

The Memo – Episode 7

5G: Why all the fuss?

— Joe :

In Seoul, South Korea- the home of LG and Samsung- 5G has now become a reality. This small Asian country was the first (in the world) to deploy the latest-generation mobile network, in 2019. Koreans can already purchase compatible phones. By the end of January, the data being exchanged through 5G already represented 21% of the total data traffic in the country, according to the telecommunication news site Light Reading.

In his show “Why it matters,” journalist Joshua Lim, from the Singaporean network CNA, took us on a visit to the Jamsil stadium. That’s where Seoul’s baseball team, the Bears, play. The stadium’s digital equipment has been completely redesigned since the arrival of 5G. Around 60 cameras now capture *everything* that happens in the field at the same time. Thanks to 5G, supporters can choose their viewing angle in real time.

Joshua Lim also showed us the You + AR application, which teaches you how to dance like a K-Pop star, thanks to a virtual reality coach.

[Jingle]

So is this what a 5G connected world looks like? More entertainment, more screens, more virtual reality?

Hello Chloe!

— Chloe :

Hello Joe!

— Joe :

Welcome to the Memo, the podcast that decrypts the latest technical news for you. Reports about 5G over 2019- and even in recent weeks- have shown it to be a complex geopolitical issue- a network that has fuelled tensions between the world’s superpowers. In this episode we are going to try and understand why.

What is it that distinguishes 5G from previous generations of telecommunications standards- and why is it being talked about as such a revolution? So Chloe, we’ve already seen how in Seoul, they have mainly been applying these services for entertainment. But I imagine that’s not the only domain?

— Chloe :

No of course not. If there is talk about a revolution, it’s mostly because 5G permits us to develop radically different uses from what we know today. You can’t really compare the 4G/ 5G transition to the move from 3G to 4G. To understand it, the CNA report takes us a few kilometers outside Seoul to K-City. A city center with

shop fronts, a motorway, residential areas with curvy streets- here the Korean Transport Authority, or KOTSA, has built 320,000 square meters of artificial city to test self-driving cars. The area has recently been given a 5G network. Nam Baek is the research director of the site. He explains that autonomous cars will have to share quantities of extremely important data. That means exchanging them with their environment, but also with other vehicles.

— Joe :

So the whole point of 5G is that it will allow data to be transmitted faster?

— Chloe :

Actually there are *three* great strengths. Those are the speed of data transmission, latency reduction- which we will come back to- and the possibility of adapting the network's data quality for different uses. That's known as slicing. Let's talk about speed first. According to Justin Denison, the Samsung vice-President speaking to the New York Times: Instead of downloading a season of your favourite series the night before your airplane flight, you could now do it in mere seconds in the departure lounge.

Belgian daily newspaper L'Echo has created an interactive page to compare the speed difference between 3, 4 and 5G for various uses.

To download an episode of Stranger Things- it's 1.7 seconds with 5G, 39 seconds with 4G and 3.8 minutes in 3G.

— Joe :

You also talked about latency delay? What is that? Is it different from speed?

— Chloe :

Yes, you know that when you launch an application you have to wait a little while before using it? Because the signal is being transferred from one piece of equipment to another, it's not always super reliable. 5G has been designed to reduce this time to 1 millisecond. It's almost instantaneous. Fredrik Jejdling, an executive at Ericsson, explained to us that it's an absolutely necessary condition for remote surgical procedures, for example. And if we go back to self-driving vehicles, this latency permits vehicles to warn each other of hazards.

— Joe :

And the third characteristic of 5G was the capacity to do "slicing". So - what is it?

— Chloe :

Yes, exactly. I read a very precise article on the subject in Insider Pro. 5G is able to adapt to different needs. For example, take an Internet of Things network with a great number of connected devices- the bandwidth is not necessarily important because it doesn't transmit large amounts of data, but it requires a large network density.

On the contrary, our mobile devices are fewer, but they need a lot of bandwidth to broadcast videos for example. And finally there are critical services for which

bandwidth must be reserved, such as self-driving vehicles, when the latency time is non-negotiable.

— Joe :

And all these uses take place at the same time.

— Chloe :

Yes. Slicing guarantees each network user the properties they need. If you want to understand these technical concepts in detail, you can read the glossary that Wired made about 5G; the link is in the description.

