Glossary

The descriptions below are intended to help the reader understand the text; they are not necessarily definitive scientific terms, for which the reader is advised to consult specialist sources.

Words in bold are defined separately.

Analogue	The original cellular technology used in the transmission of speech by Vodafone and Cellnet since 1985, operating as an analogue system at 900 MHz. Typically accessed by high powered phones installed in cars.
AM	Amplitude modulation.
Action potential	Voltage produced across a nerve cell membrane by a stimulus. It arises from the entry of sodium ions across the cell membrane, which results in membrane depolarisation.
Antenna	Device designed to radiate or receive electromagnetic energy.
APC	Adaptive Power Control. System used to control mobile phones and base stations in order to ensure that the radiated power does not exceed the minimum consistent with high quality communication. The system effectively operates to reduce average radiated powers.
Base station	Facility providing transmission and reception for radio systems. For macrocells, the infrastructure comprises either roof- or mast-mounted antennas and an equipment cabinet or container. For smaller microcells and picocells, the antennas and other equipment may be housed in a single unit.
Case–control study	An investigation into the extent to which a group of persons with a specific disease (the cases) and comparable people who do not have the disease (the controls) differ with respect to exposure to putative risk factors.
CDMA	Code Division Multiple Access. System that encodes signals to a number of users, so that all of these users can simultaneously use a single, wide frequency band. Each user's handset decodes the information for that user, but cannot access information for any other user.
Cell and Cellular	A cell in the context of mobile phone technology is the area of geographical coverage from a radio base station. "Cellular" describes such systems, but is often used to distinguish the original analogue systems from the later digital **PCN** systems, although the latter themselves have cells.
Chromosomes	Rod-shaped bodies found in the **nucleus** of cells in the body. They contain the genes or hereditary material. Human beings possess 23 pairs.
Cohort study	An investigation into the extent to which a group of individuals (the cohort) about whom certain exposure information is collected, and the ascertainment of the occurrence of diseases at later times. For each individual, information on prior exposures can be related to subsequent disease experience.

CJD	Creutzfeldt-Jakob disease.
Confidence interval (CI)	An interval calculated from data when making inferences about an unknown parameter. In hypothetical repetitions of the study, the interval will include the parameter in question on a specified percentage of occasions (for example, 95% for a 95% confidence interval).
CW	Continuous wave.
Decibel (dB)	A measure of the increase or decrease in power at two points expressed in logarithmic form. Gain = $10 \log_{10}(P_2/P_1)$.
DECT	Digital Enhanced Cordless Telecommunications.
Digital	Technology introduced in the 1990s as a method of transmitting speech and data. Offers increased security, and technical advantages with low powered phones.
DNA	Deoxyribonucleic acid. The compound that controls the structure and function of cells and is the material of inheritance.
DTX	Discontinuous transmission. System regulating mobile phones to ensure that transmission occurs only during speech. The system has the effect of reducing the time of exposure to approximately half (assuming an equal conversation).
EEG	Electroencephalogram. Measurement of changing voltages associated with brain activity.
EIRP	Equivalent isotropically radiated power. This is the power that would have to be emitted in *all directions* to produce a particular intensity and so takes account of the transmitter power plus the characteristics of the antenna.
Electric field	Produces a force on a charged object. Measured in units of volts per metre.
Electromagnetic fields	The electric and magnetic fields associated with electromagnetic radiation.
Electromagnetic radiation	A wave of electric and magnetic energy that travels or *radiates* from a source.
EMF	Electromagnetic field.
ERP	"Evoked" or "Event-related" potential.
FDD	Frequency division duplex.
Frequency	The number of complete cycles of an electromagnetic wave in a second. Measured in units of **hertz (Hz)**.
Genes	Biological units of heredity. They are arranged along the length of **chromosomes**.
Gene expression	The realisation of genetic information encoded in **genes** to produce functional protein or **RNA**.
GSM	Global System for Mobile Communications or *Groupe Spéciale Mobile*. The international, pan-European operating standard for the new generation of digital cellular mobile communications. Enables mobile phones to be used across national boundaries. PCN operators work to the same standard but at different frequency allocations.
Hertz (Hz)	Unit of frequency. One cycle per second.

