

SINGAPORE

Report to the World Health Organisation on EMF Activities

International EMF Project

International Advisory Committee

June 2024

Electromagnetic Field Exposure and Health Effects Research Activities

Radiofrequency (RF) Radiation Measurement and Assessment Study

The National Environment Agency (NEA) has commissioned a radiofrequency (RF) radiation measurement and assessment study in Nov 2022 to measure and assess RF radiation levels in Singapore in public accessible areas arising from RF radiation emissions from various types of RF communications and broadcasting services. The study is a follow-up to a previous study done in 2017 and was completed in end 2023.

The study showed that the RF radiation levels in Singapore are well within the International Commission on Non-Ionising Radiation Protection (ICNIRP) exposure guidelines for RF radiation. NEA is planning to conduct a follow-up study in 2026/2027.

Electromagnetic Hypersensitivity

In collaboration with the NEA, the Academy of Medicine Singapore has issued a statement on electromagnetic hypersensitivity or Idiopathic Environmental Intolerance to Electromagnetic Fields. The statement can be found on NEA website via this [link](#).

Policies and Legislation Regarding Electromagnetic Field Exposure

General

In Singapore, the Radiation Protection Act (RPA) and its Regulations govern and regulate activities and safety issues pertaining to ionising and non-ionising radiation. The NEA enforces the RPA and its Regulations.

Under Radiation Protection (Non-Ionising Radiation) Regulations, selected types of non-ionising radiation equipment are controlled:

- 1) Sunlamps
- 2) Microwave ovens
- 3) Ultrasound apparatus
- 4) Magnetic resonance imaging apparatus
- 5) High power lasers

Telecommunication equipment and electrical power equipment or facility are not classified as controlled apparatus under the RPA. On public exposure to RF and Extremely Low Frequency (ELF) radiation from such sources, the NEA adopts the ICNIRP exposure guidelines for RF and ELF radiation.

RF and ELF Exposure

[International Agency for Research for Cancer \(IARC\)](#) has classified RF electromagnetic fields and ELF magnetic fields as Group 2B carcinogen (possibly carcinogenic to humans).

ICNIRP has taken a cautious approach in developing the exposure guidelines by including [reduction factors](#)¹ and World Health Organisation (WHO) has concluded that there is no convincing scientific evidence of adverse health effects in populations or individuals that are a result of exposure to very low RF radiation.

The ELF levels near electrical substations and switchrooms in Singapore are low and well within ICNIRP guidelines. Nonetheless, in line with the WHO's recommendation, NEA encourages developers to explore the implementation of cost effective measures as a precaution to further lower exposure to ELF radiation when building new facilities or modifying existing facilities.

Government agencies will continue to monitor international developments relating to effects of RF and ELF exposure on health in order to make policy interventions if and when necessary.

5G Standalone Networks

The mobile network operators have rolled out the 5G standalone networks from 2021 with the target of nationwide coverage by end-2025. Singapore will continue to take guidance from WHO and ICNIRP guidelines, monitor international developments on this matter, and track such radiation levels in Singapore.

Cessation of 3G Networks

The regulator for the telecom industry (Infocomm Media Development Authority of Singapore) has announced that 3G networks in Singapore will be retired by 31 July 2024. The spectrum released will be used for *"5G to provide a better experience for users and support enterprises undergoing digital transformation."* From the RF radiation measurement and assessment study carried out, it was noted that 3G network accounted for about 0.3% of the RF radiation levels. NEA expects that the RF radiation levels in Singapore to be largely unchanged due to the cessation of 3G services. Information on the announcement can be found at this [link](#)

¹ The guidelines use a range of mechanisms to ensure that all people are protected from RF EMF exposure. One of these is the use of reduction factors, that ensure that the restrictions are far lower than are required to cause adverse health effects for all people.

Areas of Public Concern and National Responses

There is an increasing trend in the number of queries received from members of the public regarding the safety of RF radiation emitted from mobile base stations and ELF radiation emitted from electrical substations. The queries were addressed based on findings, recommendations and advice from WHO factsheets and health publications on radiation.

Public Information Activities

An updated list of information on RF radiation and ELF radiation is made available on NEA website via the following links:

- RF radiation at this [link](#)
- ELF radiation at this [link](#)