

Buying an 'EMF safe' Property

This article is separated into 6 sections, each of which can be individually downloaded. It is a 'work in progress' incorporating new information whenever time permits.

Section 5

Mobile Phone base stations or masts

1. Introduction; The need for more housing and potential EMF effects; Powerfrequency EMF exposure sources; Radiofrequency EMF exposure sources; how microwaves reflect off building surfaces and into buildings; impact on property value; location maps; in the face of uncertainty, measure and take action if necessary; references
2. Powerlines and pylons; when are powerlines 'needed?'; an easement; a wayleave; references; equipment for measuring powerfrequency electric and magnetic fields; summary of safety points to do with powerlines; powerlines worksheet (2 sides)
3. Substations and transformers; junction boxes; net currents; stray currents; references; equipment for measuring powerfrequency electric and magnetic fields; summary of safety points to do with substations and transformers; substations and transformers worksheet (2 sides)
4. Electrified railways; overhead lines; third rail; diesel; references; summary of points to do with railway lines; equipment for measuring electric and magnetic fields; meters for measuring microwave radiation; electrified railways worksheet (1 side)
5. Mobile Phone base stations or masts; what base stations may look like, including hidden ones; effect on house prices; distance from the source where the microwave radiation meets the ground; drums; TETRA antennas; amateur radio operator's equipment; equipment for measuring microwave radiation; summary of safety points to do with mobile phone base stations; Mobile Phone Base Stations worksheet (2 sides)
6. EMFs inside buildings (including flats and caravans); wiring; electrical appliances; caravans; summary of safety points to do with your home, school, office, etc.; equipment for measuring electric and magnetic fields; equipment for measuring microwave radiation; EMFs inside buildings worksheet (2 sides)

Mobile Phone base stations or masts

At the end of 2011 there were about 52,500 radio base station sites in the UK according to the Mobile Operators Association (MOA). Because of community opposition to mobile phone masts, the mobile phone operators began to 'hide' the more common microcells inside other structures. This can be in church towers and steeples, disguised as a part of a building structure or, more concerningly, low places such as the price boards in Shell garages, or looking like burglar alarms or similar small boxes, attached to the sides of buildings (see below).

There have been newspaper articles to show that operators are fixing them to private houses on rainwater downpipes, or behind false burglar alarm boxes in return for a rental to the property owner of thousands of pounds. This may be hard to resist by those whose financial situations are difficult. If this is the case for the property you are interested in, it may be worth checking that the agreement ceases with a change of property ownership. Otherwise, if you wish to have the base station removed, there may be financial penalties for cancelling a contract entered into by the previous owner.

The number of mobile phone base stations is growing all the time. Buying a property that is *not* near a mobile phone base station of some sort is getting harder. It may be worth plotting all the masts within about 10 miles of a proposed house purchase.

If an operator network mast is missing within that distance, or the coverage is poor for a particular operator, then it is likely they will want to put a base station somewhere around to improve the situation, especially if there is a significant amount of population within the area with poor cover. All operators are trying to cover 'A' roads, so the cover situation is worth checking if the property is near an 'A' road. Small side roads that carry light traffic are a very low priority for fill-in coverage.

A house that is detached (to avoid neighbours' DECT & WiFi, though these can extend some distance, and the RF exposure from them detectable only with a meter) may be preferable. The house could be situated not too high up in the surrounding geography, so that as far as possible, microwave radiation from the RF source goes over the top of the property.

Mobile phone companies do not have to apply to upgrade their equipment on existing masts. The government agreed that they can include GSM, 3G, 4G, WiMax and anything else their handsets can cope with. It is not just basic coverage that is needed, though. With increasing demand for music and films and all sorts of apps providing information wirelessly, the need for more base station equipment to service the increasing call traffic is necessary.

According to the organisation which advises the government, Public Health England, microwaves are not dangerous if they do not have enough power to heat you, and so they set a high limit on public exposure known as the ICNIRP guideline. Some other European countries do not go along with this and many have now set far lower precautionary levels for the mobile phone operators to work within, which they do in Europe.

