility is wireless communication. Wireless communication is becoming moreand morepopular everydayduetoits portability, flexibility, andconvenience of use. Mobile phone calls and other wireless communications can be made at any time and from any location with a remarkably high throughput performance [2, 3]. Infrastructure is an additional crucial point. It takes a lot of money and effort to set up and deploy the infrastructure for wired communication systems. Installing the wireless communication infrastructure is a simple and affordable process. Wireless communication is apractical choice in emergency scenarios and remote areas where conventional connection setup is challenging.

II. Wireless Communication

In 1888, Heinrich Herz made the discovery of radio waves, and by 1894, the contemporary method of transmitting a message over telegraph wires was initially carried out. Marconi used radio waves to

send and receive signals up to two miles away. Marconi earned the title "father of radio" over time. By 1899, Marconihad sent signals to Francethat were nine miles across theBristol Channel and thirty-one miles over the English Channel.He succeeded in sending signals across the Atlantic Ocean in 1901. The United States Army was the first to transmit data via radio waves during World War II. This prompted a team of University of Hawaii researchers in 1971 .ALOHNET was the first radio communications network based on packets. The first wireless local area network (WLAN) was called ALOHNET. Seven PCs used a bi-directional star topology to interact with one another in this initial WLAN. WLAN technology was first developed using an unlicensed spectrum (902–928 MHz ISM), which subsequently become congested due to interference from industrial machinery and small appliances. To reduce this interference, a spread spectrum operating at 500 kilobits per second was employed. With a speed of 2 Mbps per second, the second generation of WLAN technology was four times quicker than the first. Operating on third-generation WLAN technology The 802.11 Working Group was founded in 1990 by the IEEE 802 Executive Committee in order to develop a standard for wireless local area networks, or WLANs. Theguidelines providedan operational frequencyintheISM bandof 2.4GHz. 1997 saw the group accepted IEEE 802.11, the first WLAN standard in history with 1 and 2 Mbps of data speed.

2.1.NetworksofWireless Personal Areas

A wireless personal area network (WPAN) is a type of short-range personal wireless network used to link gadgets that are exclusive to a person's workspace. WPANs are used for wireless Networking and mobile computer devices, including PDAs, PCs,cellphones, pagers, peripherals, andconsumer electronics. Another name for WPANs is short wireless-distance networks.Infrared (IR) and Bluetooth (IEEE 802.15) are the two technologies used currently for wireless personal area networks. These will enable personal devices to be connected within roughly thirty feet of one other. Nevertheless, the range of IR is shorter and it needs a direct line of sight.

Figure 1. WPANs.

2.2 Wireless Local Area Networks, or WLANs

WLANS enableusers tocreatenetworks or obtainaccess tothe local area networkina local area, like a library or university campus online. If there is no requirement for an access point, a small group of users can create a temporary network without requiring access to network resources. It installs a versatile data communication system that frequently enhances cable LANs on campuses or buildings rather than replacing them. WLANs reduce the requirement for wired connections by transmitting and receiving data over the air using radio frequency. Wireless local area networks, or WLANs, are a means of distribution for two or more high- frequency radio-using devices, which frequently have an Internet access point included. With a WLAN, users can roam around the service area—typically a house or small office—while still staying connected to the network. [5]

2.3 Wireless Metropolitan Area Networks, or WMAN

This technology makes it possibletojoinseveral networks inacity, suchas thoselocatedin separatebuildings, It can serve as a backup plan or substitute for installing fiber or copper wiring. Wireless Local Loop (WLL) is another name for a Wireless Metropolitan Area Network (WMAN).WMANs are built upon the IEEE 802.16 specification. Local loop wireless technology can

especially helpful to telecom businesses, reaching effective transfer speeds of 1 to 10 Mbps within a 4 to 10 kilometer range.

2.4 Wireless Wide Area Networks, or WWANS

These kinds of networks can be kept up over vast regions, cities or nations, using several satellite systems or internet service provider-managed antenna locations.

Figure 2. WMANs.

