1. Councilman Kilman Report On 5G - May 13th Mayor & Council Meeting

    Documents:

        COUNCILMAN KILMAN SUMMARY REPORT ON 5G TECHNOLOGY MAY 13 2020.PDF

May 13, 2020

Councilman Peter Kilman's 5G Report at the May 13, 2020 Council Work Session.

(My May 13, 2020 5G report comments are drawn from various articles about 5G and conversations with 5G IT and BioTech professionals. My report does not purport to claim personal expertise on this subject, but reflects the thoughts, opinions, and expertise of others. At the end of day, with today's search engines and volumes of information available to anyone, it is easy enough to do your own due diligence and draw your own conclusions. If 5G interests you, I would highly recommend you do your own investigation.)

- *Councilman Kilman*

What is 5G?

5G is the 5th generation of mobile networks, a significant evolution of today's 4G LTE (Long-term evolution) networks. **5G** has been designed to meet the very large growth in data and connectivity of today's modern society with its billions of connected devices, and to support tomorrow's innovations.

How Does 5G Work?

Like other cellular networks, **5G** networks use a system of cell sites that divide their territory into sectors and send encoded data through radio waves. Each cell site must be connected to a network backbone, be it a wired or wireless backhaul connection (i.e., getting data from the Core or central source network to the edges of the network). As I understand it, 5G will initially operate in conjunction with existing 4G networks before evolving to

fully standalone networks in subsequent releases and coverage expansions over the years ahead.

In addition to delivering faster connections and greater capacity, 5G features high-speed response times referred to as latency.

Latency is the time taken for devices to respond to each other over the wireless network.

- 3G networks had a typical response time of 100 milliseconds

- 4G is around 30 milliseconds and

- 5G will be as low as 1 millisecond. This is virtually instantaneous enabling a new generation of applications, services and business opportunities.

There are three major categories of use for 5G:

1. **Massive machine to machine communications** – also called the Internet of Things (IoT) that involves connecting billions of devices without human intervention at a scale not seen before. This has the potential to revolutionize modern industrial processes and applications.

2. **Ultra-reliable low latency communications** – these are mission critical including real-time control of devices, industrial robotics, vehicle-to-vehicle communications and safety systems, autonomous driving and safer transport networks. Low latency communications can support remote medical care,

procedures, and treatment.

3. **Enhanced mobile broadband** – provides significantly faster data speeds and greater capacity keeping the world connected. New applications will include fixed wireless internet access for homes, outdoor broadcast applications without the need for broadcast vans, and greater connectivity for people on the move.

For communities, the promise of the 5G connection of billions of devices will enable smart cities, smart schools and smart homes, smart and safer vehicles, enhance health care and education, and provide a safer and more efficient place to live.

For businesses and industry, 5G and IoT will provide a wealth of data allowing them to gain insights into their operations like never before. Businesses will operate and make key decisions driven by data, innovate in agriculture, in medicine, in manufacturing, and in communications that promote new and emerging technologies. This will open up the way for cost savings, better customer experiences, better standard of life, and long term growth.

What's different about 5G?

5G uses higher frequency waves than earlier mobile networks, allowing more devices to have access to the internet at the same time and at faster speeds.

These waves travel shorter distances through urban spaces, so 5G networks require new base stations or transmitter masts – more than previous technologies - positioned closer to ground level.

But because there are more transmitters, each one can run at lower power levels than previous 4G technology, which means that the level of radiation exposure from 5G antennas will be lower.

Is 5G dangerous?

Although 5G may improve our day-to-day lives, some consumers and scientists have voiced concern about potential health hazards. Many of these concerns are over 5G's use of the higher energy millimeter-wave radiation.

Here we need to make an important distinction. There's often confusion between **ionizing** and **non-ionizing** radiation because the term radiation is used for both.

Kenneth Foster, a researcher and professor of bioengineering at Pennsylvania State University who has studied the health effects of radio waves for nearly 50 years, has stated: "All light is radiation because it is simply energy moving through space. It is ionizing radiation that is dangerous because it can break chemical bonds."

Ionizing radiation is the reason we wear sunscreen outside because short-wavelength ultraviolet light from the sky has enough energy to knock electrons from their atoms, damaging skin cells and DNA. Millimeter waves, on the other hand as used by 5G, are non-ionizing because they have longer wavelengths and not enough energy to damage cells directly.”

The only established hazard of non-ionizing radiation is too much heating. At high exposure levels, radio

frequency (RF) energy can indeed be hazardous, producing burns or other thermal damage, but these exposures are typically incurred only in occupational settings near secured high-powered radio frequency transmitters. To that end, the maximum radio frequency level that someone in the community could be exposed to from 5G (or any other type signals in general community areas) is so small that no temperature rise has been observed to date.

