Misunderstandings about radiofrequency electromagnetic field exposure and 5G misinformation

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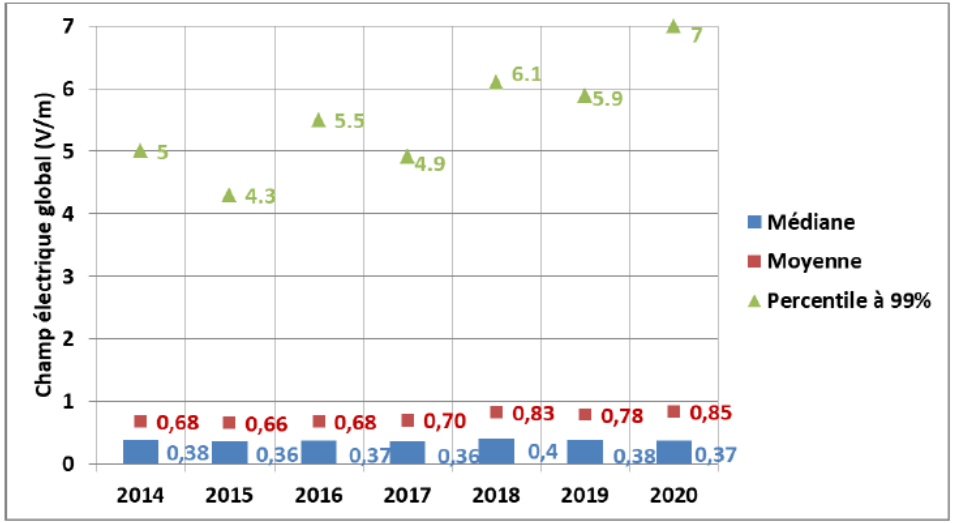
No significant change in RF-EMF exposure from networks



Median level 4,500 times below limit

Median values (blue), mean values (red) and 99% percentiles (green) versus year

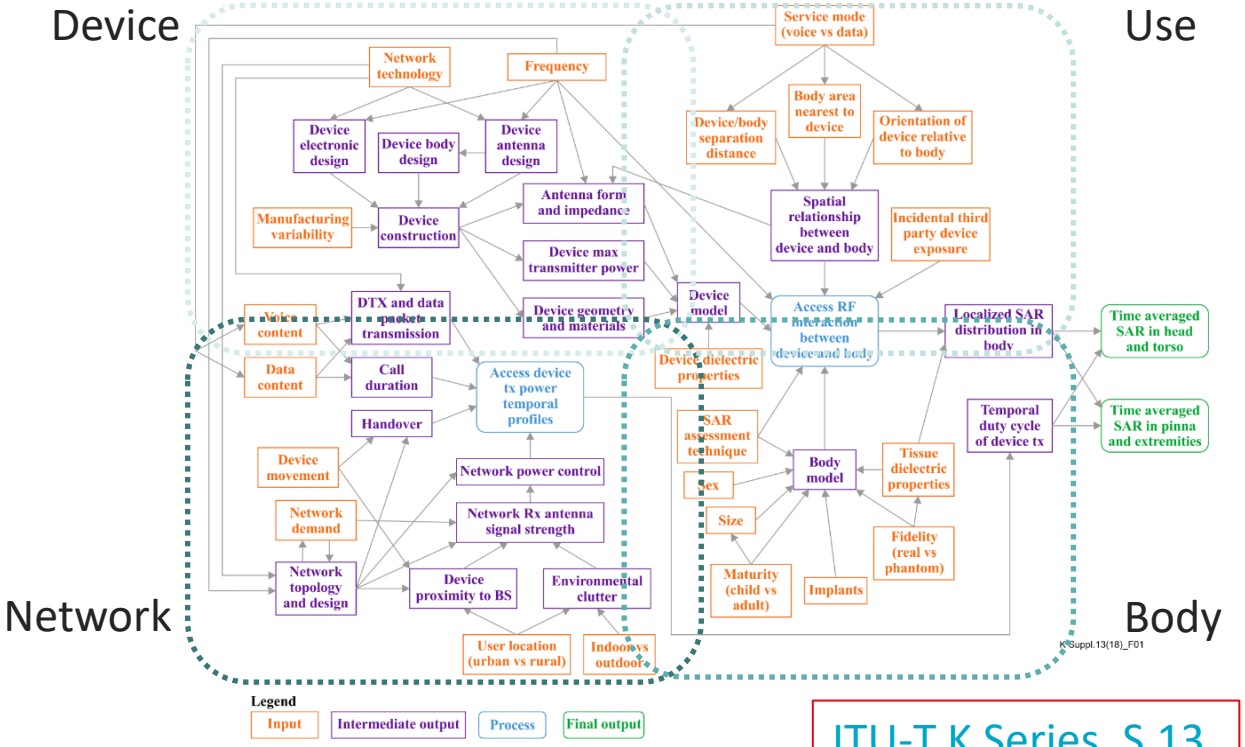
France: ANFR (2021)

