

# Electromagnetic Radiation Including G5 Frequencies, Health Effects Summary and Policy Recommendations

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**Abstract:** *Introduction:* 5G millimeter wave technology offers advantages: "smart" homes, "smart" cities and autonomic automobiles. A rise of at least 30-100% in exposure to electromagnetic radiation (EMR) from antennas in the public space near citizens' homes is expected, and higher exposure levels inside homes from millions of devices communicating with antennas ("*Internet of Things*"). Scientists have declared current exposure levels not relevant to protect against health effects. A rise in exposure raises the risk of an extreme rise in incidence of adverse health effects including electrohypersensitivity. Susceptible members of the public such as pregnant women, babies and children have a right to be protected from chronic exposure of public source, in their private homes, against their will. Following implementation of 5G technology in the public space, some electrohypersensitive individuals would be forced to leave their homes and become refugees.

*Methodology:* Presented at the CEST 2019 Electromagnetic Radiation Workshop, this is a summary of some of the adverse health effects reported following exposure to electromagnetic radiation, and of health effects of exposure to 5G frequencies (millimeter waves) reported in animal studies. No study that proves safety of 5G frequencies for public use exists.

*Reported effects:* Reported health effects, similar to symptoms reported in Occupational Medicine studies in the 1950-60's, include: headache, hematologic problems, fertility problems, decline in libido and neural effects –named "Microwave Sickness". In newer studies this same syndrome is called Electrohypersensitivity. EMR has been categorized as a possible human carcinogen by IARC. Experiments conducted in former USSR on animals exposed to non-thermal levels of millimeter waves for only 15 minutes a day demonstrated detectable changes in both the central and peripheral nervous system, changes in permeability of blood vessels, changes in the reflex response of the nervous system (stronger response from a lower trigger) and changes in the hematopoietic and lymphatic systems. Studies from the Hebrew University in Jerusalem and from Japan demonstrate that human sweat ducts respond to

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millimeter waves and concentrate the energy inside the skin, contradicting the assumption that G5 frequencies cannot penetrate the skin.

*Conclusions:* There is no known method to measure 5G frequencies outside the laboratory. The decision to authorize 5G frequencies by the US FCC relied only on thermal 1996 guidelines and did not take non-thermal biological effects or public health precautionary measures into account. Extensive public exposure keeping with thermal allowable levels is expected to have adverse health effects and is therefore unsafe. Safer alternatives do exist: broad band internet via fiber-optic infrastructure, including for wired "smart" meters. Electromagnetic radiation is an environmental pollutant. There is a need to evaluate the potential health effects and the environmental effects of both the new and the existing technology as well as the economic burden on the Health system of a rise in health effects including electrohypersensitivity. In accordance with the precautionary principle, it is the responsibility of those who wish to implement G5 technology, to prove that it is safe for public use.

**Keywords:** Electrohypersensitivity, EHS, Electromagnetic radiation, G5 frequencies, IOT

## **1. Introduction**

5G millimeter wave technology offers advantages: "smart" homes, "smart" cities and autonomic automobiles. The price: a rise of at least 30-100% in exposure to electromagnetic radiation from antennas in the public space near citizens' homes and higher exposure levels inside homes ("Internet of Things", I.O.T., millions of devices communicating with 5G antennas). Health effects have been reported at exposure levels lower by several orders of magnitude than today's allowable exposure levels.<sup>1</sup> Scientists have declared current exposure levels not relevant to protect against health effects.<sup>1</sup> Susceptible members of the public such as pregnant women, babies and children have a right to be protected from chronic exposure of public source, in their private homes, against their will. Following implementation of 5G technology in the public space, some electrohypersensitive individuals would be forced to leave their homes and become refugees.<sup>2</sup> In Brussels, as well as other cities, 5G has been halted due to health concerns.<sup>3</sup>

## **2. Methodology**

Presented at the CEST 2019 Electromagnetic Radiation Workshop, this is a summary of some of the adverse health effects reported following exposure to electromagnetic radiation, and of health effects of exposure to 5G frequencies (millimeter waves) reported in animal studies. No study that proves safety of

5G frequencies for public use exists.