Many very eminent scientists across the world believe that there are biological effects, leading to adverse health effects on people, animals and plants at far lower levels of microwaves than the high ICNIRP limit. Khurana (2010) stated *"We found that eight of the 10 studies reported increased prevalence of adverse neurobehavioral symptoms or cancer in populations living at distances of less than 500 metres from base stations. None of the studies reported exposure above accepted international guidelines, suggesting that current guidelines may be inadequate in protecting the health of human populations."* People living near masts report disturbed sleep, headaches, blood pressure problems and heart arrhythmias, skin problems, memory and concentration problems, mood disturbances,

nosebleeds, increase in the number and / or severity of epileptic fits and other even more serious effects, including cancer. Very little research has been, or is being, done in this country, and internationally, on the sort of pulsing microwave emissions that people are exposed to from such masts. There is sufficient evidence to believe that they may affect health at least in a proportion of the population, and until research evidence is available, we feel that people may choose to take appropriate precautions, depending on how much belief they have in the risk of health problems. For further details of the current state of research, see 'Radiofrequency EMFs and health risks' in [the article library](#).

Lattice structures covered with antennas and dishes are not aesthetically pleasing, and are the most visually intrusive. As far as microwave radiation is concerned, low height high-power masts are responsible for higher levels of RF exposure to the general population than the ugly, but high ones. Slim monopole masts usually blend in better, looking not too unlike high lampposts, but these structures can't easily be shared.



Mast with more than one operator



Mast on existing structure



Monopole mast

Different Planning Authorities do not co-ordinate planning consent applications. If you live on the boundary between two District Councils you may find that an application for a mobile phone base station is being considered by the Council next to yours. If consent is given by the adjacent authority, the mast could be made available to other companies to share the site, the mast or the equipment, which may result in your being exposed to high levels of EMFs.

Some mobile phone antennas attached to the side of buildings are painted to look unobtrusive, some are intended to blend into the landscape (see below). Field levels inside buildings, on the other side of the wall to which the antenna is fixed, could be high. Across the road, the fields could be *very* high depending on the power of the transmitter.



2 mobile phone masts in Dublin

Microcell antennas are a lot smaller than macrocell antennas and can often be disguised as building features.

Effect on house prices

There are an increasing number of people reporting that their house has become unsellable due to being near a very ugly mast. *"We tried to sell and everyone who came around would see what a lovely home we had and then see the mast so close to us and just leave,"* said one potential seller. The estate agent told them the mast would prevent them from selling their house at anything like the £189,000 it had been valued at. *"She said that if we had wanted a quick sale, we would have had to take our asking price down by £70,000-£80,000."* The house remains unsold 4 years later. Another person was told that a mobile phone mast had wiped £50,000 off the value of her £440,000 house. *"I'm stuck,"* she says. *"My neighbours are horrified too. One couple only moved in six months ago and they've got two small children. They wouldn't have bought the house if they'd known."* The estate agent said: *"I regret to inform you that due to the erection of the mobile phone mast and its proximity-to your property, we will need to revise the asking price of your property to around £380,000-£390,000. Our experience shows that mobile phone masts have an adverse effect on potential purchasers."*

A question was asked in the House of Commons about what considerations would be given to the effect on house prices of telecommunications planning decisions; the response was *"In respect of potential impacts of proposed telecommunications development on property values, PPG 1 notes that it is not for the planning system to protect the private interests of one person against the activities of another. Although in a particular case considerations of public interest may serve to protect private interests, the material question is not whether a particular development would cause financial or other loss to owners and occupiers of the neighbouring property, but whether the proposal would have a detrimental effect on the locality generally, and on amenities that ought, in the public interest, to be protected"*. We have been repeatedly told that having a good mobile phone signal is a positive selling point for a house and that this amenity was in the public interest!

The Royal Institution of Chartered Surveyors (RICS) included in their March 2016 survey report:

"13.0.0 ELECTRO-MAGNETIC FIELDS

You should be aware that unresolved medical controversy exists concerning the effect on health of electro-magnetic fields generated by overhead power lines, electricity sub-stations, and mobile phone masts. Public awareness of this issue could have an effect on future saleability and value which could be substantial if a link with ill health is proved."

