



## CASE STUDY: CELL PHONE RADIATION

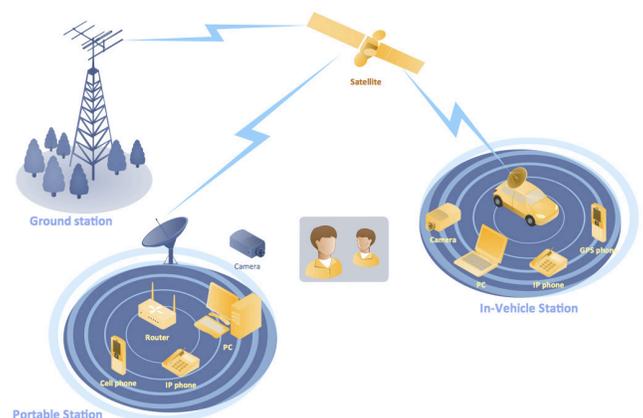
### Summary

The International Agency for Research on Cancer's (IARC) [classification](#) of radiofrequency from cell phones as “possibly carcinogenic” is a prime example of the Agency’s outdated and faulty process. The evaluation was based primarily on two widely-criticized studies: the Interphone study, which was funded by IARC itself, and a collection of studies led by Swedish researcher, Dr. Lennart Hardell. As is often the case with IARC Monographs, the Working Group charged with evaluating carcinogenic risk factors was dominated by scientists with conflicts of interest, financial incentives, and activist histories. For example, Dr. Hardell served as a member of the Monograph Working Group, allowing him to [promote](#) his own work and findings, while Anders Alhborn, an expert who had criticized Hardell’s work in the past, was asked to [leave](#). The final conclusion was [contested](#) by some of the expert panelists within the Working Group because they were concerned about the data reviewed and that [personal ambitions](#) drove the Working Group’s agenda. In the end, IARC’s classification of cell phone radiofrequency provides another example of the urgent need to reform both the Agency and its processes.

### What are Radiofrequency Electromagnetic Fields?

Radiofrequency (RF) electromagnetic fields (EMFs) are a type of [non-ionizing radiation](#). “Non-ionizing” means that the radiation does not carry enough energy to physically alter atoms or molecules. This means that its impact is strictly “thermal” - it can only heat up atoms and molecules.

The most common use for radiofrequency is in [telecommunication services](#), such as radio and television broadcasting, cell phones, radio communications, satellites, and radar. Drastic leaps in technology over the past decades have made the use of radiofrequencies ever more crucial to modern societies. Cell phones, for example, have enjoyed mass popularity, with an [estimated](#) 4.6 billion mobile phone users worldwide. The demand and use of cell phones has a [significant impact](#) on global economies, with related businesses also booming; the app business, for example, could exceed [\\$101 billion](#) by 2020. However, radiofrequency also has significant application in the medical field, where it is used to generate images in MRIs, physical therapy, [neurosurgery](#), and eye procedures.

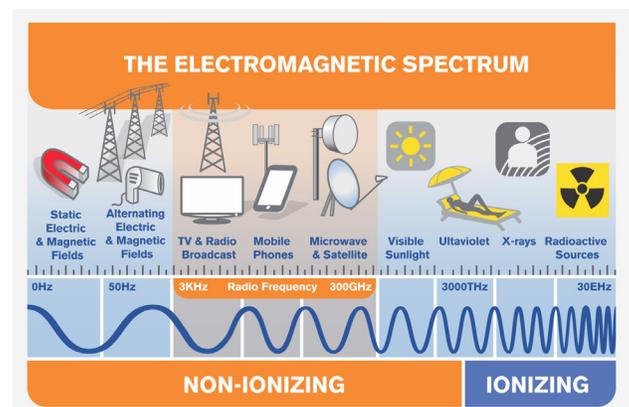


Source: [Concept Draw, Mobile Satellite Communications](#)

### Are Radiofrequencies Safe?

There is no convincing [scientific evidence](#) that RF radiation causes any adverse health effects, especially at levels emitted by devices such as cell phones. The [frequency](#) associated with RF has long been considered harmless, and is less powerful than the waves emitted from sunlight, incandescent light bulbs, fire, and even remote controls.