2G (2nd Generation) systems are the name given to these kinds of systems. WWAN technologies are divided into three families: GSM/UMTS, CDMA One/CDMA 2000, and WiMAX. Service providers in the US include AT&T, Verizon, Sprint, andClear wire. Theavailabilityof wireless WAN services is anticipatedtogrowas4G technologies advance.

2.4Networks of Cells

Amobileor cellular networkisa wireless networkthat isdispersedover cells, or landareas, and is connected to at least one one fixed-location transmitter, sometimes referred to as a base station or cell site. In a cellular network, in order to prevent interference and ensure bandwidth inside each cell, each cell employs a separate range of frequencies from adjacent cells. These cells can cover a large geographic region with radio coverage when connected together. This makes it possible for a large number of porfigur transceivers (such as cell phones, pagers, and other devices) to communicate via base stations with fixed transceivers, telephones, and each other anywhere in the network, even when some of the transceivers are moving through multiple cells while transmitting [6].

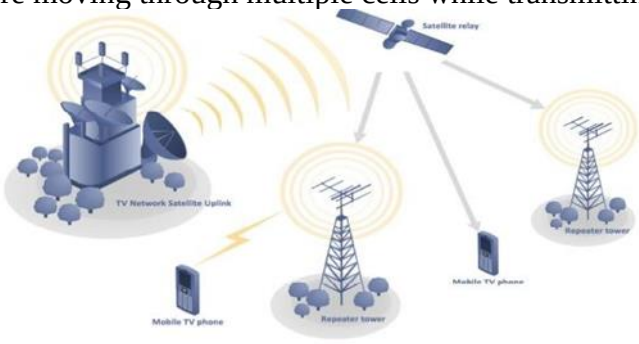

Figure 3. Wireless Cellular Network.

2.5 Virtual Private Network, or VPN

Aprivatenetwork can beextended across a public network, liketheInternet, using a virtual privatenetwork, or VPN. It permits a utilizing the functionality, security, and administration guidelines of the private network, a computer or network-enabled device can send and receive data across shared or public networks as if it were directly linked to the private network. By using dedicated connections, virtual tunneling protocols, or traffic encryptions to build a virtual point-to-point connection, a VPN is built. Principal IPsec and Open VPN are two examples of VPN implementations.

III. Fundamental Components of a Wireless Network

Industrial Engineering Journal
ISSN: 0970-2555
Volume : 53, Issue 4, No. 3, April : 2024

Typical Wireless Communication Systemsseparated into three parts: the receiver, the channel, and the transmitter. The wireless communication system's block diagram is displayed in the picture below.

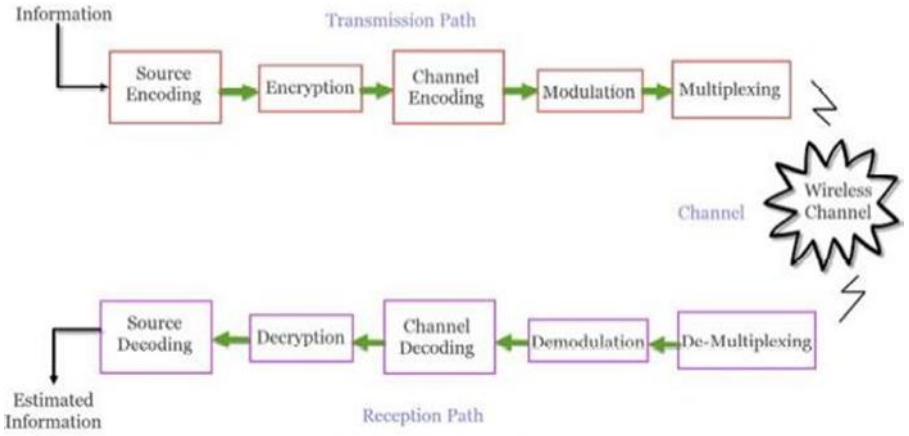

Figure 4. Block diagram of WCS.

