



## Navigate the feature of 7<sup>TH</sup> Generation mobile wireless networks

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### Abstract

At the present time participants are looking for an appropriate package that includes all the advanced features because they have become recognizable with the evidence of mobile phone technology. At present, it is developing very rapidly and addresses all mobile and wireless communications fields. In generations beyond 5G, network operators will be connected to one single core a nanocore. Combined with artificial intelligence, this nanocore will transform the mobile and wireless service that we know today. Already, 7G has lofty goals, such as space roaming (with support from the global navigation satellite system, the telecommunication satellite system, the earth-image satellite system, and the 6G cellular system). The telecommunication satellite will be used for voice and multimedia communications; the navigational satellite will obviously be used for global positioning systems (GPS); and the earth-image satellites will provide us with closely up-to-the-minute weather updates and help with things like natural disaster preparedness. Needless to say, 7G should have absolutely no issue with data capacity coverage or bandwidth (no matter what tasks one throws at it). The 7G of mobile wireless networks which aims to acquire space roaming. The world is trying to become completely wireless, demanding uninterrupted access to information anytime and anywhere with better quality, high speed, increased bandwidth and reduction in cost. When 7G will complete all its week points then there will be no issue of data capacity coverage and hand off left behind. At that time there will be only one demand from user which is the cost of mobile phone call and its services.

**Keywords:** 7G, 6G, 5G, space roaming, Emerging Technology

### 1. Introduction

Technology will further advance in the future; there are no two opinions in it. The speed at which technology is changing. In the coming time, it will make even more progress. Technology has given us lots of options to connect with each other. We also use social media. We can video calling chatting sharing through mobile phones and so on. With the advancement of technology in the future, we will get additional options and additional services at affordable prices <sup>[1]</sup>.

Most of the countries currently using 4G technology in the world. But very few people know that and started working on 7G technology mobile phones from now on. 7G technology will be a huge success in the form of mobile phone technology. Many people are widely recommended to know about various technologies and inventions. Because it effectively helps shape your life career and family based on need. However, we know that 5G mobile 6G mobile networks have not yet come to our country. The 7G technology mobile phone will grow significantly from the previous technology with additional features and options. People are excited about technology at the present time. As we know we have used 2G-3G networks and in today's times, we are using 4G networks. So with time, we are changing and our technology is also changing. We are going to upgrade ourselves over time. Similarly, 7G technology is now being used in technology. This will be much more advanced technology than all of its previous technologies. 7G Technology is the future technology <sup>[2]</sup>.

There is no doubt that 4G internet connection is providing very

fast service. So this internet connectivity is beneficial for every person. Because he gets this information easily. The current generation is very satisfied with the 4G internet connection. Because it increases the speed of loading the website and application. Through which all the applications and the internet on our mobile phone run at a very fast speed. We get the information we need from the internet easily.

But now time 7G technology mobile phone is going to come. In which the speed of the Internet will be 2 times or 3 times more than the speed 4G. There is no doubt that we need to have the right gadget to take advantage of technology. Therefore, 7G technology mobile phones are being tested in now. Which means that what gadgets are right for 7G technology mobile phones? There is no official announcement yet. Because 7G technology is still in testing mode. It is being tested in the right way so that when the service is fit to use it will be launched in India.

Therefore, considering the compatibility of 7G technology, gadgets are being prepared accordingly. The way we use 4G networks, we need to have 4g of our gadgets supported. Similarly, to use 7G technology, our gadgets are very important to be 7G network supported. That's why this technology is being tested in India right now.

We expect 7G technology to come to as soon as possible. Because we know that Japan is a very developed country. Which is going very far in terms of technology? He has also started using this technology. The people there are also using 7G and network and technology.

## 2. Conceptual study

### 2.1. 7G Mobile communication system

7G mobile network is like the 6G for global coverage but it will also define the satellite functions for mobile communication. In satellite system, the telecommunication satellite will be for voice and multimedia communication; navigational satellite will be for global positional system (GPS) and earth image satellite for some extra information like weather update. The 6G mobile wireless network will support local voice coverage and other services. The 7G will be the most advance generation in mobile communication but there will be some research on demanding issues like the use of mobile phone during moving condition from one country to another country, because satellite is also moving in constant speed and in specific orbit, the standards and protocols for cellular to satellite system and for satellite to satellite communication system. The dream of 7G can only be true when all standards and protocols are defined. May be this is possible in next generation after 7G and can be named as 7.5G [3].