However, the sheer popularity of cell phones and their ubiquity in modern society have raised



Source: [International Telecommunications Union EMF Guide](#)

questions about whether increased exposure to RF could cause an unanticipated health risk. However, studies of cell phones have consistently demonstrated that RF does not pose a health risk, and in [recent years](#), a number of scientific organizations and individual [experts](#) have confirmed this:

- [National Cancer Institute](#) (2016): “Radiofrequency energy, unlike ionizing radiation, does not cause DNA damage that can lead to cancer. It’s only consistently observed biological effect in humans is tissue heating. In animal studies, it has not been found to cause cancer or to enhance the cancer-causing effects of known chemical carcinogens.”
- [U.S. Food and Drug Administration](#) (2014): “According to current data, the FDA believes that the weight of scientific evidence does not show an association between exposure to radiofrequency from cell phones and adverse health outcomes.”
- [World Health Organization](#) (2014): “A large number of studies have been performed over the last two decades to assess whether mobile phones pose a potential health risk. To date, no adverse health effects have been established as being caused by mobile phone use.”
- [British Medical Journal](#) (2012): “Raised risks of glioma with mobile phone use, as reported by one (Swedish) study forming the basis of the IARC’s re-evaluation of mobile phone exposure, are not consistent with observed incidence trends in US population data.”
- [Environmental Health Perspectives](#) (2011): “The trend in the accumulating evidence is increasingly against the hypothesis that mobile phone use can cause brain tumors.”

Note: Some types of radiation, called “ionizing radiation”, are capable of biological harm.. Some examples include gamma rays, cosmic rays, and nuclear fallout.

## IARC’s Classification

Despite global regulatory consensus, IARC took a different view.

On May 31, 2011, IARC issued a press release [announcing](#) its decision to label radiofrequency electromagnetic fields as “possibly carcinogenic to humans” (Group 2B). The Working Group [admitted](#) that there was inadequate evidence to tie carcinogenicity to occupational and environmental exposure, but based their conclusion on the results of IARC’s own, [widely-criticized Interphone study](#), and a cohort study led by Dr. Lennart Hardell, who served as a Monograph 102 Working Group member. The IARC Monograph commented on the importance of both studies in its conclusion, [saying](#) that the “bulk of evidence came from reports of the Interphone study...and a separate large case-control study from Sweden on gliomas, both of which showed an association.” Glioma is a common type of brain tumor.

A dissenting minority of Working Group members [believed](#) that “current evidence in humans was inadequate, therefore permitting no conclusion about a causal association.” This difference in opinion was only disclosed in the full Monograph 102, which wasn’t available to the public until [April 2013](#), fully two years later.

Leading academics and scientists immediately criticized IARC’s misclassification:

- [David Savitz Ph.D.](#), epidemiologist at Brown University (2011): “There has been no obvious uptick in brain cancer rates in the two decades since cell phones went from zero to some 5 billion subscriptions in the world.”
- [Geoffrey Kabat](#), cancer epidemiologist at the Albert Einstein College of Medicine (2011): “There has been little insight into how the IARC could evaluate all of the relevant scientific evidence and come up with an impossibly vague conclusion...At the end of the week-long meeting everyone voted, but, interestingly, the vote was only on the epidemiology. In other words, all the other evidence from experimental studies was left out of the final decision on how to classify RF.”

WHAT TO MAKE OF IARC’S CLASSIFICATIONS		
GROUP	WHAT DOES IT MEAN?	WHAT DOES IT INCLUDE?
GROUP 1	<b>CARCINOGENIC TO HUMANS</b> Sufficient evidence in humans. Causal relationship established.	Tobacco, mustard gas, plutonium, processed meats, canned fish, alcohol, sun
GROUP 2A	<b>PROBABLY CARCINOGENIC TO HUMANS</b> Limited evidence in humans. Sufficient evidence in animals.	Red meat, frying, very hot beverages, exposures from working in hairdressing
GROUP 2B	<b>POSSIBLY CARCINOGENIC TO HUMANS</b> Limited evidence in humans. Insufficient evidence in animals.	Pickled vegetables, radiofrequency electromagnetic fields, exposures from working in carpentry, gasoline
GROUP 3	<b>CARCINOGENICITY NOT CLASSIFIABLE</b> Inadequate evidence in humans. Inadequate evidence in animals.	Coffee, tea, caffeine, fluorescent lighting
GROUP 4	<b>PROBABLY NOT CARCINOGENIC</b> Evidence suggests no carcinogenicity in humans/animals.	ONLY 1 CHEMICAL EVER PLACED IN THIS GROUP. OF ALL SUBSTANCES ASSESSED Caprolactam which is used in the manufacture of synthetic fibres.