Reportedly, exposure to electromagnetic radiation (EMR) in frequencies above 1 Gigahertz has risen  $10^{18}$  times background environmental levels.<sup>4</sup> It is the largest and fastest growing anthropomorphic environmental pollutant, affecting billions. Allowable exposure levels from 1996 rely on physics theory that low-level nonionizing EMR can cause nothing but thermal effects.<sup>5</sup> But thousands of studies demonstrate biological effects on cells and tissues exposed to low non-thermal levels of EMR.<sup>6</sup> Studies from the 1950-60s in radar technicians in former USSR reported health effects: headache, hematologic problems, fertility problems, decline in libido and neural effects – named "Microwave Sickness".<sup>7</sup> In newer studies this same syndrome is called Electrohypersensitivity.<sup>8,9,10</sup> EMR has been categorized as a possible human carcinogen by IARC.<sup>11,12</sup> Data trends indicate a rise in the incidence of brain cancer even though researchers are still in disagreement.<sup>13,14</sup> Economic interests might affect some of the studies and their conclusions. Recent studies in humans demonstrate: acute exposure to non-thermal levels of EMR affects brain metabolism,<sup>15</sup> brain electric function<sup>16</sup> and the immune system.<sup>17</sup> Studies have shown effects of chronic exposure to EMR on DNA by enhancement of oxidative stress response<sup>18,19</sup> and effects in nerve tissue, on myelin.<sup>20</sup> Two recently published large animal studies performed by the US- National Toxicology Program<sup>21</sup> and by the Ramazzini institute reported statistically significant rise in tumors in animals exposed chronically to non-thermal levels of EMR.<sup>22</sup> Studies on G5 millimeter wave frequencies: Experiments conducted between 1970-75 in former USSR on animals exposed to non-thermal levels of millimeter waves for only 15 minutes a day demonstrated detectable changes in both the central and peripheral nervous system, changes in permeability of blood vessels, changes in the reflex response of the nervous system (stronger response from a lower trigger) and changes in the hematopoietic and lymphatic systems.<sup>23</sup> Studies from the Hebrew University in Jerusalem and from Japan demonstrate that human sweat ducts respond to millimeter waves and concentrate the energy inside the skin, contradicting the assumption that G5 frequencies cannot penetrate the skin.<sup>24, 25, 26</sup>

### **3. Conclusions – Policy recommendations**

There is no known method to measure 5G frequencies outside the laboratory.<sup>27</sup> The decision to authorize 5G frequencies by the US FCC relies only on thermal 1996 guidelines and did not take non-thermal biological effects or public health precautionary measures into account.<sup>28</sup> Extensive public exposure keeping with thermal allowable levels is expected to have adverse health effects and is therefore unsafe.<sup>29</sup>

The public have a basic human right to be safe inside their homes from public source exposure. In accordance with the precautionary principle, it is the responsibility of those who wish to implement G5 technology, to prove that it is safe for public use.<sup>30</sup> The suggestion that "more antennas mean less radiation" is not true in this case, because this is not division of a stable amount of radiation by more antennas; rather, an extreme rise in usage is predicted (I.O.T. "Internet of Things"). Therefore adding 5G antennas will cause exposure to rise, not fall.

Safer alternatives do exist: broad band internet via fiber-optic infrastructure, including forwired "smart" meters.

Policy recommendations:

- Allowable exposure levels should be lowered according to biological effects<sup>31</sup>
- EMF measurement results should be analyzed in relevance to biological thresholds, without averaging
- Wired, not wireless technology should be used in the public space and in schools, and existing wireless networks removed
- Electromagnetic radiation is an environmental pollutant. There is a need to evaluate the potential health effects and the environmental effects of both the new and the existing technology, including the effect of adding millions of radiation sources on water and on wildlife, e.g. bees, and effects on climate change (multiple energy sources required for all radiation sources and wireless devices; heating effect of microwave antennas on water molecules in the environment)
- There is need to evaluate the economic implications of adding millions of sources of electromagnetic radiation in the public space near citizens' homes, since this chronic exposure would raise the odds of more people becoming electrohypersensitive, and eventually leaving their workplace or home to avoid exposure.<sup>32</sup> Excessive cases of cancer would raise the burden on the Health system
- Mast sharing by communications companies can reduce exposure, or even better: one single low-exposure network
- An individual "opt-out" option for citizens from wireless devices of public source near their private homes would safeguard their rights to refrain from exposure
- The public should be warned about adverse effects of G5 frequencies, and unbiased research should be funded by government agencies or dedicated trust funds

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