3.1. The Route of Transmission

A wireless communicationsystem's usual transmission pipelineconsists of an encoder, encryption, modulation, and The multiplexing process. A Source Encoder receives the signal from the source and transforms it into a format that may be used with signal processing techniques.In this technique, the redundant information from the signal is eliminated to optimize resource utilization. After that, this signal is encrypted using an encryption standard to protect both the data and the signal from unwanted access. One method used to lessen signal impairments likenoise, interference, etc. is channel encoding. Atinybit of redundancyis addedthroughout this operation tothesignal to makeit moreresistant to noise. Subsequently, thesignal undergoes modulation by an appropriate modulation technique (e.g., PSK, FSK, QPSK, etc.) to facilitate its antenna-based transmission [7]. In order to share the valuable bandwidth, the modulated signal is then multiplexed with other signals using various multiplexing techniques, such as frequency division multiplexing (FDM) or time division multiplexing (TDM).

3.2. The Path

In wireless communication, the channel denotes the signal's transmission medium, which is open space. The wireless channel exhibits great variability and unpredictability. varied and haphazard in character. Interference, distortion, noise, dispersion, and other factors can cause a channel to The transmission that was received can contain mistakes.

3.3 The Way of Reception

Gathering the signal from the channel and reproducing it as the source signal is the receiver's responsibility. The steps in a wireless communication system's journey are source decoding, channel decoding, decryption, demultiplexing, and demodulation. It is evident from the elements of the reception path that the receiver's job is just the opposite of the transmitter's. The Demultiplexer receives the signal from the channel and separates it from other signals. The original message signal is recovered once each signal is demodulated using the proper demodulation techniques. The Channel Decoder is used to eliminate the unnecessary portions of the communication. Decryption of the signal eliminates the security and reduces the message to a basic bit sequence because it is encrypted. Ultimately, the Source Decoder receives this signal to return the initial signal or message that was broadcast [8, 9].

IV. Wireless Communication Types

The various forms of wireless communication mostly consist of Bluetooth, Zigbee, broadcast radio, satellite communication, broadcast radio, microwave radio, and infrared communication.

4.1. Transmission by Satellite

One form of independent wireless communication technology that isextensively used worldwide to enable users to stay connected practically anywhere on the planet is satellite communication. When

the signal is a modulated beam of microwave) is transmitted closeto thesatellite, which then amplifies thesignal and sends it back to the earth's surface antenna receiver. There are two primary parts to satellite communication: the ground segment and the space segment. The space section, which mostly consists of the satellite itself, and the ground segment are made up of stationary or mobile transmission, reception, and auxiliary equipment.

Figure 5. Satellite Communication.

With their robust broadcasting equipment, emergency communication aids during disasters and can even transmit digital information via radio frequency spectrum.

Figure 6. Broadcast Radio Studio.

Radio is primarily an audio transmission service that uses radio waves to transmit sound through the atmosphere. Utilizinga transmitter,radiotransmits data intheformofradiowaves to various types ofantennas, which receive them. In order to transmit shared content, radio N/Ws are linked to stations. The broadcast takes placevia syndication, simulcast, or both. Satellites, the internet, and cableFM arethethree ways that radio can be broadcast. A broadcast (AM/FM radio) transmits data across large distances at up to two megabits per second. [11] Electromagnetic signals, or radio waves, are sent out by an antenna. These waves consist ofentirelydistinct frequencysegments, thus you'll beable toget byswitchingintoa frequencysectionof anaudio signal.

Figure 7. Radio.

Take a radio station, for instance. When the RJ says, "You're listening to 92.7 BIG FM," what he really means is that thestation's transmitter is periodic, operatingata frequencyof 92.700,000cycles per

second. Signals are being broadcast at 92.7 megahertz. All you need to do to enjoy flawless audio reception when listening to 92.7 BIG FM is adjust the radio to just accept that particular frequency.