Dr. David Robert Grimes a physicist and cancer researcher at Oxford University states: “The radio non-ionizing wave band, used for mobile phone networks, lacks sufficient energy to break apart DNA and cause cellular damage."

The fact is higher up the electromagnetic spectrum – well beyond those frequencies used by mobile phones – there are clear health risks from extended exposure.”

There are strict advisory limits for exposure to even higher energy radiation levels such as medical x-rays and gamma rays, which can both lead to damaging effects within the human body.”

Dr. Grimes continues: "People are understandably concerned over whether they [radiofrequencies] might elevate their risk of cancer, but it's crucial to note that radio waves are significantly less energetic than even the visible light we experience every day."

There is no reputable evidence," he says "that mobile phones or wireless networks have caused us health problems."

A recent study in Denmark, published in the *Journal of the National Cancer Institute*, analyzed the records of more than 358,000 mobile phone subscribers with brain tumor incidence data from the Danish Cancer Registry. The "analysis found no association between radio waves and cell phone use and the incidence of tumors benign or malignant, even among people who had been cell phone subscribers for 13 or more years."

In the UK, the British government has stated that "while a small increase in overall exposure to radio waves is possible when 5G is added to the existing network, the overall exposure is expected to remain low."

The frequency range of the 5G signals being introduced is within the non-ionizing band of the electromagnetic spectrum and well below those considered harmful by the International Commission on Non-Ionizing Radiation Protection (ICNIRP), which has considered the exposure that 5G will produce in great depth.

The World Health Organization also says electromagnetic frequency exposures can possibly be cancerous, but they emphasize that radiofrequency (RF) set below the limits recommended in the ICNIRP guidelines do not appear to have any known consequence on health.

The US Food and Drug Administration (FDA) with the Federal Communications Committee (FCC) summarized that "we have not found sufficient evidence that there are adverse health effects in humans caused by exposures at or under the current radiofrequency energy exposure limits."

In support of the FDA's position, the National Cancer Institute notes that it does not see increasing numbers of brain tumors in the general population. The Institute stated: "Given that humans have been exposed to radiofrequency energy for decades, if there was a direct correlation to our health, we should have seen the impact already. So far, we have not."

And lastly, and it's important to note, that while there is no federally developed national standard for safe levels of exposure to radiofrequency energy, many federal agencies have addressed this important issue. In addition to the Federal Communications Commission, federal health and safety agencies such as the Environmental Protection Agency (EPA), the Food and Drug Administration (FDA), the National Institute for Occupational Safety and Health (NIOSH) and the Occupational Safety and Health Administration (OSHA) have been actively involved in monitoring and investigating issues related to RF exposure. For example, the FDA has issued guidelines for safe RF emission levels from microwave ovens, and it continues to monitor exposure issues related to the use of certain RF devices such as cellular telephones.

Federal, state and local government agencies and other organizations have generally relied on RF exposure standards developed by expert non-government organizations such as the Institute of Electrical and Electronics Engineers (IEEE) and the National Council on Radiation Protection and Measurements (NCRP). Since 1996, the FCC has required that all wireless communications in the United States meet its minimum

guidelines for safe human exposure to radiofrequency (RF) energy.

Under Chairman Agit Pai, the FCC is pursuing comprehensive research and a strategy to Facilitate America's advancement in 5G Technology. The Chairman's strategy includes three key components: (1) pushing more spectrum into the marketplace; (2) updating infrastructure policy; and (3) modernizing outdated regulations.

In Closing, I now refer to the FORBES Magazine article published on November 1st, 2019 titled "The Science of Why 5G Is (Almost) Certainly Safe For Humans." History has shown that with each new generation of wireless technology that comes out, a new wave of anxiety and fearful health claims emerge. And they always come with the same arguments:

- Humans have never been exposed to this much type of radiation before
- Or scientists have not adequately demonstrated that the proposed new infrastructure won't be harmful to humans
- Or that WHO has already declared radio-frequency to be possibly cancerous
- and therefore, we should declare a moratorium on radiation technology until its safety has been established.

Since my focus has been on 5G today, Forbes states that the best safety measure that technicians can take is to simply have a small exclusion zone around the 5G radio towers that emit the most powerful signals for this type

of radiation. So long as the exclusion zone is about 10 meters in all directions, any person outside of the zone will undoubtedly be safe.

It goes on to say that there are lots of real hazards out there in the world, but 5G – much like vaccines, fluoridated drinking water, microwave ovens, and the vapor trails left by airplanes – are not among them. Current science is clearly on the side of wireless, but we must always be cautious and assume nothing.

Arguments must be based on logic and fact, not emotion. In the search for truth, society should rely on the full suite of scientific evidence, because we can always learn something.

When we do, all of us can reap the benefits of a safe, connected world.

And that concludes my report. Thank you for your attention.