Lloyds of London underwriters have added a clause to their policies excluding claims for injuries/medical conditions that can be proven to have been caused by electromagnetic radiation which includes microwaves from towers, Wi-Fi etc.

Distance from the source where the microwave radiation meets the ground

The main microwave beam from an antenna radiates sideways in a similar way to a lighthouse beam. It will probably reach ground level between 80 and 250 metres away, depending on how the antennas are tilted and whether the land is level or hilly and whether buildings are in the way. The upper floor of a building will be in the beam closer than the lower floors (Unless the building is higher than the antenna). Some localised 'hotspots' of high radiation are detectable a lot nearer to the mast than the 80 metres distance suggested for the main beam. This is because antenna design is imperfect, and some energy is lost sideways and below.

In fact, the amount of radiation reaching any property depends on what is surrounding it. Most materials reduce microwaves, though not by very much. They can also be reflected by most materials. Microwaves travel through windows easily, but are reduced by other building materials. It is impossible to calculate exactly what the radiation at any place will be. The only way to know for certain is to measure the field, see the instrument on page 5.

Drums



Drums, Large (A), Medium (B), Small (C)

Dishes, or drums, have very focused beams and are used only for communication between one base station and another. There is negligible radiation from these, though some people are sensitive even to these low levels.

If you are looking to move into a new area, do not forget to check for base stations near schools, nurseries, workplaces, etc. It is believed internationally that children are more likely to be affected by microwave radiation than adults; and people who have poor immune systems or those who suffer from a chronic health problem, or who are recovering from a serious illness are also likely to be vulnerable.

Most WiMAX antennas (WiMAX gives WiFi coverage to people on the move) will be mounted on existing mobile phone masts in order to keep the cost down. It is not generally installed in very rural areas as there will not be enough users to justify the cost.

Following the 2000 Stewart Report, the Radiocommunications Agency, which became Ofcom, set up a website in which the location and power of mobile phone base stations could be made available to the general public (www.sitefinder.ofcom.org.uk/). Unfortunately, due to a legal dispute the sitefinder site is becoming increasingly inaccurate and we understand it has not been updated by all of the operators since the beginning of 2007. You may want to check your area for masts before relying on the information it displays.

The masts for the TETRA system used by the Police and possibly some of the other emergency services, are not all shown on the sitefinder website, nor are local radio amateurs, or private radio systems, such as those used by taxi firms. The Ofcom website used to be updated every 3 months approximately, so a mast which had only just been integrated into the national network, or was only proposed, would not be on the site. The information on the Ofcom website depends on the accuracy of the information given to them by the mobile phone operators. The easy to use instruments listed below will pick up microwave fields from all microwave sources, so you have a good idea of what is, or would be, surrounding you.



TETRA antennas



Amateur radio operator's equipment

The base stations take their power from a small transformer usually situated near the foot of the mast. This will give off powerfrequency EMFs which may affect a property if situated very close. The EMFs from the transformer and its associated underground cables can be detected using the EMFields ELF or the MagneMeter, details of which can be found on [the EMFields website](#). The potential biological effect of passing through high transient fields has not been extensively studied, but some research shows that it may affect people who are vulnerable.

References:

Khurana VG et al 2010 – *Epidemiological evidence for a health risk from mobile phone base stations* Int J Occup Environ health 16(3):263-7 PMID: 20662418

Equipment for measuring microwave radiation



Acoustimeter



Acousticom 2

You can buy an Acoustimeter or an Acousticom 2 microwave monitor to check the field levels from mobile phone base station masts, WiFi or WiMAX systems near your property or the property you are considering buying, outside in the garden, and in other places of concern (schools, nurseries, workplaces, etc.). You can also measure fields from mobile phones, DECT phones, baby monitors, cars, wireless computer networks, microwave ovens and some burglar alarm systems.

They change amplitude modulated radiofrequency signals into audible sound (including the *pulsing* signals from mobile phone base stations) and also gives peak readings on LED scales. The Acoustimeter also gives average readings and a digital readout. It is easy to detect 'hot spots' of radiation that you can then avoid or screen against them.