4.2 Transmission by Microwave

Effective communication can be achieved by microwave wireless transmission, which primarily uses radio waves with wavelengths expressed in centimeters. There are two ways that information or data can be transferred in this communication. There are two types of methods: satellite and terrestrial With the satellite approach, information can be sent via a satellite orbiting 22,300 miles above the planet. Earthly stations use a satellite to transmit and receive data signals. having a frequency between 11 and 14 GHz and a transmission speed between 1 and 10 Mbps. In the terrestrial approach, there are no obstructions to obstruct the line of sight between thetwo microwavetowers that areused. For this reason, privacy is the main reason it's employed. The terrestrial system's common frequency range is 4GHz–6GHz, and its typical transmission speed is 1Mbps– 10Mbps. The primary drawback of microwave communications is their susceptibility to inclement weather, particularly rain.

4.3 Wireless

A low power wireless communication technology utilized by many electronic devices, including computers and smart phones, is called Wi-Fi.

4.4 Systems for Mobile Communication

Generation after generation has seen the development of mobile networks. Numerous users converse via asinglefrequencybandvia cellular devices. Twoexamplesofgadgetsthat employwireless transmissionsarecell phones and cordless phones. Cell phones may cover a wider variety of networks than other devices. However, the range of cordless phones is constrained. Certain phones use satellite signals for communication, just like GPS units do [12]. In this configuration, a router serves as a wireless hub for communication. Users are only ableto connect to these networks when they arenear arouter. In networking applications, Wi-Fi is widely used because it allows for wireless portability.

4.5 The Use of Bluetooth

The primary purpose of Bluetooth technology is to enable wireless connections between different electronic devices. Wireless keyboards, mice, andhands-freeheadphonesareallconnectedtocellphones. Informationcan be transferred between devices via Bluetooth technology, which is widely used in the wireless communication industry and has several uses.

V. Wireless Communication's Benefits.

The advantages of wireless systems, networking, and communication technology over wired Systems, such as reliability, cost, and ease of installation.

5.1. Price

Wireless communication lowers installation costs because it does not require the installation of Wires, Cables, or other infrastructure. The system's total cost in relation to a wire communication system. The process of installing a wired network in a structure, excavating the ground to place the cables, and laying those wiresacross the streets is a very challenging, expensive, and time-consuming task. It is not a good idea to drill holes for cables in historical buildings because this Compromises the building's significance and integrity. Additionally, wireless communication methods like Wi-Fi and Wireless LAN are the only options available in older buildings without dedicated lines for communication.

5.2 Movement

As previously stated, the primary benefit of wireless communication systems is their mobility. It provides mobility freedom. while remaining linked to the network [13].

5.3.Installation Ease

The architecture and equipment of a wireless communication network are very simpleto set up and install because there are no wires to worry about. Furthermore, compared to setting up a whole cabled network, configuring a wireless system—such asa Wi-Fi network, for example—takes a very short amount of time [14].

5.4Trustworthiness

There is no possibility of a communication breakdown in wireless communication because there are no connections or wires involved. because of these cables' deterioration, which can be brought on by external factors, cable splices, and the aging process of metallic conductors.

5.5Recovering from Disasters

In the event of fire, flood, or other natural disaster-related incidents, the loss of wireless , a simple communication system is possible.

VI. Wireless Communication's Drawbacks

There are a few drawbacks to wireless communication in addition to its many benefits over conventional communication. The drawbacks that should worry you the most are interference, security, and health.

Interference: Open space is the transmission medium used by wireless communication systems. Consequently, there is a massive possibility that radio transmissions from a single wireless network or system could interfere with those from other networks. Bluetooth and Wi-Fi are the greatest examples (WLAN). When both of these devices are in operation at the same time, interference may occur because both of these technologies utilise the 2.4GHz band for communication.

Security: The security of the data is one of the primary issues with wireless communication. Since the signals are being transmitted over open space, there's a chance that someone could intercept them and steal privatedata.HealthConcerns:Extendedexposuretoradiationofanykindcanbedangerous. Since the exact extent of the harm is unknown, it is recommended to limit exposure to radiofrequency radiation.