IMT - 2000	International Mobile Telecommunications - 2000. International name for **UMTS**.
Infrared radiation	**Electromagnetic radiation** capable of producing the sensation of heat and found between visible radiation and **radiofrequency radiation** in the electromagnetic spectrum.
Intensity	The power crossing unit area normal to the direction of wave propagation. Measured in units of watts per square metre (W/m^2). See also **power density**.
Ion	Electrically charged atom or group of atoms.
Ion channel (gate)	Protein that allows the passage of ions across a membrane, down a concentration gradient.
Ion pump	A protein pump that moves ions across a membrane against a concentration gradient.
Magnetic field B	Produces a force on a charged object moving at an angle to it. Measured in tesla (T). See also **magnetic flux density**.
Magnetic flux density	Produces a force on a charged object moving at an angle to it. Measured in tesla (T). See also **magnetic field B**.
Magnetite	Naturally occurring oxide of iron with magnetic properties
Microwave	Electromagnetic radiation of ultra high frequencies between 1 GHz and 300 GHz.
Molecule	Smallest portion of a substance that can exist by itself and retain the properties of the substance.
Mutation	Chemical change in the DNA in the nucleus of a cell. Mutations in sperm or egg cells, or their precursors, may lead to inherited effects in children. Mutations in body cells may lead to effects in the individual.
Neuron(e)	Nerve cell. Basic unit of the nervous system, specialised for the transmission of electrical impulses.
Nucleus	The controlling centre of higher cells. Contains the important material **DNA**.
Order of magnitude	Quantity given to the nearest power of ten. A factor of ten or so.
OFTEL	Office of Telecommunications.
PCN	Personal Communications Network. A mobile system principally directed towards the hand portable, domestic user market and operating with **digital** technology at 1.8 GHz. The two main UK operators are One 2 One and Orange.
Power density	The power crossing unit area normal to the direction of wave propagation. Measured in units of watts per square metre (W/m^2). See also **intensity**.
Radiofrequency radiation	Electromagnetic radiation used for telecommunications and found in the electromagnetic spectrum at longer wavelengths than **infrared radiation**.
Relative risk	The ratio of the disease rate in the group under study to that in a comparison group, with adjustment for confounding factors such as age, if necessary.
RF	**Radiofrequency radiation**.

Risk	The probability or likelihood of injury, harm or damage occurring.
RNA	Ribonucleic acid.
SAR	**Specific energy absorption rate**.
Significance level	The probability of obtaining a result at least as extreme as that observed in the absence of a raised risk. A result that would arise less than 1 in 20 times in the absence of an underlying effect is often referred to a being "statistically significant".
Specific energy absorption rate	The rate at which energy is absorbed by unit mass of tissue in an electromagnetic field. Measured in units of watts per kilogram (W/kg).
Third Generation	The next evolution of mobile phone technology, based on **UMTS** and expected to result in widespread use of video phones and access to multimedia information.
TDD	Time Division Duplex.
TDMA	Time division multiple access. System that divides each frequency band into a number of time slots, each allocated to a single user. Allows several users to operate on the same frequency at the same time.
TETRA	Terrestrial enhanced trunk radio system.
Transcription	The synthesis of **RNA** from **DNA**.
UMTS	Universal Mobile Telecommunications System.
Wavelength	Distance between two successive points of a periodic wave in the direction of propagation, in which the oscillation has the same phase. Measured in units of metres.

Quantities and units used to characterise electromagnetic radiation

Quantity	Unit	Symbol
Frequency	hertz	Hz
Wavelength	metre	m
Electric field strength	volt per metre	V/m
Magnetic field strength*	ampere per metre	A/m
Magnetic field, B/Magnetic flux density*	tesla	T
Intensity/Power density	watt per square metre	W/m^2
Specific energy absorption rate (SAR)	watt per kilogram	W/kg

*A magnetic field strength of 1 A/m is equivalent to a magnetic field of $4\pi\ 10^{-7}$ T in non-magnetic media