### 2.2. Issues of 7Generation

When 7G will complete all its week points then there will be no issue of data capacity coverage and hand off left behind. At that time there will be only one demand from user which is the cost of mobile phone call and its services. This issue will again start evolutionally change in standard and technology and will also open new horizons for research. This new revolution in technology for cost of mobile phone call and services will be called as 7.5G or 8G. The processing capacity increase made possible to use higher and higher frequencies, with 6G we might jump into the THz space, but now the processing capacity increase is leveling out when we look at a single chip. In mobile devices you don't want to have many chips, they won't fit in the sleek cases we have come to love, and they would increase power consumption. We will keep seeing for a few more decades processing capacity increase but at a lower space (the areas of GPUs were an exception to these rules but that was the result, mostly, of parallel processing). So on the technology side there will be evolution and it might just be that the law of accelerated returns may compensate for the slowing down in technology evolution in the processing area, being able to maintain the pace we have seen so far [4].

Back now to economic considerations. As we move up in frequency (something enabled by the increased processing capacity) we are confronted with propagation issues, and we are forced to either increase the wireless power (something that is not allowed by regulators and that would decrease battery time) or make cells smaller. The latter is what needs to happen. The problem with smaller cells is that you need to increase the investment at the edges. The number of antennas required by 5G, assuming you want to deliver the 5G capacity potential and cover the same area, is ten times more than 4G: that means a huge infrastructure investment (in antennas, optical fiber drops and space rent) [5].

Actually, I do not think that a 6G pervasive infrastructure can be economically sustainable, based on today's business models and approach to infrastructures ownership. What is most likely to happen (it is already part, technically speaking, of the 5G architecture) is to have the wireless edge created by a myriad of players, each one investing on his own, with no need to recap the investment in a direct way (i.e. by getting money back). What I

can imagine is that I will buy a new device, a car, a wearable Smartphone... whatever and that device will become an edge network node. The big infrastructures, pipes, will grow at their own pace, sufficient to manage any increase in traffic, and the costly edges will grow asynchronously through disseminated and dispersed investment. In this sense there might be some devices that will start using higher frequencies in the tens of THz 20 years from now but I would not consider them as a real shift to a new G, to 7G, as I did not consider 5G some wireless point to point experiments in the years as 5G. An additional point to take into consideration is the time it takes to define and agree a new infrastructure standard. It is likely that in the future we will need to change some aspects of the standardization process but that, also, will take time. Industries are looking for standards to enable new business in an effective way but at the same time they are slow in progressing to protect existing investment [6].

### 2.3. A Look Ahead to 6G and 7G

Mobile™ World Congress 2018 has everyone buzzing about 5G. But 5G is so near-future. How boring! Surely, if we have any vision at all, we should be looking to what 6G and 7G could be offering us in a decade or two, especially for engineers who are already hard at work on these nascent technologies. When it comes to mobile and wireless computing, like impatient toddlers, we're always demanding more. More speed! More bandwidth! More ubiquitous connectivity! More potential! And although the term "continuous computing" has been bandied about for years, we're only now just starting to see this happen [7].

Our mobile potential is enormous: Smart cities, connected infrastructure, wearable computers, autonomous driving, seamless virtual and augmented reality, artificial intelligence, Internet of Machines and Things, and much more are still very much untapped. Only by looking ahead to 6G and 7G (*take a breath*) with space roaming do we get a glimpse of what may be possible in the next 10 to 20 years. Also, while 5G has yet to grace us with its presence, Google Trends rates the term "6G" as the 17th most searched word in the search engines (as of the time of this writing). So, what's in 6G that isn't in 5G? Short answer: A lot of the things that just miss the 5G boat, plus a boatload of potential applications that sound like they come straight out of a sci-fi novel. I'm talking home-based ATM machines, sea-to-space communication for world defense, and even mind-to-mind communication. Yes telepathy. It's a thing, and a thing that will soon be based on telephony. Assuming it pans out the way it's currently being discussed, 6G will form the framework of that ever elusive connected utopia a fully-connected world of cheap, fast Internet service with wireless speeds of up to 11Gbps and the ability to tap satellite communication networks using specially designed nanoantennas. By comparison, today's 4G technology only lets us get piddly download speeds of 5 to 12Mbps and upload speeds of 2 to 5Mbps, so we're talking faster orders of magnitude [3].