VII. Wireless Communication Network Security

Wireless communicationis thetransfer of informationbetweentwoor morepoints that arenot connectedbyan electrical conductor. A wireless network enables people to communicate and access applications and information without wires. Network security consists of the provisions and policies adopted by a network administrator to prevent and monitor unauthorized access, misuse, modification, or denial of a computer networkandnetwork-accessibleresources.Cryptographyisamethodofstoringandtransmittingdataina

particular form so that only those for whom it is intended can read and process it.This article's primary goal is tospreadawareness oftheconceptsof networksecurity, cryptography, andwireless communication. Awireless network's security mainly guards against malevolent and illegal access attempts. Wireless network security is typically provided by wireless equipment, which encrypt and secure all wireless communication by default. These devices are typically wireless routers or switches. A hacker cannot examine the content ofcommunication or packets in transit, even if the security of the wireless network is breached. Wireless network administrators can also be protected by wireless intrusion detection and prevention systems, which notify them in the event of a security breach. Wired Equivalent Policy (WEP) and Wireless Protected Access are two common algorithms and standards to assure wireless network security. (WPA) [15].

VIII. Wireless communication networks and smart cities

Recently, the term"smart cities" has gained a lot of popularity. And is currently considered a complete buzzword. However, like most buzzwords, its definition is a little hazy, and most people aren't always sure how to use it or what the precise advantages are. However, Fluid-mesh has had the honor of working on numerous projects for cities in various nations, and through putting these ideas into action, I was able to understand what a Smart City actually entails. Automating processes and utilizing technology are common components of Smart City deployments in practice. Providing security and safety for the residents of a smart city is one of its objectives.

I now have a comprehensive understanding of what a Smart City is because to Fluid-mesh's work with law enforcement agencies on security-related projects and its experience in such areas. truly is. In the

last ten years, a large number of cities and municipalities worldwide have made large financial investments to install urban video surveillance systems. These mechanisms have frequently resulted in the identification and apprehension of the perpetrators of significant acts of terror, as we have all witnessed in the media. Multi-feed video streams that are useful for both public safety and criminal prosecutionareessentialtoanySmart City. Situational awareness is alsorelatedto videostreaming ina smart city.

Organizations and government agencies in charge of safety, security, and emergency management use Real-time video streams are used to respond to emergencies and save people. The most crucial component of an emergency detection system is an urban security camera system, although local government organizations also use various kinds of sensors in addition to video feeds. These caninclude sensors that detect gunshots as well as chemical, biological, and nuclear ones. Large cities that could be the target of an attack frequently deploy these kinds of sensors. Smart and sustainable transportation aretwo more important aspects of a smart city that I have firsthand experience with with Fluid-mesh, in addition to security and safety. A smart city is not a place whereresidents arelimited to using their own cars and spend hours caught in traffic. Transit systems for the general public should be quicker and more energy-efficient than private automobiles.

Fluid-mesh has worked on projects that call for automating traffic signals according to the positions of light rail and mass transport vehicles. Though many individuals are unaware of it, these systems are a reality in today's world [16]. Modern surface metros and trams usually approach intersections with the intention of possible to pass through the intersection without stopping and quickly change the traffic signal to green. In the future, traffic lights and automobiles could both benefit from similar automation that wouldregulatethetimingof thesignal basedontraffic volume. Parkingis another fascinatingreal- world use. Up to 40% of traffic in city centers, according to Cisco, is caused by drivers searching for a place to park. This statistic initially shocked me, but it fits my experiences visiting big cities in the US and Europe quite nicely. Many decide against driving into cities out of concern that they won't be able to to locate a parking spot for their vehicle upon arrival.

People would benefit greatly from being able to use technology to find open parking spots fast, and it would also assist to minimize traffic! Here's another example of a Smart City application that will be implemented in real life in the coming years [17]. Fluid-mesh, a broadband wireless provider, participates in numerous Smart City initiatives since trenching and wiring a city may be highly costly. Usually, transmission is simpler to establish the necessary communication network. Furthermore, since trains, trams, ferries, and other network vehicles are all always in motion, wireless connectivity is frequently the only practical option. For instance, our technology to link trains and mass transport vehicles was first introduced to the market five years ago thanks to Fluid-mesh R&D work. a long time ago becausea large number of thecities that werealready using our products weretrying to find a way toconnecttheirnetworkstomovingcars.AllSmartCityinitiativesdependheavilyonwireless communication, and creating a wireless network is frequently the first step in becoming a "Smarter City."

