



# DECT phone

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DECT phones consist of a base station and one or more mobile parts (handsets). The handset and the base station communicate with each other with high-frequency electromagnetic radiation. While emissions from the handset only occur during a call, the base station can also emit in the idle state.

DECT phones offer an ECO mode. When this is activated the base station, when idle, does not emit or emits only to a much lesser extent. In addition, the range of the base station (and thus the radiation strength) can be reduced in some models. During the conversation the emission of the handset (and sometimes the base station) is dynamically reduced, depending on the quality of the connection (distance between handset and base station).

Emissions from the base station and handset are low. They lie below the international threshold limits. The base station emissions decline rapidly with distance from the source.

The effects on health from long-term exposure to high-frequency electromagnetic fields from mobile phones and DECT phones are uncertain. Short-term effects of high-frequency radiation from DECT phones are not expected.

The following advice can be offered to people who, taking a precautionary approach, wish to keep EMFs to a minimum in their home or at work:

- Activate the low-emission mode (ECO mode) offered by DECT phones.
- Ensure that DECT base units without an ECO mode are placed at least 50 cm away from relaxation places or work stations occupied for long periods



# 1 Technical data

## 1.1 Structure

A DECT phone consists of a base station and one or more mobile parts (handsets). The base station and the handset communicate by means of high-frequency electromagnetic radiation.

The base station and the, or several, handsets transmit and receive alternately. As the device only produces emissions during transmission, the emissions are pulsed. The low emission and energy-saving ECO mode ensures that the base station only emits when telephoning. The transmitting power of the handset and the base station is automatically matched to the reception quality, hence strongly reduced for a short distance from the base station. A base station can communicate simultaneously with up to six handsets.

Range: up to 300 m outdoors, up to 50 m in buildings

Frequency: 1,88 - 1,9 GHz (high frequency)

Wavelength: approx. 16 cm

## 1.2 Transmitting power

	Transmitting power base station (mW)	Transmitting power handset (mW)
Peak transmitting power	250	250
6 telephone calls	60	10
1 telephone call	10	10
Idle state	2,5	0

The peak transmitting power of the base station and handset is 250 mW. Averaged over time, however, emissions are lower, since transmission is not continuous. The base station can communicate with up to six handsets simultaneously. In the idle state, when no calls are in progress, the base station transmits a brief pulse every 10 milliseconds. In the ECO mode, the base station emits nothing. The handset emits nothing in the idle state.

# 2 Exposure

Exposure to emissions is best described by the specific absorption rate (SAR, in watts per kilogram), which is a measurement of the electromagnetic radiation (W) absorbed by the human body (kg). In appliances operated at least one wavelength away from the body (16 cm in this case), the electric field can also be measured.



In a study carried out in 2005 by the IT`IS Foundation on behalf of the FOPH, electric fields were measured for three different DECT base stations and the SAR was determined for four different handsets [1].



Figure 2: Dummy head used for exposure measurements. Photo source: © <http://europa.eu.int>

SAR values were determined for the four handsets with the aid of a dummy head (Figure 2). The values measured were between 0.01 and 0.05 W/kg [1]. These values lie far below the limit of 2 W/kg [2]. One may assume, moreover, that the SAR value of DECT telephones in service is still somewhat smaller, as in the ECO mode the emission strength for a good connection quality (i.e. shorter distance from the base station) is correspondingly reduced.

The electric fields measured close to a DECT base station in the idle state and with the operation of one or more handsets are shown in Figure 3. The base station is without an ECO mode and also transmits when in the idle state. The field strength is highly distance dependent. The measured field strengths are all well below the limit of 60 V/m [2]. Even while six calls are in progress, the field strength at a distance of 20 cm is 10 times lower than the limit.