'This review does not indicate a noticeable increase in everyday RF-EMF exposure since 2012 despite increasing use of wireless communication devices.'
- Jalilian et al., 2019

A low SAR phone may not reduce personal exposure

1%

99%

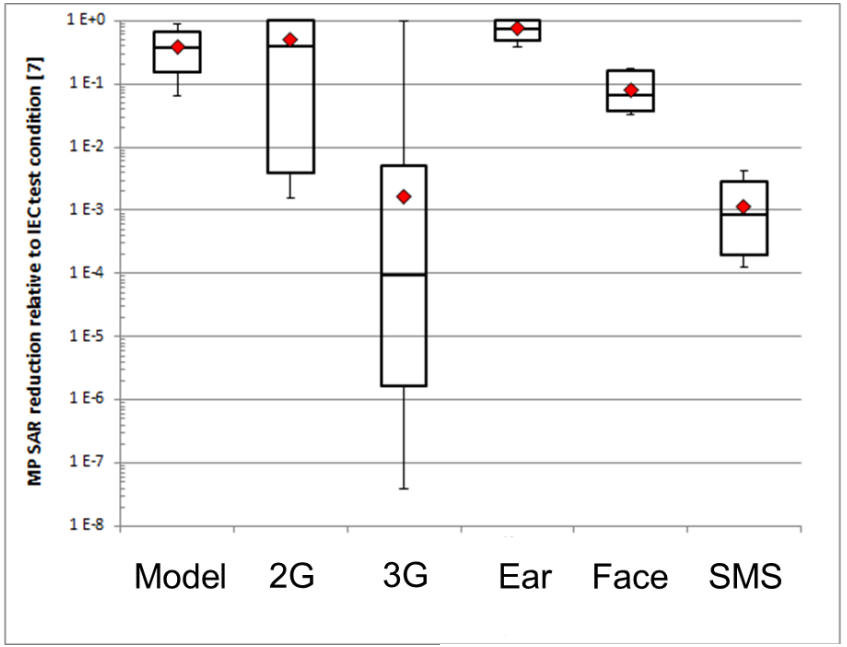


Liorni et al., 2020

ITU-T K Series, S.13

A low SAR phone may not reduce personal exposure

- SAR tests under laboratory conditions
- Adaptive power control in use
- Technology more important than limit value



BfS (2011), Vrjheid et al., 2009; Persson et al., 2011; Keshvari et al., 2011; Hadjem et al., 2010