Communication networks throughout the entire city are constantly needed in order to automate any process and transfer information. When we first launched Fluid-mesh in 2005, the majority of cities primarily considered municipal Wi-Fi, or "Muni Wi-Fi," as the initial step towards cities become increasingly interconnected.Although the idea of a "smart city" was still in its infancy, the popularityof Wi-Fi technology spurred some city administrations to investigate ways to expand Wi-Fi coverage throughout their cities Sadly, there was a serious conflict of interest that prevented this first attemptfrom being very effective. On the one hand, the city was making a best-effort Wi-Fi coverage utilizing public funds, whereas many telecom providers are devoting resources to improving their cellular and3G networks in order to offer their customers a broadband connection. Furthermore, it was incredibly costly and complicated to manageand maintain a citywideWi-Fi network with tiny cells ten

years ago.

Figure 9. Future Smart City:

Even now, a lot of cities still provide free Wi-Fi in public spaces like parks and busy downtown districts. But now the emphasis is on developing wireless networks that can offer more than Wi-Fi access for locals and visitors. As the automation component of the Smart City idea gained ground, Wi-Fi provisioning is becoming less crucial. This is also because the introduction of LTE technology in cellular networks has increased the throughput available across those networks. large cities. Nonetheless, the argument over free Wi-Fi offered by towns and localities is still being discussed. Furthermore, cellular carriers are finding it difficult to meet the exponential increase in throughput that their customers who use smartphones frequently want. consequently, widespread Wi-Fi is starting to beused in some nations as a means of shifting traffic fromcellular basestations (BTS) to the Wi-Fi bands.

In contrast to the municipal Wi-Fi networks that were established between 2004 and 2006, telecom companies are currently engaged in the endeavor to offer connectivity to citizens and visitors via extensive Wi-Fi installations. Simultaneously, most countries' wireless Smart Cities are putting less emphasis on offering just Wi-Fiserviceand moreemphasis on helping local governments construct wireless infrastructureandimplement the technologies needed to improve people's lives by making them safer, easier, and more productive. The wireless network functions as a platform for automation and communications technologies that safeguard individuals and property to operate on top of it.

Reduce traffic congestion and pollution by automating tasks like street cleaning and waste pickup. It is already possible for a wireless city to develop into a smart city very soon. Free Wi-Fi is a very wonderful perk, and sinceI adoreWi-Fiso much, I wouldrather stayina hotel withstrongWi-Fithanone that is cleaner. But in my opinion, havingWi-Fidoes not automaticallymakea citysmart. Wi-Fiandwireless technologyareessentialfor the majority of Smart City applications. A smart city is one that features wireless network services that enable people to move efficiently and safely to their destinations, as well as to walk at night. locate a parking space without needlessly spending thirty minutes driving about in search of one. It's wonderful to be smart!

IX. Wireless Communication Network's Future

To put it plainly, taking thehigh-frequency option is not feasible. in any case. Thecoverage is severely limited, and thefrequency over 5G is completely unusable. If the multi-carrier systemis based on LTE, or at least more than three carriers, then only one path can be referred to as 5G. Regarding some who argue that a 5G network system requires gigabit speed and water blasting, there isn't now a workable use case. (TD high-frequency cell phones arecompatible with up to 100 carriers or thebasestation.) Mega, yet thelong-distance itself is a slag in order to catch up with WCDMA. The truth is that China has a vast user base and limited spectrum resources. There are now a lot of dense regions. Both the network speed and the first-class signal stick are too slow.

Therefore, multi-carrier is the most likelyapproachfor 5G,buttheissueis difficult because multi-carrier is today classified as 4G+ [16].Since the 5G standard has not yet been developed, multi-carrier

technology based on 4G and LTE should continue to rule our communications for some time to come. Wireless technology has a bright future since it is incredibly affordable, user-friendly, and best of all, there's no need to worry about getting tangled in wires. Wireless technology is present in radios and cell phones. But this technology also has a plethora of other useful applications that could completely transform the future. In plain and uncomplicated terms, wireless technology is inexpensive and easily managed.