Source: [Compound Interest](#)

- [Kenneth Foster](#), bioengineer at the University of Pennsylvania (2011): “Scientists have been studying how electro-magnetic fields in the non-ionizing range, such as radio-frequency energy, interact with biological matter since probably around 1900...And nothing has emerged that would indicate how such fields could produce biological effects other than heating...The epidemiology data IARC looks at is ‘quite solidly negative except that some exposure conditions...seem to suggest a barely detectable increase in the likelihood of a couple rare kinds of tumor...IARC made their decision mostly on this basis.’”
- [Lorne Trottier](#), co-founder of Matrox and EMF expert (2012): “Since the IARC published its report the evidence against its conclusion has grown stronger. Three new studies of cancer incidence rates have shown that rates have remained flat up to at least 2009. The findings of Hardell et al. have been put to the test in these same three studies. A large portion of Hardell’s results have been shown to be wrong. This undermines one of the main pillars for IARC’s finding. The authors of Interphone, the other main pillar have stated that biases and error prevent a causal interpretation of their results.”

### Related Links

- Are Cell Phones a Possible Carcinogen? An Update on the IARC Report (Science Based Medicine, [April 2, 2012](#))
- At C.D.C., a Debate Behind Recommendations on Cellphone Risk (NY Times, [January 1, 2016](#))
- Behind The World Health Organization’s “Cancerous” Pronouncement On Cell Phones (Forbes, [August 23, 2011](#))
- Brain cancer incidence trends in relation to cellular telephone use in the United States (Neuro-Oncology, [July 16, 2010](#))
- Brain tumour risk in relation to mobile telephone use: results of the INTERPHONE international case-control study (International Journal of Epidemiology, [March 8, 2010](#))
- CDC Avoids Panic Over Cell Phone Radiation Warnings – Protects Profits NOT People (RF Safe, [January 1, 2016](#))
- CDC Calls for Caution on Cell Phones, Then Gets Cold Feet (Microwave News, [August 16, 2014](#))
- Cell Phones and Cancer Risk Fact Sheet (NIH National Cancer Institute, [October 6, 2016](#))
- Cell Phones and Cancer: A Study’s Muddled Findings (TIME, [May 17, 2010](#))
- Current Research Results on Cell Phones (from FDA, [October 6, 2016](#))
- Do Cell Phones Cause Cancer? Probably, but It’s Complicated (Scientific American, [June 13, 2016](#))
- Electromagnetic fields and public health: mobile phones fact sheet (WHO, [October 6, 2014](#))
- GAO Research and Regulatory Efforts on Mobile Phone Health Issues (US GAO, [May 7, 2001](#))
- IARC Monograph 102 Corrigenda ([March 30, 2016](#))
- IARC Monograph 102: Non-Ionizing Radiation ([October 6, 2016](#))
- IARC Press Release for Radiofrequency EMFs ([May 31, 2011](#))
- ITU EMF Guide (from EMF Guide, [October 6, 2016](#))
- Location of gliomas in relation to mobile telephone use: a case-case and case-specular analysis (American Journal of Epidemiology, [July 1, 2016](#))
- Major Cell Phone Radiation Study Reignites Cancer Questions (Scientific American, [May 27, 2016](#))
- Microwave News Report on EMFs (Microwave News, [November 30, 1999](#))
- Mobile phone use and glioma risk: comparison of epidemiological study results with incidence trends in the United States (British Medical Journal, [January 3, 2012](#))
- Mobile Phones, Brain Tumors, and the Interphone Study: Where Are We Now? (Environmental Health Perspectives, [July 1, 2011](#))

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- Non-Ionizing Radiations – Sources, Biological Effects, Emissions, and Exposures (International Conference on Non-Ionizing Radiation at UNITEN, [October 20, 2003](#))
- Number of mobile phone users worldwide 2013-2019 (Statista, [October 6, 2016](#))
- Power-Frequency EMFs Promote Cancer in Massive Animal Study (Microwave News, [February 27, 2016](#))
- Radiation Protection (from EPA, [October 6, 2016](#))
- Radiofrequency Ablation (from UCLA Health, [October 6, 2016](#))
- Radiofrequency Radiation (from HPS, [October 6, 2016](#))
- The app economy could double to \$101 billion by 2020 (Venture Beat, [February 10, 2016](#))
- Time trends (1998–2007) in brain cancer incidence rates in relation to mobile phone use in England (Bioelectromagnetics Journal, [January 28, 2011](#))
- What is Ionizing Radiation? (from WHO, [October 6, 2016](#))
- What is the impact of mobile telephony on economic growth? (GSM Association, [November 12, 2012](#))
- What the WHO's Cellphone-Cancer Statement Really Means (IEEE Spectrum, [June 23, 2011](#))
- WHO Says Cell Phone Radiation Is “Possibly Carcinogenic.” Now What? (TIME, [May 31, 2011](#))
- Working with Non Ionizing Radiation (from University of Twente, [October 6, 2016](#))
- Your Cell Phone Absolutely Will Not Give You Brain Cancer (True Viral News, [October 18, 2016](#))