Interpretation of box and whisker chart

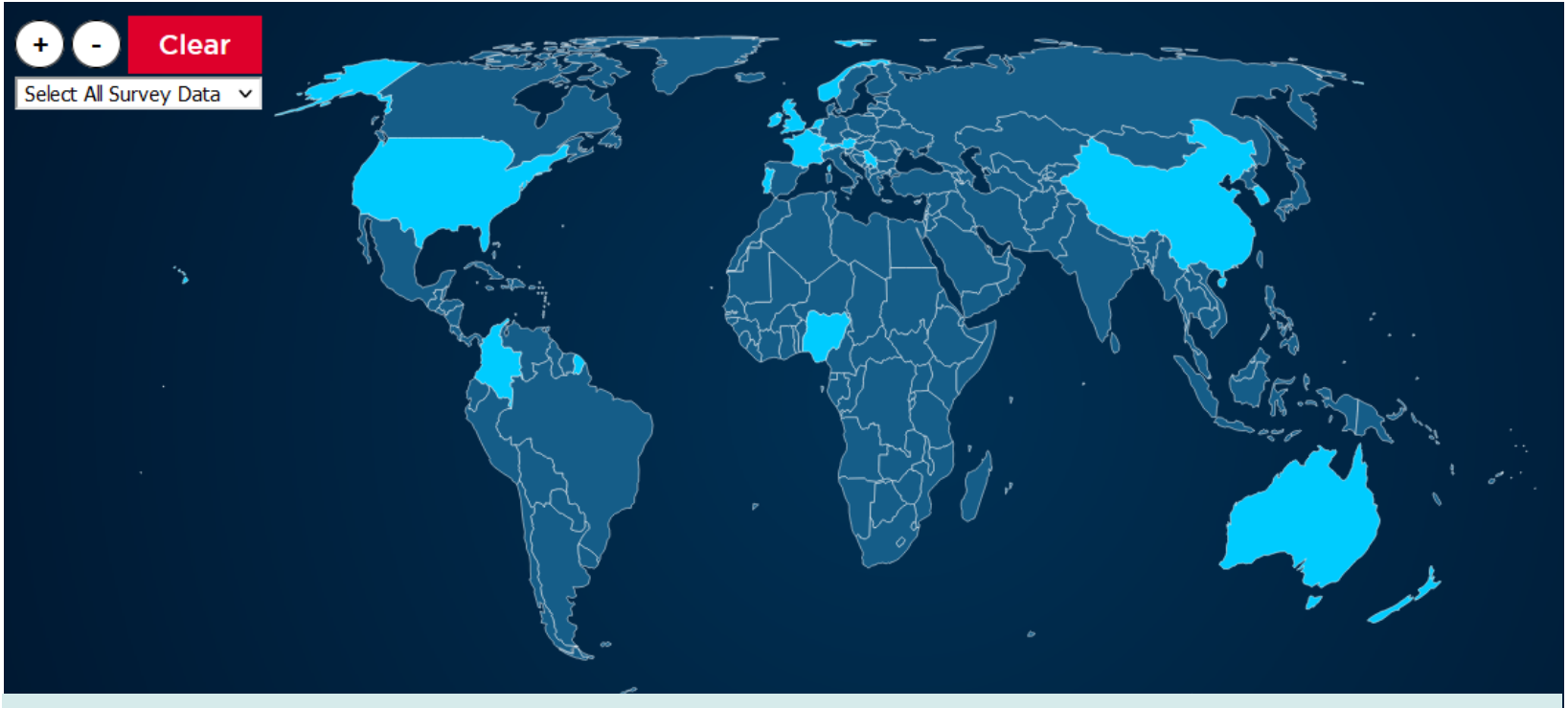
Top whisker:	upper bound
Top of box:	95th %tile
Middle of box:	50th %tile (median)
Bottom of box:	5th %tile
Bottom whisker:	lower bound
Red diamond:	relative mean power

5G deployments will have little impact on RF-EMF levels

- *The "optimised 4G" scenario reveals that a possible delay to 5G would not result in the stabilisation of the current exposure levels; indeed, it would see a significant increase in exposure in dense areas to allow the 4G network to attempt to cater to part of the expected increase in traffic.*
- *The "5G only" scenario results in a moderate increase in exposure … It shows that the 5G beam steering antennas in the 3.4-3.8 GHz band in the long term should not be the main contributors to exposure, including in dense urban areas where these antennas should be widely deployed.*
  - ANFR (2020)

- *It was found that the impact of the investigated [5G NR commercial] network on the total environmental RF-EMF exposure was small, only a few percent of the total RF-EMF exposure even in the case of 100% induced traffic.*
  - Aerts et al., 2021