9.1. The Principal Wireless Technology

Nowadays, wireless technologies are widely used, and industry advancements have raised their standard to providemobilephoneoperations and extremely fast internet. It is nowfeasibletointegrateoneor morewireless technologies to improve the system's effectiveness and service. Wi-Max, Wi-Fi, Bluetooth, and infrared technologies are only a few examples of the various kinds of wireless technologies. The cordless Radio, infrared, and microwave transmission are all possible means of communication. Point-to-point and multipoint communications areexamples of wireless applications. Wi-Fiis a typeof localarea network(LAN) technology that allows wired LANs to become wireless LANs The devices are equipped with wireless technologies either bydefault or bytheinstallationof wireless interfacecards. The next is Wi-Max. generation wireless technology, which seeks to address the shortcomings of earlier wireless systems. The fact that using wireless technology doesnot requirechangingor replacingcurrent wireless equipment isthereasonit isthought tobecost-effective. Because WiMax technology is designed to cover vast area networks, it is also the most efficient of its kind. It has a 50 km range that it can cover. Pen drives are no longer necessary thanks to Bluetooth technology, which can also take the place of wires in LAN networks [18].

9.2 Wireless Technologies' Future Expectations

The phrase "ubiquitous" or "pervasive communication" describes the future expectations of businesses as wellas people. It is this word that provides manufacturers of goods and services compatible with wirelesstechnology with a growing platform. To take use of the many facilities, wireless technology is supposed to be available everywhere, all the time. There is mobile TV broadcasting everywhere, extremely fast broadband connectivity for users worldwide, less expensive mobile roaming, real-time video conferencing and calls, and portable wrist-sized mobile phone sets. As a result, the many expectations surrounding wireless technology are linked to digital devices as well as wireless broadband internet access. The full installation of computer networks and home office wiring is taken care of in the future. Wireless MAN is anticipated to appear with the advent of4Gbycombiningdifferent WLANs ina singlecity. Sincecarryingand maintaining wireless networks is becoming less expensive, wired technologies may be replaced by wireless ones.

9.3. The Challenges of the Future for Next-Generation Technologies

We live in a time when having a voice is feasible. conversations andvideoconferences ineventhe most remote locations, but there are still a lotof obstaclesin the way of wireless success. The primary obstacle is figuring out how to integrate the design of the current network with that of upcoming technologies like 4G. Thisexplains why 4G hasn't taken off as it should. In order to benefit technology carriers in the long run, next generation technologies are updated. Looking at Korea as it is now, we would see that this area differs greatly from the rest of the globe. They have access to widespread communications across their nation. While the majority of nations, including the United States, are anticipating having to adjust to these developments in the future. Thus, we may conclude that the problems associated with wireless technology can be solved without requiring further network changes. Like Korea, all we need is individual and governmental support at every level [19].

X. Conclusion

Within the communication field, wireless communication is one of the most dynamic and rapidly expanding technology domains. The process of sending data from one location to another without the use of connections like wires, cables, or other physical media is known aswireless communication. Information is typically sentover a finite distance froma transmitter to a receiver in a communication system. Utilizing wireless communication, The distance between the transmitter and receiver can range from a few meters (similar to a TV remote control) to several thousand kilometers (Satellite communication).Our lives are centered around communication, and wireless communication in particular plays a vital role in it. In our daily lives, we frequently use wireless communication systems such as Bluetooth audio, Wi-Fi, GPS receivers, remote

controls, and mobile phones. As with any new development in the modern world, there are concerns with it as well. Thesecurity concerns arounda person's personalThelack of information or theperceived harmit does to society are some of the factors impeding wireless technology's potential advancement. The issues surrounding wireless communications canbelessenedand it canbecomea moreimportant aspect ofsociety with morestudy and testing done. In the near future, wireless technology will play a major role since there won't seem to be as much need for wires to connect separate devices.

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