This is good news for several application areas including the Internet of Everything (IoE) and all its machine-to-machine communication demands as well as robotic and autonomous drone delivery and transport systems. It would also likely be the tipping point for technologies like "ultra-high-fidelity" virtual reality, which consumes about 50 times the bandwidth of a high-definition video stream and which doesn't currently work well enough wirelessly to generate any real demand. Imagine, too, the

impact 6G would have on autonomous vehicles, driver-assistance systems, car-Internet, infotainment, inter-vehicle information exchange, and vehicle pre-crash sensing and prevention, not to mention road sensors and smart traffic lights that optimize traffic flow. The “wide” world would become more and more in reach as well. In the world of health care, remote diagnostics from doctors to patients (living in rural areas) would get significantly easier, and in equal measure, so would remote learning and education via mobile devices. Similarly, because 6th generation wireless mobile communication networks would integrate satellites for global coverage, there would be very few (if any) mobile network *dead spots*. So, were you to live up a mountain or in some remote village in a jungle, you’d still have medical care and fantastic coverage, which is great news for those campaigning to close the digital divide. The FCC’s Spectrum Horizons First Report and Order deals specifically with the 95 gigahertz (GHz) to 3 terahertz (THz) range a collection of frequencies that aren’t currently being used in consumer devices, and have wide bandwidth with vast potential for data streaming. In addition to issuing 10 year licenses to experiment in that range, the FCC will offer a full 21.2GHz of spectrum for testing of unlicensed devices<sup>[8]</sup>.

Collectively, that 95GHz to 3THz spectrum extends a little beyond the 300GHz to 3THz range defined as “tremendously high frequency.” At the lower end of the FCC’s range, 95GHz to 300GHz signals are technically still millimeter waves, as they’re at or over 1 millimeter in wavelength. But 300GHz to 3THz signals are at or less than 1 millimeter in wavelength and for that reason called “sub-millimeter waves.”

Even by comparison with the 24GHz to 28GHz millimeter wave spectrum that’s currently being auctioned off by the FCC, the terahertz spectrum is considered bleeding-edge enough to be nearly science fiction. FCC Commissioner Michael O’Rielly said the nascence of terahertz technology made the vote felt “like designating zoning laws for the moon,” and noted his hesitance to “create a class of incumbents, who then have to be moved or protected in the future when this spectrum becomes of greater interest for 6G, 7G, or whatever the next-next-generation wonder technology may be.”

Matthew Griffin, described as “The Adviser behind the Advisers” and a “Young Kurzweil,” is the founder and CEO of the World Futures Forum and the 311 Institute, a global Futures and Deep Futures consultancy working between the dates of 2020 to 2070, and is an award winning futurist, and author of “Codex of the Future” series. Regularly featured in the global media, including AP, BBC, CNBC, Discovery, RT, and Viacom, Matthew’s ability to identify, track, and explain the impacts of hundreds of revolutionary emerging technologies on global culture, industry and society, is unparalleled. Recognized for the past six years as one of the world’s foremost futurists, innovation and strategy experts Matthew is an international speaker who helps governments, investors, multi-nationals and regulators around the world envision, build and lead an inclusive, sustainable future. A rare talent Matthew’s recent work includes mentoring Lunar X Prize teams, re-envisioning global education and training with the G20, and helping the world’s largest organizations envision and

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### 3. Report on the finding

Seventh generation (7G) of wireless mobile communication will be the most advance generation as compared to its predecessors. It will set a well-defined standards and protocols for satellite communication as well as improve the security. 7G systems can be supported by global navigational satellite system using techniques such as OFDM methodology and FEC for the speed of communication process. It will provide better Quality of Service (QoS). 7G can be improved by including services like direct HD video broadcasting. It must achieve “Zero Latency” which is not achieved by previous generations. It must be cost-effective technology with no issues related to data capacity coverage and hand-off. It must set a goal to provide network for all and to implement the concept of net neutrality i.e. provide access to all the contents at a constant and equal speed to different users<sup>[9]</sup>.