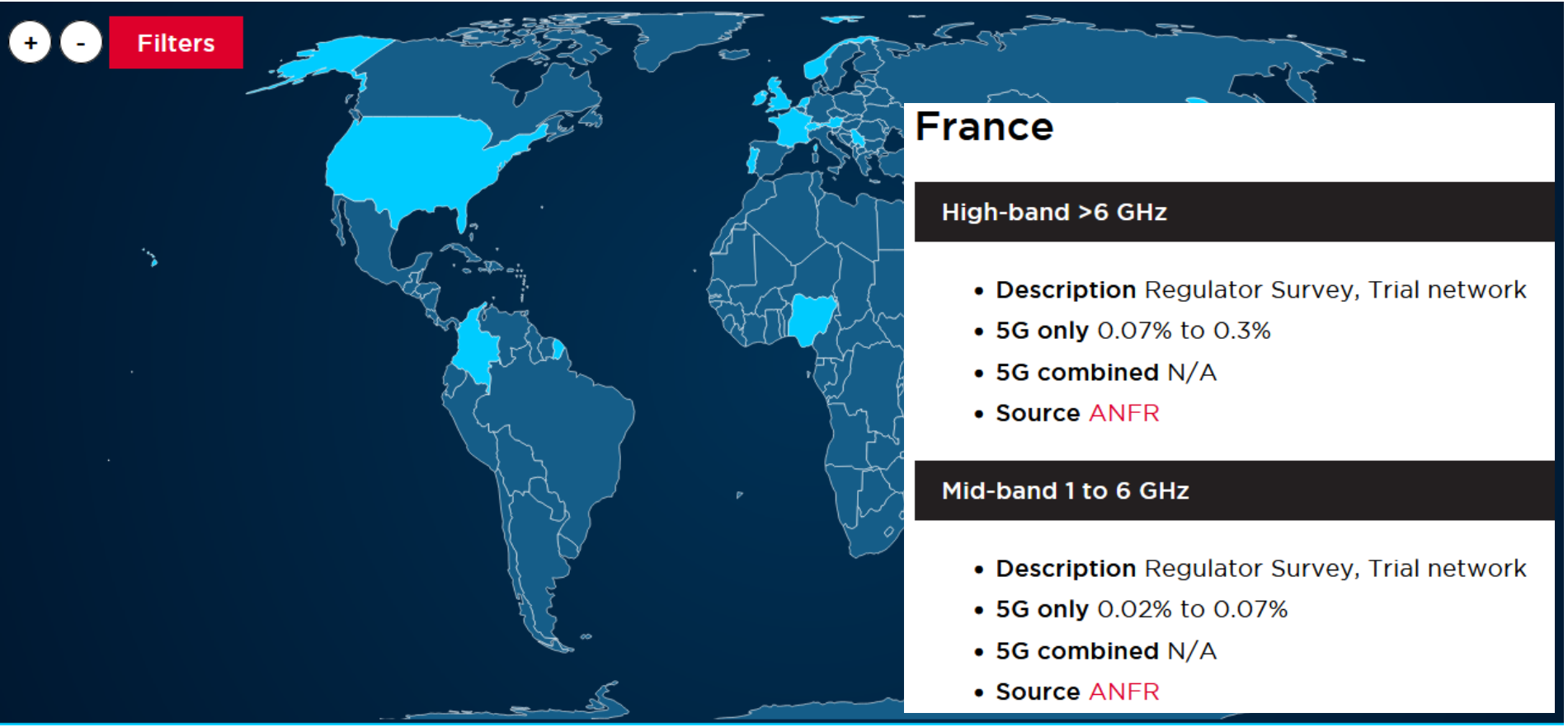
5G EMF surveys map



https://www.gsma.com/publicpolicy/emf-and-health/safety-of-5g-networks/5g-emf-surveys