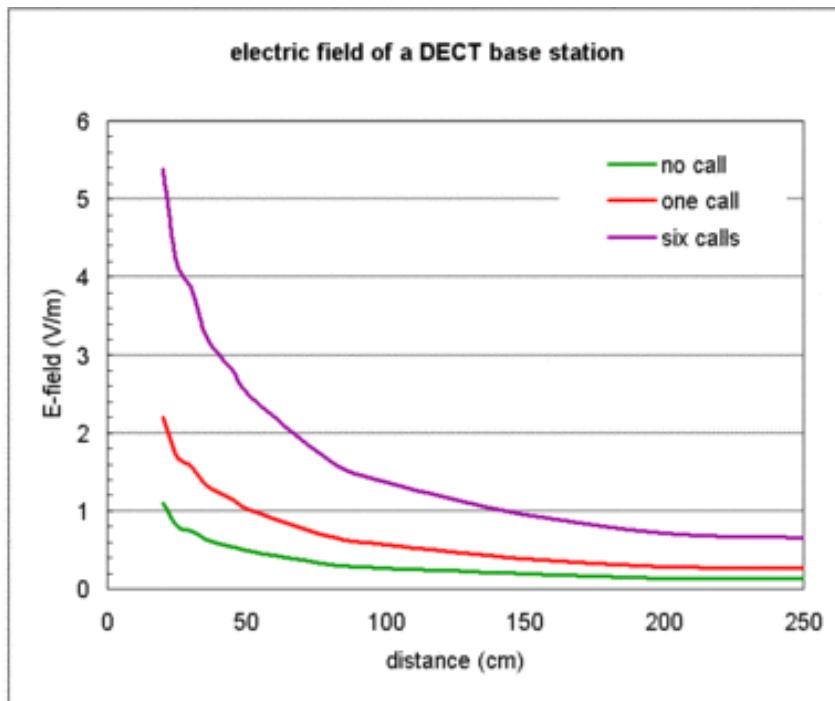


Figure 3: Electric field (E-field) over distance for different modes of operation [1]. The results are only shown for the base station for which the highest E-field values were measured.

The everyday exposure of various people to DECT telephones has been measured in various studies [3-6]. For those people who themselves own a DECT telephone, the DECT emission accounts for 25 - 50 % of the total exposure to high-frequency radiation. Exposure to DECT radiation has decreased in the last years due to the introduction of the low radiation DECT telephones [5].

### 3 Health effects

The limits for electromagnetic fields [2] are based on known, short-term effects of the radiation, such as heating of the tissue. The emissions from handsets and base stations are well below these limits. Accordingly, short-term health effects are not to be expected with the use of cordless telephone handsets or base stations.

The limits do not, however, cover possible long-term effects of electromagnetic radiation. Such long-term effects have been investigated in a number of epidemiological studies. Although these studies mainly focused on the health effects of mobile phone emissions, several studies also include emissions from DECT phone handsets. In this regard, a German study found no association between DECT phone use - even over a period of more than 5 years - and the occurrence of brain tumours [7]. In contrast, a recent Swedish study concluded that elevated risks of brain tumours are found in particular when DECT phones have been used for many years [8]. In 2011 based on studies that saw a possible connection between telephoning with a mobile phone or a cordless telephone and the occurrence of brain tumours, the International Agency for Research on Cancer (IARC) classified high-frequency electromagnetic fields as possibly carcinogenic (Group 2B) [9]. The overall data was found to be limited by the IARC, as these studies on brain tumours and mobile phones and DECT phones have



shortcomings in regard to the study design and the estimation of the length of exposure. A connection between exposure to mobile and DECT phones and other illnesses or symptoms could not be determined. The association between unspecific symptoms of ill-health and self-reported sleep disturbances with the use of DECT phones was also investigated in some epidemiological studies. In most of the epidemiological studies, no consistent association between subjective sleep quality and DECT phone use was found [10-12].

Interference to implants: According to a study, neither base stations nor handsets cause interference with pacemakers or defibrillators [13].

## 4 Legal regulations

DECT phones devices are subject to the Ordinance on Telecommunications Installations (FAV) [14], which sets out basic requirements for protecting the health and safety of persons who use or are exposed to radiation from telecommunications installations. These requirements are elaborated in Swiss-European standards. The limits specified in these standards correspond to those given in the [1999/519/EC: Council Recommendation of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields \(0 Hz to 300 GHz\) - Publications Office of the EU](http://data.europa.eu/eli/reco/1999/519/oi).

Manufacturers are responsible for ensuring that their appliances comply with the conformity criteria. In Switzerland, no authority checks whether DECT phones meet these standards ([23.4244 | Mobile phones emit more radiation than permitted. The time has come to check the NIR limits in Switzerland too! | Item of business | The Swiss Parliament](http://data.europa.eu/eli/reco/1999/519/oi) – available in German, French and Italian).

## 5 Literature

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## Contact

Federal Office of Public Health FOPH

[str@bag.admin.ch](mailto:str@bag.admin.ch)