It is true that technology is developing very fast in today’s time. It is necessary that in today’s time people should be aware of technology and they should understand it at a time when people call away at other places. To do it had to travel long or had to stand in long lines. At present time, we can sit inside the house and talk to all our relative’s friends and others very easily. This is a huge advancement in technology that has given us the option of connecting most within our home. Mobile phone technology is a great invention Technology in the future will further advance. There are no two opinions on the speed at which the technology is changing at the time that it will advance even more in the coming time.

7G has built a Tier-1 grade network that supports carriers, call centers, and businesses alike. Utilizing superior design and technology, 7G Network delivers millions of calls reliably, every day, all around the world, at industry leading rates. These services are all supported by customer portal features that allow access to service analytics and reports, customer account and service modifications, and tools for moving more of your services to our trusted network<sup>[10]</sup>.

### 4. Discussion on the finding

7G Network’s reliability is not only based on our service up-time and our network hardware redundancy within our Network Operation Center itself, but also by the fact that 7G Network has Network Operation Centers on the East and West coast (Los Angeles and New Jersey). This provides our valued customers with peace of mind that, should there be a network outage or natural disaster, services will remain active and calls will go through. 7G Network supports our customers with superior customer service, industry leading rates, and excellent quality of service. These three items are what set 7G Network apart from other carriers and, from your first 7G contact, you’ll understand and appreciate the 7G difference.

## 5. Conclusion

In recent years, full-duplex communication technology has been progressing and finding its way to the standards. Full Duplex is a duplexing scheme that allows a communication device to simultaneously transmit and receive wireless signals on the same channel (frequency band). Enabled by means of self-interference and cross-link interference management methodology, Full Duplex can significantly increase the throughput for each allocated channel and improve the total system capacity. The inherent capability of Full Duplex can provide an opportunity to reduce round-trip latency for data transmission, which is due to transmission of acknowledgment or feedback information, and to implement an in-band and out-of-band relay system

The 7G of mobile wireless networks which aims to acquire space roaming. The world is trying to become completely wireless, demanding uninterrupted access to information anytime and anywhere with better quality, high speed, increased bandwidth and reduction in cost.

After 4G the next generation 5G aims a real wireless world with no limitations while 6G integrates 5G with satellite networks. Due to variable technologies and standards, with 6G handoff/roaming will be an issue. This drives the 7G of mobile wireless networks which aims to acquire space roaming. Some people write that 10G networks are working in many countries. I am sorry that such people do not know the difference between 10G (Generation-10) and 10G Network Ring.

## 6. Reference

1. Gill J, Singh S. "Future Prospects of Wireless Generations in Mobile Communication." 2015; 4(2):18–22.
2. Zhao Y, Xu H. "6G Mobile Communication Network : Vision, Challenges and Key Technologies 6G Mobile Communication Network : Vision, Challenge s and Key Technologies," no, 2019.
3. Committee PJ, Enforcement L. "Inquiry into the Impact of new and emerging information and communications technology Dynamic Spectrum License Management and Spectrum sales," no. January, 2018, 1-5.
4. C. Engineering, "6G," pp. 871–874, 20AD.
5. P. M. Latva-aho, "Challenges for 6G."
6. Giordani M, *et al.*, "Towards 6G Networks : Use Cases and Technologies," 1–7.
7. Khutey R, Rana G, Dewangan V. "Future of Wireless Technology 6G & 7G." 2015; 3(2):583-585.
8. IRNI Mphin. "Blended Learning : An Emerging Technology." 2015; 5:95-106.
9. Rappaport TS, Xing Y, "Wireless Communications and Applications above 100 GHz : Opportunities and Challenges for 6G and Beyond," IEEE Access. 2020; 7:78729–78757.
10. Karki RS, Garia VB. "Next Generations of Mobile Networks," 2016, 13–17.