Country with 5G survey data

5G EMF surveys map: country summary - France



France

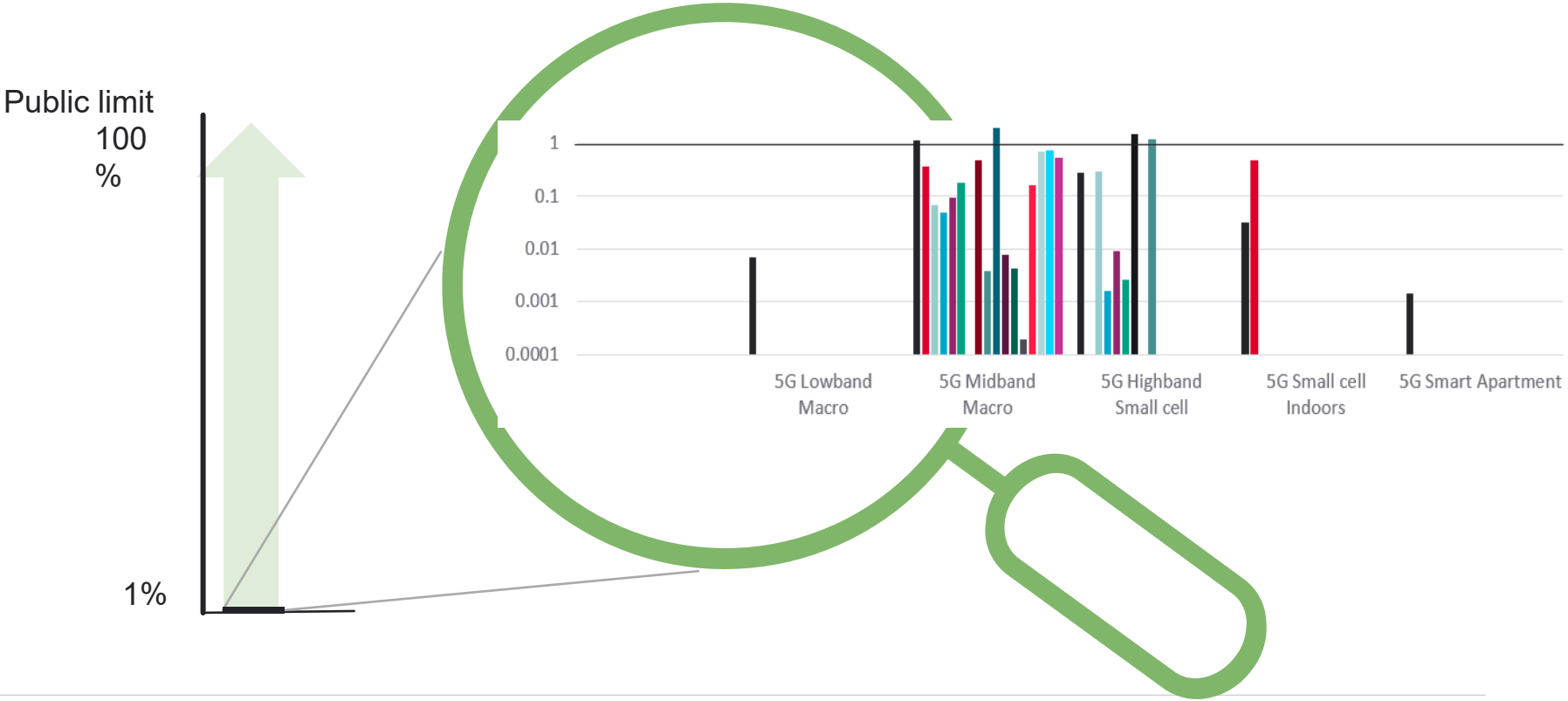
High-band >6 GHz

- **Description** Regulator Survey, Trial network
- **5G only** 0.07% to 0.3%
- **5G combined** N/A
- **Source** ANFR

Mid-band 1 to 6 GHz

- **Description** Regulator Survey, Trial network
- **5G only** 0.02% to 0.07%
- **5G combined** N/A
- **Source** ANFR

