



# Scientific American: ‘We Have No Reason To Believe 5G Is Safe’

The 5G industry has spent no funds on consumer safety testing, yet it disparages and vilifies legitimate scientists and studies that are issuing strong warnings about its safety. It’s time the public took notice! □ TN Editor

The telecommunications industry and their experts have accused many scientists who have researched the effects of cell phone radiation of “fear mongering” over the advent of wireless technology’s 5G. Since much of our research is publicly-funded, we believe it is our ethical responsibility to inform the public about what the peer-reviewed scientific literature tells us about the health risks from wireless radiation.

The chairman of the Federal Communications Commission (FCC) recently announced through a [press release](#) that the commission will

soon reaffirm the radio frequency radiation (RFR) exposure limits that the FCC adopted in the late 1990s. These limits are based upon a [behavioral change in rats](#) exposed to microwave radiation and were designed to protect us from [short-term heating risks due to RFR exposure](#).

Yet, since the FCC adopted these limits based largely on research from the 1980s, the preponderance of peer-reviewed research, [more than 500 studies](#), have found harmful biologic or health effects from exposure to RFR at intensities too low to cause significant heating.

Citing this large body of research, more than 240 scientists who have published peer-reviewed research on the biologic and health effects of nonionizing electromagnetic fields (EMF) signed [the International EMF Scientist Appeal](#), which calls for stronger exposure limits. The appeal makes the following assertions:

“Numerous recent scientific publications have shown that EMF affects living organisms at levels well below most international and national guidelines. Effects include increased cancer risk, cellular stress, increase in harmful free radicals, genetic damages, structural and functional changes of the reproductive system, learning and memory deficits, neurological disorders, and negative impacts on general well-being in humans. Damage goes well beyond the human race, as there is growing evidence of harmful effects to both plant and animal life.”

The scientists who signed this appeal arguably constitute the majority of experts on the effects of nonionizing radiation. They have published more than 2,000 papers and letters on EMF in professional journals.

The FCC’s RFR exposure limits regulate the intensity of exposure, taking into account the frequency of the carrier waves, but ignore the signaling properties of the RFR. Along with the patterning and duration of exposures, certain characteristics of the signal (e.g., pulsing, polarization) [increase the biologic and health impacts](#) of the exposure. New exposure limits are needed which account for these differential effects. Moreover, these limits should be [based on a biological effect](#), not a change in a laboratory rat’s behavior.

The World Health Organization's International Agency for Research on Cancer (IARC) [classified RFR as "possibly carcinogenic to humans"](#) in 2011. Last year, a \$30 million study conducted by the U.S. National Toxicology Program (NTP) found "clear evidence" that two years of exposure to cell phone RFR [increased cancer in male rats and damaged DNA in rats](#) and [mice](#) of both sexes. The Ramazzini Institute in Italy replicated the key finding of the NTP using a different carrier frequency and much weaker exposure to cell phone radiation over the life of the rats.

Based upon the research published since 2011, including human and animal studies and mechanistic data, the IARC has recently prioritized RFR to be reviewed again in the next five years. Since many EMF scientists believe we now have [sufficient evidence](#) to consider RFR as either a probable or known human carcinogen, the IARC will likely upgrade the carcinogenic potential of RFR in the near future.

Nonetheless, without conducting a formal risk assessment or a systematic review of the research on RFR health effects, the FDA recently reaffirmed the FCC's 1996 exposure limits [in a letter to the FCC](#), stating that the agency had "concluded that no changes to the current standards are warranted at this time," and that "NTP's experimental findings should not be applied to human cell phone usage." The letter stated that "the available scientific evidence to date does not support adverse health effects in humans due to exposures at or under the current limits."

The latest cellular technology, 5G, will employ millimeter waves for the first time in addition to microwaves that have been in use for older cellular technologies, 2G through 4G. Given limited reach, 5G will require cell antennas every 100 to 200 meters, exposing many people to millimeter wave radiation. 5G also employs new technologies (e.g., active antennas capable of beam-forming; phased arrays; massive inputs and outputs, known as MIMO) which pose unique challenges for measuring exposures.

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