The meters are easy-to-use, hand-held and arrive complete with instructions for use. They come in a lightweight carry pouch. They are intended for the non-scientist who needs to have no understanding of the physics or technology involved, in order to use them. See the EMFields website www.emfields-solutions.com.

Instruments are sent out by 1st class recorded delivery.

Summary of safety points to do with mobile phone base stations

- Look around your proposed purchase to see any obvious mast structures.
- Your exposure is likely to be worse if you are anywhere with a good clear view into the distance from the house windows, unless you are looking out to sea or into very wild areas with few people in them. The more trees in the area around the house, the lower your exposure will be as trees, especially evergreen trees can form an effective screen.
- Check the Ofcom website www.sitefinder.ofcom.org.uk/ to see if there are any hidden base stations (on the side of buildings, in church steeples or towers, looking like 'trees', or in the structure of other buildings).
- Check how close you are to the next District Council, as it may give planning permission for a mast that will radiate the property you may be interested in.
- Measure the microwave field levels in and around your proposed purchase, to check for the existence of 'hidden' or disguised base stations. Measure local schools and nurseries that your children are likely to attend.
- Check power frequency fields if there is a transformer feeding a base station next to the property you are interested in.
- If you decide to buy a house near a mobile phone base station, check the inside field levels with the Acoustimeter or Acousticom 2 to check that your beds and commonly used areas are in fields of low exposure.
- Future research findings may make a property near a mobile phone base station harder to sell.

Mobile Phone Base Stations (2 sides)

Is there a visible mast near to the property? Yes / No

According to the website www.sitefinder.ofcom.org.uk/ is there a mast near you? (this may not be very accurate, now, but it's still some sort of a guide) Yes / No

What is mobile phone reception like? Good / poor

Does this apply to *all* networks? Yes / No

Is the reception appropriate for the local population density? Yes / No
If 'No' the erection of further masts may be planned

Is there a TETRA mast or local radio transmitter? These will not all be listed on the sitefinder website Yes / No

Are you on the boundary of two (or more) District Councils? Yes / No

Is a base station visible from bedroom windows? Yes / No

Is there a transformer unit next to the house? Yes / No

Electric field levels at the closest point of the house (or garden) V/m

Magnetic field levels at the closest point of the house (or garden) microtesla

You will need an [EMFields ELF meter](#) or [MagneMeter](#) to measure these.

Measure the microwave field levels

Garden play area volts per metre

In the bedroom(s) (1)centre pillow

(2)centre pillow

(3)centre pillow

In the sitting room / lounge / play room volts per metre

Conservatory or patio volts per metre

You might find radiofrequency microwave radiation coming into the house from a neighbour. This could be due to a DECT phone or phones or a WiFi computer system. There could be a WiMAX source nearby. WiMAX offers access to the internet for people's wirelessly enabled laptops, whilst they are away from their home or office. WiMAX equipment is being installed in most towns and cities.

Is there an 'A' road nearby? Yes / No

Do any RF field levels get higher the closer you are to a party wall? Yes / No

Can you detect RF levels without a visible source? Yes / No

Find out about shielding materials if the base station is visible, or you get high RF signals, and you decide to proceed with the purchase. Materials are available from:

EMFields, 12, Mepal Road, Sutton, Ely. CB6 2PZ

Tel: 01353 778814

Measure the microwave field levels if there is a base station on or near the school or nursery your child(ren) may be attending

How far away is the mast? (be as accurate as you can) metres
Height of base station metres
Power of base station dBW

Could the school or nursery be in the main beam? Yes / No

If practicable, check for hotspots. Are there any? Yes / No

If so, where?

Maximum microwave field levels measured near the school and playing areas. Remember that taking measurements on school property (including school grounds) needs the permission of the headteacher

..... place volts per metre

Schools may have WiFi equipment or whiteboards with multiple laptop user facilities. These may also generate hotspots of RF radiation within the classroom. You may want to check for these (with the school's permission).

Classroom hotspots