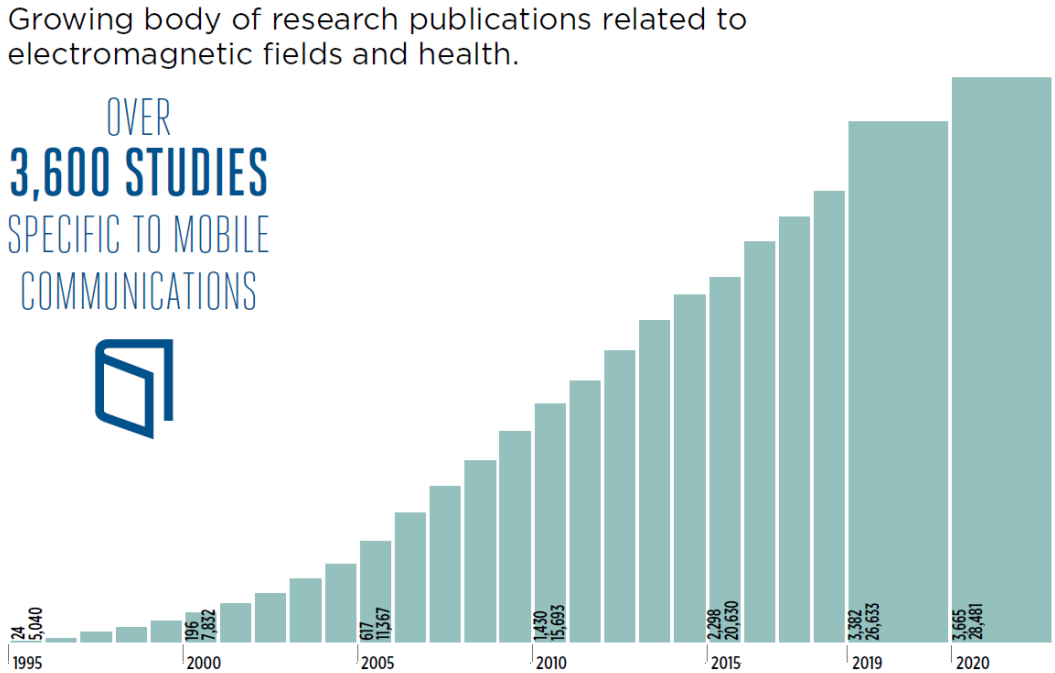
5G RF-EMF surveys – in context



A large body of relevant research exists

'…a review of all the [>6 GHz] studies provided no substantiated evidence that low-level radio waves, like those used by the 5G network, are hazardous to human health.'

Australia: ARPANSA (2021)



GSMA (2021) from EMF-Portal

Established RF-EMF hazards relate to heating

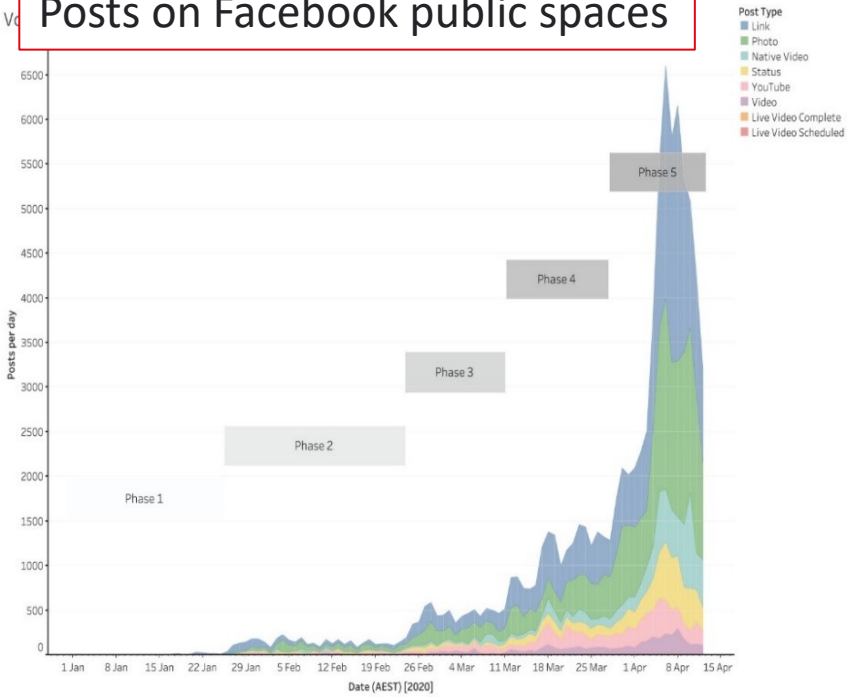
'There is no evidence of adverse health effects at exposure levels below the restriction levels in the ICNIRP (1998) guidelines and no evidence of an interaction mechanism that would predict that adverse health effects could occur due to radiofrequency EMF exposure below those restriction levels.'