— Joe :

So the principle characteristic of 5G is that it will permit a large variety of uses?

— Chloe :

Yes, the National Frequency Agency in France (ANFR) has made a diagram available which describes all the potential uses. There are some in media and entertainment, like in South Korea- which we talked about at the start of the episode. But by increasing the density of the network we will be able to increase the overall amount of connected objects (allowing different networks to be deployed). That will be useful for smart cities (controlling energy expenditure, connecting different areas) but also for the future of industry. We will be able to do predictive maintenance, for example. There's also a lot of anticipation in critical sectors like transportation and medicine.

— Joe :

Talking about medicine, there's been a lot of discussion about whether the intensification of waves could have an impact on human health- in other words it could be carcinogenic. Is there a decent response to these fears?

— Chloe :

In the New York Times, I read an article that aims to dismantle the misconceptions. It underlines the fact that at first, frequencies allocated to 5G will be fairly average frequencies on the wave spectrum. Frequencies which are already being used for our current communications- and also for television. These frequencies don't contain anything we need to worry about anymore than we already do. The question is more significant when we talk about millimeter waves, which are due to be used in a few years. The big advantage of these waves is that they will provide much faster flow, but only at a short distance. To exploit this band we will need to set up more diffusion points- which always tends to increase fears.

— Joe :

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Do we already know the impact of millimeter waves on health?

— Chloe :

Well they won't be used straight away. Not before 2026 in places like France at least. And not everybody is familiar with the Science. When we talk about health dangers in terms of waves, it's their ionizing effect- gamma and x-rays for example, which are very high in the spectrum. Millimeter waves are fairly high in the spectrum, but they don't fall into the category of ionizing waves. If you want to see this spectrum and where the bands affected by 5G are located, I recommend that you have a look at the National Frequency Agency diagram.

— Joe :

So, no danger to health?

— Chloe :

Nothing's been proved in any case. But in France, the government has commissioned ANSES (the National Agency for Health, Food, Environment and Work) to carry out an evaluation, which is due to be published in the first Quarter of 2021.

— Joe :

I've also read that the frequencies of waves used for 5G may interfere with things like emergency signals, especially those that allow us to alert populations in the event of a natural disaster?

— Chloe :

Yes, particularly in the United States, according to Numerama... In France, this mainly concerns millimeter waves, which will only be used later on as we talked about before. But ARCEP is committed to ensuring that they don't clash with the satellite and radio astronomy services already using them.

— Joe :

And in terms of timing, where is it all being rolled out?

— Chloe :

The GSMA, the Global System for Mobile Communications, published a map of the world of deployments on its website. To date, only Australia, China and South Korea have a fully deployed network, even if it is quite difficult to assess. In the United States, the 4 main service providers already offer 5G services in several cities. In Europe- Switzerland, Spain, Hungary, Italy, Austria, Germany, Finland, Slovenia and Romania already have at least one supplier who has launched a 5G network. The European Commission set up a common calendar in 2016, and has also set up a 5G observatory, which delivers reports every quarter.

— Joe :

And in France?

— Chloe :

In France, the candidates for frequency allocation declared themselves on February 25th, so the first 5G commercial services should be arriving there over 2020.

Operators will have to pay around 2.17 billion euros to be allocated the first frequencies. But it will take until 2030 for it to be fully deployed. You can find the entire calendar in the Numerama article.

— Joe :

Thank you Chloe and thank you all for being with us for this episode on 5G. We'll be back in 15 days for a new series on the Memo looking into cyberwar. In the first episode, we're looking at the problems surrounding phishing. Until then, goodbye!

Resources Used :

Channel News Asia (CAN) – [Why it matters ?](#)

The New York Times – [What is 5G ? Everything you Need to Know About the New Cellular Network](#)

[L'écho – Testez la puissance de la 5G](#)

Insider Pro – [What's the difference between network slicing and Quality of Service ?](#)

Arcep – [Préparer l'arrivée de la 5G](#)

The New York Times – [Your 5G Phone won't hurt you. But Russia wants you to think otherwise](#)

Numerama – [La 5G, un danger pour l'évacuation des gens en cas de catastrophe naturelle ?](#)

GSMA – [5G coverage map and statistics](#)

Numerama – [Quel est le calendrier de la 5G en France ?](#)