https://www.icnirp.org/

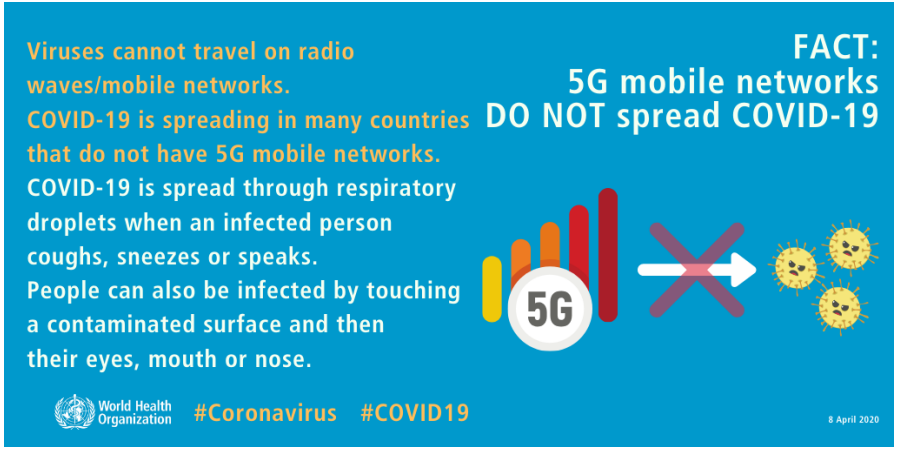
Health effect	ICNIRP summary
Brain electrical activity and cognitive performance	*There is no substantiated experimental or epidemiological evidence that exposure to radiofrequency EMFs affects higher cognitive functions relevant to health.*
Symptoms and wellbeing	*No reports of adverse effects of radiofrequency EMF exposures on symptoms and wellbeing have been substantiated, except for pain, which is related to elevated temperature at high exposure levels.*
Other brain physiology and related functions	*There is no evidence of effects of radiofrequency EMFs on physiological processes that impair human health.*
Auditory, vestibular, and ocular function	*No reported effects on auditory, vestibular, or ocular function or pathology relevant to human health have been substantiated*
Neuroendocrine system	*The lowest level at which an effect of radiofrequency EMFs on the neuroendocrine system has been observed is 4 W/kg (in rodents and primates), but there is no evidence that this translates to humans or is relevant to human health. No other reported effects have been substantiated*
Neurodegenerative diseases	*In summary, no adverse effects on neurodegenerative diseases have been substantiated.*
Cardiovascular system, autonomic nervous system, and thermoregulation	*No effects on the cardiovascular system, autonomic nervous system, or thermoregulation that compromise human health have been substantiated for exposures with whole-body average SARs below approximately 4 W/kg, with harm only found in animals exposed to whole-body average SARs substantially higher than 4 W/kg.*
Immune system and haematology	*The few human studies that have been conducted have not provided any evidence that radiofrequency EMFs affect health in humans via the immune system or haematology.*
Fertility, reproduction, and childhood development	*No adverse effects of radiofrequency EMF exposure on fertility, reproduction, or development relevant to human health have been substantiated.*
Cancer	*No effects of radiofrequency EMFs on the induction or development of cancer have been substantiated.*

Misinformation linking 5G to COVID-19

Posts on Facebook public spaces



Bruns et al., 2020



International EMF Exposure Guidelines

EMF Exposure Compliance Policies for Mobile Network Sites

5G, the Internet of Things and Wearable Devices

- Misunderstandings about RF-EMF and 5G specific misinformation continue
- International EMF guidelines are protective against all established hazards
- Typical RF-EMF levels remain a small fraction of limits

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